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A Study on a New Tabulation of Forward Pion-Nucleon Scattering Amplitudes

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Following an exhaustive discussion on the treatment of the errors affecting πN-scattering experimental data, a new tabulation of forward scattering amplitudes and total cross sections is presented.

Faz-se uma discussão exaustiva do tratamento dos erros que afetam os dados experimentais do espalhamento πN. Apresentam-se novas tabelas das amplitudes de espalhamento para a frente e das seções de choque totais.

1. Introduction

Forward pion-nucleon scattering amplitudes have become a tool of primary importance in most theoretical calculations involving a phenomenological approach to strong interactions. One of the main reasons (if not the prominent one) is the extensive amount of accurate experimental information available about pion-nucleon total cross sections. From these data, through forward dispersion relations, a reliable determination of the for. ward real parts, and hence of the whole forward amplitude, can be accomplished. Although collections of total cross-section data[1] and Tables of the complete amplitudes[2,3] are already available, I think it useful to provide a new selection of the former, and a further calculation of the latter, based on a criterion of handling the data that is somewhat different from what has been so far customarily done in this field. With respect to the existing work on this subject, this paper presents a new feature insofar as it contains an exhaustive discussion on the treatment of the errors affecting the experimental data. Indeed, in too many theoretical papers such errors are handled superficially or, sometimes, even ignored.

So far, the importance of an adequate error treatment has been emphasized in a few papers dealing with the fitting of finite-energy sum rules and

high-energy total cross sections[4-6](*); however, to my knowledge, no list of pion-nucleon real parts carrying error indications has ever been issued. The necessity that all numerical outputs of theoretical investigations based on experimental data carry a meaningful set of errors is, in my opinion, hardly enough emphasized. This work may, in a sense, help people to orient their effort in such a direction, more by showing the guidelines of a correct reasoning than by supplying a ready-to-use set of numbers to be plugged acritically into a computer.

Furthermore, in the course of this work, I devoted a particular attention to some problems of data consistency met in the very-low-energy range (at threshold, and immediately above). Indeed, the study of the threshold region is intimately tied with dispersion relations, which represent the only effective means of investigation in this energy range. I intend to perform a more thorough study of this problem in a forthcoming paper, where the data collected here will be used to carry out an investigation (based on an idea previously outlined by G. Violini and myself[7]) that exploits a (nonlinear) dispersion relation on the square of the forward scattering amplitude. The "preliminary" work made in this paper can, at the same time, outline the interesting features of the problem and serve as a basis for the proposed future developments.

It is obvious that, in the course of the discussion, my analysis of the data will partially overlap the similar analyses already existing in this field. (In particular, I will often refer to the work by Hohler and collaborators[3,8-11]). I would emphasize that this work should not be considered as a *review* or a *compilation* on pion-nucleon forward scattering in the sense that is currently attributed to these words. This is indeed a particular, and, in a sense, personal selection and elaboration of data, intended to serve a specific purpose, namely, to put the theoreticians in the condition to evaluate the accuracy (in a way as exhaustive as possible) of the result of a calculation involving an integration of the real and/or imaginary parts of the forward πN scattering amplitudes over the whole energy range or a sizable part of it. Such a kind of calculation occurs frequently in high-energy phenomenology: the real parts themselves provide a relevant example, exhaustively discussed in this work. Other examples are provided. e.g., by the various types of sum rules.

(*)The present work can be, in a sense, identified with the paper announced in Ref. 4. footnote 14, which was never issued. However, the data reported here are somewhat different from those used in Ref. 4 and in other similar calculations made at that time, because in the meantime our knowledge about total πN cross sections has improved.

2. The Treatment of the Errors of the Experimental Data

As I stated already, the crucial point of my analysis consists in the attempt to find a satisfactory treatment of the errors. It is well known that in principle each measurement carries errors of two kinds: statistical errors (which can have either sign, and are mainly generated by counting statistics) and systematic errors, which can be due to various causes and cannot be determined but only estimated. (The estimates reported in the experimental paper should have the meaning of maximum errors). A characteristic feature of systematic errors is that they are expected to have the same sign and, to a minor extent, the same magnitude, for different experimental points measured in similar conditions.

For most of the experimental data (total cross sections) used as input in this paper, usually a single experiment provides a rather large set of points covering a wide energy region, with a high point-to-point precision (small statistical errors) and with larger systematic errors; the latter generally account for the discrepancies occuring between sets of data coming from different experiments and covering overlapping energy regions. In such a situation, I think that the analysis should treat statistical and systematic errors separately. Statistical errors can be plugged into a propagation formula of the standard type; systematic errors should not, in order not to destroy the "constant-sign requirement" (at least over a sizable set of neighbouring experimental points) which represents their typical feature. [In order to keep separate the errors of different kind, I shall reconstruct them in the cases when the experimentalists instead report the quadratic combination of the statistical and systematic error (henceforth called combined error) in their papers]. Furthermore, systematic errors should be better given in pairs, because those on the positive side and those on the negative side might not be necessarily equal. I shall call *positive* and *negative* systematic errors those which must be added to or subtracted from the central value, respectively.

Once the separation of errors has been accomplished for the input data, there is the problem of how to find the corresponding errors in the output data (in my case, on the real parts). From what has been stated above, it follows that the statistical errors on the output should be determined only by the statistical errors in the input (however small the latter can be) and the same should hold for the systematic effects. For the statistical errors, I shall use the standard propagation formula. For the evaluation of the systematic errors affecting the output, the solution is not so straightforward. In the case of a calculation where the cross sections are to be multiplied

by a positive weight function (such as for certain finite-energy sum rules) a simple method, which stems from the interpretation of the systematic errors as maximum errors, consists in repeating the calculation with the input data varied by the amount of the positive and negative systematic errors respectively(*). The differences between the results of these calculations and the original result can be assumed as reasonable estimates of the systematic errors affecting the latter, again interpretable as maximum errors. However, in the present case, the weight function changes sign, so that the application of the above method produces cancellations between contributions from the systematic errors in different energy regions, and the resulting *positive* or *negative* systematic errors may turn out to be very small, or even to have a minus sign (this means that, by increasing all values of the input data, the output value decreases, and/or viceversa). Certainly, a systematic error obtained in this way cannot have the meaning of a maximum error. Nevertheless, in my opinion, this is still the procedure to be followed whenever the obtained real parts are to be inserted into an integral where also the input cross sections occur. Such is the case of all the so-called "nonlinear dispersion relations" (NLDR), i.e., complicated integral relations linking real and imaginary parts of the scattering amplitudes: one example has been presented in Ref. 7, and other proposal can be found in the literature[12]. On the other hand, whenever the real parts are used by themselves, it will be necessary to estimate the magnitude of the maximum systematic uncertainty on the latter, compatibly with the constant-sign requirement for the systematic errors on all input data coming from the same experiment. A reasonable prescription for the evaluation of such maximum systematic errors is described in Appendix III.

The correlation to be kept in NLDR between the systematic errors on the imaginary and real parts is important because, for favourable combinations of these two quantities, further cancellations of the systematic effects can arise, leading to an improved accuracy of the resul(**). Other error correlations (e.g., between the statistical errors of the real parts at differerit energies) are of minor weight, and show difficulties for a correct handling.

(*)I am indebted to G. Giacomelli for stressing this point to me.

(**)In order to handle this correlation, I have stuck to the criterion of maximizing the systematic errors on the input cross section and by taking the errors on the real parts that come out from the calculation. However, one could "distribute" differently the signs of the systematic errors for the various experimental sets of input data and find a different correlated-error set. For most NLDR, I am convinced that when one takes imaginary and real parts together such different possible choices are equivalent, in the sense that the effective cancellation between the various error contributions should stay substantially unchaged, if one is not striving for a meaningless accuracy of the estimate of this effect.

Therefore, the most reasonable thing to do is still to treat all errors as independent of each other, apart from the cases previously discussed.

3. The Collection of Total Cross-Section Data

In collecting the cross-section data that I used as input for the calculation of the real parts, I did not attempt a thorough comparative analysis of a large number of available experimental results (as can be found, e.g., in Ref. 1). I have rather followed the procedure usually adopted in all kinds of phenomenological analysis: namely, I have selected a particular set of accurate experiments, covering large, adjacent, energy regions. The choice of a particular set of data is, in this work, less arbitrary than it might seem at first sight: indeed, the data reported here are to be always considered *together* with their errors, and, as a matter of fact, the results of the experiments I have not utilized are generally consistent with the values reported here within such errors.

The data have been taken from the following sources:

i) In the low-energy region ($\nu \leq 490$ MeV), I have used mainly the results from a rather recent experiment performed at CERN by a Cavendish – Rutherford collaboration[13]. For the energies below $T = 70$ MeV,(*) not covered by this experiment, I have referred to the CERN phase-shift analysis[14], and also to some directly measured data reported in Ref. 1. For T below 21.5 MeV, where neither direct measurements nor phase shifts are available, I have derived the cross sections together with the real parts, as explained in Sec. 6.

ii) In the energy region between $\nu = 0.49$ GeV and $\nu = 6$ GeV, I have used the data by Carter et *al.*[15] and by Citron et *al.*[16].

iii) In the high-energy region ($\nu > 6$ GeV), I have essentially based my analysis on the Brookhaven[17] and Serpukhov[18,19] most recent measurements, supplemented with a few elementary theoretical considerations based on Regge-pole theory; in this way, I could also obtain a hint on how to estimate the cross-section behaviour in the region where no measurements are yet available ($\nu > 65$ GeV).

(*)ν indicates the pion lab. total energy, T the pion lab. kinetic energy.

The collected cross sections can be found in Tables 1 and 2. I have taken account of the fact that in most theoretical applications there are not the amplitudes for $\pi^+ p$ scattering that are needed, but rather their sum and their difference which have a definite parity (even and odd respectively) under crossing. Therefore I have devoted a particular attention to these quantities and given separate Tables for them.

Appendix I will display a few details about my cross-section collection. However, at this point, let me add some remarks concerning the major problems that I have faced in the course of the above work.

In all calculations involving a dispersion-relation-type approach, it is essential that the behaviour of the input data be smooth. Indeed, the principal-value integration contained in a dispersion relation enhances any discontinuity of the input trend and may give a completely distorted output unless all such "artificial" discontinuities are eliminated in some way. The customary solution to such a problem has been the assumption of a suitable smooth parametrization of the input data (for example, a Breit-Wigner formula for the cross section in an energy region dominated by a resonance). However, in this way it is difficult to achieve a satisfactory treatment of the errors.

I have therefore retained my input under the form of a set of experimental points (each consisting of a "central value" and of the associated errors already introduced), which however have been "smoothed out" in order to make all artificial discontinuities disappear.(*) Details on the smoothing procedure are reported in Appendix I. Due to the good quality of the experimental points I have used, my sets of smoothed-out data reproduce the sets of the original data quite well, as far as both the central values and the errors are concerned.

The above statement is only partly true in the high-energy region ($6\,\mathrm{GeV} \leq \nu \leq 65\,\mathrm{GeV}$, covered by the experiments described in Ref. 17-19), where the experimental data are of poorer quality than those at the lower energies, and, as far as Ref. 17 is concerned, the errors are likely to have been underestimated. In practice, the problem of data handling in this energy region is entangled with that of "guessing" the cross-section behaviour beyond 65 GeV. Unfortunately, the theoretical pattern about the

(*)Iaimed at a criterion of smoothness, although in a much looser form, alço for the systematic errors, for which I assumed roughly interpolated values at the junctions between different experiments (cf. Appendix I).

asymptotic region is much more confusing today than it was a few years ago, when a few dominant Regge poles seemed to provide a satisfactory asymptotic description of all total cross sections.

This point will be discussed in Appendix II, where I shall explain how I have determined the parameters of the effective Regge trajectories needed in my case.

Obviously, my choice has been an empirical one, which certainly cannot be expected to represent a satisfactory solution to the asymptotic problem, for which exhaustive analyses performed with that specific aim have failed to give a definite answer.

I conclude this Section fixing the notation. By considering the total cross sections o for the moment, I shall denote $\sigma(\pi' p)$ by $\sigma_{\pm}$, and $\sigma(\pi^- p) \pm$ $\pm \sigma(\pi^+ p)$ by $\sigma^{(\pm)}$ (without the factor 1/2 often introduced in the literature). A statistical error will be denoted by do and a positive or negative systematic error by $\Delta^{\pm}\sigma$.

The standard way of combining the errors on σ_+ and σ_- in order to obtain those on $\sigma^{(\pm)}$ is the following(*):

$$d\sigma^{(+)} = d\sigma^{(-)} = [(d\sigma_+)^2 + (\mathrm{do}-)^2]^{1/2} \tag{1}$$

and(**)

$$\Delta^{\pm}\sigma^{(+)} = \Delta^{\pm}\sigma_+ + \Delta^{\pm}\sigma_- . \tag{2}$$

Instead one has

$$\Delta^{\pm}\sigma^{(-)} = \Delta^{\pm}\sigma_- + \Delta^{\mp}\sigma_+ . \tag{3}$$

These criteria hold only if the errors on the cross sections can be considered as independent of each other.

An analogous notation will be used for the real parts, henceforth denoted by the simbol D.

(*)Formulae analogous to (1), (2) and (3) (with extra factors of 1/2) can be used in those instances where the quantities relevant to $\pi^{\pm} p$ scattering are not the primitive ones, but must be deduced as linear combinations from the crossing-odd and -even quantities. This happens for the low-energy cross sections derived in Sect. 6 and for the real parts.

(**)The criteria of combination of the systematic errors reflect the character of maximum errors which is attributed to them.

4. The Calculation of the Real Parts

As repeatedly stated, the real parts of the forward amplitudes will be calculated by means of forward dispersion relations. As is currently done for reasons of convenience, the amplitudes considered for the dispersive treatment will be those even and odd under crossing: therefore I shall obtain $D^{(\pm)}$ as primary output, and then derive $D_{\pm}$ as linear combinations. I shall use the data collected in Table 2 as input and build up the errors of the real parts from the corresponding errors on the cross sections, as previously explained (see also Appendix III).

It is common knowledge that the dispersion relation for the crossing-symmetric amplitude requires one subtraction, which is customarily made at threshold ($\nu = \mu$, μ = pion mass)(*). Instead, the dispersion relation for the antisymmetric amplitude can be written without subtractions. The relevant formulae are (the hyphen on the integration symbol indicates principal-value integration):

$$D^{(+)}(\nu) = D^{(+)}(\mu) + \frac{4f^2 \nu_B p^2}{(\nu^2 - \nu_B^2)(\mu^2 - \nu_B^2)} + \frac{p^2}{2\pi^2} \int_{\mu}^{\infty} \frac{d\nu' \nu' \sigma^{(+)}(\nu')}{p'(\nu'^2 - \nu^2)}, \qquad (4)$$

$$D^{(-)}(\nu) = \frac{4f^2\nu}{\nu^2 - \nu_B^2} + \frac{\nu}{2\pi^2} \int_{\mu}^{\infty} \frac{d\nu' p' \sigma^{(-)}(\nu')}{\nu'^2 - \nu^2}. \qquad (5)$$

Here $\nu_B = \mu^2/2M$ (M = nucleon mass), f^2 is the pion-nucleon renormalized coupling constant, and the threshold value $D^{(+)}(\mu)$ is to be supplied as an input parameter. The integral appearing in Eq. (4) can be conveniently rewritten in terms of the variable p':

$$\int_{\mu}^{\infty} d\nu' \ldots \rightarrow \int_{0}^{\infty} \frac{dp' \sigma^{(+)}(p')}{p'^2 - p^2}. \qquad (6)$$

I shall denote the part proportional to f^2 in an unsubtructed dispersion relation by $B(\nu)$, since this expression is currently known as the Born *term*(**).

(*)Let me recall that ν (= laboratory pion energy) is the most convenient variable in which forward dispersion relations can be written. Other symbols I shall use are: $p = (\nu^2 - \mu^2)^{1/2}$, the incident momentum; $T = \nu - \mu$, the incident kinetic energy. I shall use $\hbar = c = 1$ throughout

(**)From Eq. (5) it is apparent that $B^{(-)}(\nu) = 4f^2\nu(\nu^2 - \nu_B^2)^{-1}$ In Eq. (4), instead, the term containing f^2 is actually $B^{(+)}(\nu) - B^{(+)}(\mu)$; it is easy to see that $B^{(+)}(\nu) = -4f^2\nu_B(\nu^2 - \nu_B^2)^{-1}$.

In many applications, it is convenient or even necessary to consider amplitudes where the Born term has been subtracted out(*). Let me call D_F the real parts after subtraction of the Born term ($D_F = D - B$; the subscript F means "finite", i.e., without the singular pole term). With this notation, Eqs. (4) and (5) can be rewritten as follows [I shall also make the substitution (6)]:

$$D_F^{(+)}(\nu) = D_F^{(+)}(\mu) + \frac{p^2}{2\pi^2} \int_0^\infty \frac{dp' \sigma^{(+)}(p')}{p'^2 - p^2}, \tag{7}$$

$$D_F^{(-)}(\nu) = \frac{\nu}{2\pi^2} \int_\mu^\infty \frac{dv' p' \sigma^{(-)}(\nu')}{\nu'^2 - \nu^2}. \tag{8}$$

It is immediately seen that $D_F^{(-)}(\nu)$ and $D_{FS}^{(+)}(\nu) = D_F^{(+)}(\nu) - D_F^{(+)}(\mu)$ [the subscript S means "subtracted" (at threshold)] are the quantities most directly related to the experimental input, because they do not require the knowledge of the extra parameters f^2 and $D^{(+)}(\mu)$. For these quantities, a tabulation complete with errors can be obtained straightforwardly. In view of the interest presented by the Born-term-subtracted real parts, Table 3 contains a list of $D_F^{(-)}(\nu)/\nu$ and $D_{FS}^{(+)}(\nu)$ in the full energy range, including also the so-called "unphysical region" ($0 \leq \nu < \mu$) where these quantities are perfectly defined(**). It is well known[10] that at the point $\nu = \mu$, which separates the unphysical from the physical region, D_F exhibits a characteristic cusp-like behaviour, which will be "scanned" in the Tables and discussed again in Sec. 6. Of course, such a behaviour will be found also in the complete real parts D.

As far as the calculation of $D^{(\pm)}$ (and $D_\pm$) is concerned, one has to consider also the extra parameters f^2 and $D^{(+)}(\mu)$, and to discuss the meaning of their assumed values and their errors. Indeed, these parameters cannot be determined directly from experiment, but a certain amount of theoretical analysis is needed for their evaluation; as a matter of fact, the main ingredients of such an analysis are the dispersion relations themselves. Thus consistency problems arise; they involve also the energy region immediately above threshold (which is again practically unaccessible to

(*)The interest of such "Born term-subtracted amplitudes" has been emphasized in several works of the Karlsruhe group [see, e.g., Ref. (10)], and also in Ref. (7).

(**)For the tabulation, I found it convenient to divide out Eq. (8) by ν, since the quantity $D_F^{(-)}/\nu$ is finite for all values of ν and its nonvanishing value at $\nu = 0$ might be of interest in certain theoretical applications. A similar convenient factor by which to divide out Eq. (7) does not exist.

experiment). The discussion of this subject is rather complex and cannot be carried out extensively in this work. In Sections 5 and 6, I will give a preliminary treatment of this matter, by postponing a deeper study to a forthcoming paper. Thus I will be able to produce the set of the complete real parts $D^{(\pm)}$, $D_{\pm}$ which will be listed (with their errors) in Tables 4 to 7, together with the corresponding imaginary parts straightforwardly deduced from the cross sections. These Tables will cover the physical region only ($\nu > p$); indeed, in the unphysical region, the Born term exhibits a pole at $\nu = \nu_{\mu}$ which causes very strong variations on D (whereas D_F behaves as a smooth function, apart from the cusp at $\nu = \mu$).

The problem of smoothness should be in principle solved for the real parts by the smoothness of the input data. However, one should be wary that the numerical handling of the input data does not introduce sizable distorsions of the output values. (This worry cannot be got rid of when dealing with a principal-value integration). I have tried to ensure that my output data be not biased by such effects: in Appendix III, I shall discuss this aspect of the calculation, which is not so apparent, but nonetheless important.

This work contains also a Section (Sec. 7) dealing with the comparison of the calculated real parts with experiment. In line of principle, such a check should test the validity of the causality principle on which the dispersion relations are based. Alternatively, by accepting the causality principle and therefore the validity of dispersion relations, one could (as extensively discussed in Ref. 20) get interesting infarmation about the asymptotic behaviour of the amplitudes. Unfortunately, it will be seen that the experimental accuracy needed for such tests is beyond the level presently available. However, the discussion made in Sec. 7 can cast light on what should be the further experimental work necessary in order to clarify this matter.

5. The Low-Energy Parameters and the Energy Region Immediately Above Threshold

As explained in Appendix I, experimental data (either measured directly or expressed through a set of phase shifts) are not available below a certain energy (of the order of $T \sim 20$ MeV), where experimental difficulties become increasingly large and, furthermore, the problem of deducing the "true" strong-interaction amplitude presents difficulties of a fundamental

character(*). Indeed, the very concepts (such as charge independence) underlying strong-interaction physics and, in particular, phase-shift analysis, break down completely at incident kinetic energies comparable with the mass differences within the isotopic multiplets. Therefore the values of the cross sections to be inserted in the dispersive integrals for energies immediately above threshold should be considered quantities to be determined through theoretical analysis rather than experimental work. And, for this analysis, the dispersion relations themselves provide the most effective tool.

So far the theoreticians' attention in this respect has been focused only on the threshold value of the energy, where both real parts and total cross sections are described in terms of a single real parameter for each amplitude – the scattering length a. As a matter of fact, a number of scattering-length determinations, based either directly on dispersion relations[8,21] or on some extrapolation technique from the data at higher energies[22] can be found in the literature of the last ten years. The dispersive approach yields also the value of the coupling constant f^2.

However, because of the structure of dispersion relations and the poor quality of the data available at low energies, only a (more or less restricted) range of values where f^2 and the scattering lengths lie has been determined with a high confidence level; within this range, instead, the various determination disagree with each other (even though some of them are given with very small errors), so that the task of further improving the accuracy of these data seems to delude even the most serious attempts.

By taking the scattering lengths even and odd under crossing, $a^{(+)}$ and $a^{(-)}$, as independent quantities(**), the larger uncertainty occurs for $a^{(+)}$, which is known to be small and consistent with zero, but of which even the sign is unknown although the measurements performed on mesic atoms seem to favour a small negative value[23](***). Instead, $a^{(-)}$ can be given a more reliable evaluation because the unsubtracted dispersion

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(*)As a matter of fact, the analysis by Hohler and Strauss[g] indicates that the Coulomb-correction evaluation is likely to need a refinement also in the energy range spanned in Ref. 13 ($T \gtrsim 70$ MeV), although the experimentalists have devoted particular care to this problem.

(**)In terms of the isospin scattering lengths a_1 and a_3, one has $a^{(+)} = \frac{2}{3}(a_1 + 2a_3)$, $a^{(-)} = \frac{2}{3}(a_1 - a_3)$ showing again an extra factor of 2 with respect to the notation used in most analyses on the matter.

(***)Mesic atoms can also give the possibility of a direct scattering-length measurement, for which experiments are being performed (T. Ericson, A. Zavattini, private communications).

relation (5), calculated at threshold, expresses directly $a^{(-)}$ as a function of f^2 and of the total cross sections measured at all energies. Strictly speaking, also $\sigma^{(-)}(\nu')$, at threshold and immediately above it, should be considered as a function of $a^{(-)}$; however, the portion of the integral covering the region where the cross sections are not known experimentally has little weight on the final result, and the uncertainty on $a^{(-)}$ comes essentially from the uncertainty on f^2. On the contrary, Eq. (4) cannot provide a similar constraint for $a^{(+)}$ because the subtraction procedure requires the introduction of one more input parameter, which is most conveniently identified with $a^{(+)}$ itself.

The $a^{(-)} - f^2$ correlation provided by dispersion relations has been already discussed by Hohler and Strauss[9] (henceforth referred to as HS). In the present paper, I will consider this problem again, by trying to improve the error treatment and by taking account also of the scattering-length dependente of the very-low-energy cross sections to be inserted in the dispersive integral, although, as will be seen, this additional correlation is going to produce an almost negligible effect on the pattern already known. However, there is the possiblity that a treatment of this kind, extended to the case of nonlinear dispersion relations, turns out to be much more fruitful; this problem will be dealt with in a forthcoming paper.

Since no specific value among the various determinations of the low-energy parameters $a^{(+)}$ and f^2 recommends itself particularly, I will choose their values according to my preference, and I will attribute them an error covering the range where such quantities are likely to be found(*); the values I shall assume are the following:

$$\begin{aligned} f^2 &= 0.081 \pm 0.004, \\ a^{(+)} &= (-0.014 \pm 0.020)\mu^{-1} \end{aligned} \tag{9}$$

Whereas the above value for f^2 is the traditional one, I assumed a slightly

(*)The magnitude of the errors reported in (9) has been estimated from the spectrum provided by the various existing analyses [Refs. 3,8, 21,22]; however, the error in $a^{(+)}$ does not cover a few isolated values markedly different from the average. I have considered such errors as statistical ones, since they refer to quantities neither measured experimentally. nor directly obtained from experimental data. This treatment of the above errors is certainly correct, e.g., in the calculation of the threshold cross sections performed in the next Section. However for the calculation of the dispersion relations (4) and (5) the treatment of the errors on f^2 and $a^{(+)}$ may create some ambiguity: this point will be further discussed in Sect. 8.

negative value for $a^{(+)}$ because of the indications from mesic-atom analysis[23]. My value for $a^{(+)}$ coincides with the one given (with a smaller error) by Hohler and collaborators in Ref. 8(*).

For the treatment of the cross sections in the low-energy region, I assumed that above a certain kinetic energy E the total cross sections can be considered as given reliably by the experiment. I took $\varepsilon = 21.5$ MeV (the lowest energy in the CERN phase-shift analysis: see Appendix I). Actually, the data between this energy and about 70 MeV are not accurate at all; waiting for more precise measurements, I can still consider them as "reliable" as long as their errors are not underestimated. Below ε, the only assumption I made is that any total cross section can be safely parametrized as a second-order polynomial in the kinetic energy T:(**)

$$\sigma(T) \simeq A + BT + CT^2 \qquad (T \leq \varepsilon). \tag{10}$$

A parametrization of the energy behaviour of the individual partial waves is not necessary(***). By inserting **Eq.** (10) into the dispersive integrals up to $T = \varepsilon$, and by putting in the experimental data only above E, the expression, e.g., for $D_F^{(-)}/\nu$ will look as follows (of course, the parameters entering **Eq.** (10) have been properly labelled):

$$D_F^{(-)}/\nu = Ag_a^{(-)} + Bg_b^{(-)} + Cg_c^{(-)} + [D_F^{(-)}/\nu]_{\text{exp}}. \tag{11}$$

Here the g's are ***known*** functions of energy(****) and $[D_F^{(-)}/\nu]_{\text{exp}}$ is just the dispersive integral cut down to $T = \varepsilon$, which will carry the usual errors brought in by the experimental input data.

As a matter of fact, representation (11) is of interest if ν is taken at values very close (on both sides) to threshold. The next Section will discuss an application of the above method.

(*)The choice made by HS in Ref. 3 is $f^2 = 0.081$; $a^{(+)} = 0$ in the early version, $-0.034\,\mu^{-1}$ in the latest version.

(**)This is equivalent to a second-order polynomial parametrization also in variables p^2 (square of the lab. momentum) or q^2 (square of the centre-of-mass momentum).

(***)In terms of partial waves, the validity of (10) follows if (for $T \leq \varepsilon$) the s-wave effective ranges contain at most a linear term in q^2 and the p-waves can be represented by their lowest-order term $a\,q^4$. Below 20 MeV both such assumptions seem to be fairly reasonable: see also Ref. 24 on the subject.

(****)The expression of the g's is reported in Appendix III, both for **Eq.** (11) and for the analogous formula valid for $D_{FS}^{(+)}(\nu)$.

6. The Calculation of Real Parts and Cross Sections in the Very Low Energy Region

At this point, the problem is how to determine the coefficients of Eq. (10). One can think of various methods; in this paper, however, only the simplest approach will be chosen. Two of the three parameters will be fixed by the requirement of continuity at T = E, and the residual parameter (substantially, A) will be determined by exploiting the constraint, rigorously valid at threshold, that the interaction is purely in an s-wave. Such a constraint is expressed by the following threshold relations:

$$\sigma_0^{(-)} = \frac{2\pi}{F_0^2}\left[D_0^{(-)}(D_0^{(-)} + 2D_0^{(+)})\right], \tag{12}$$

$$\sigma_0^{(+)} = \frac{2\pi}{F_0^2}\left[2D_0^{(-)2} + D_0^{(+)2}\right], \tag{13}$$

where the threshold values are indicated by the subscript zero, and $F_0 = 1 + \mu/M$ is the threshold value of the centre-of-mass to lab. conversion factor, in the sense that one has

$$D_0^{(\pm)} = F_0\, a^{(\pm)}. \tag{14}$$

It is therefore convenient to rewrite Eq. (10) by a redefinition of the parameters, so that they all have the same dimensions, and the continuity requirements at T = E are automatically satisfied:

$$\sigma(x) = \sigma_0(1-x)^2 + \sigma_\varepsilon x(2-x) - \delta_\varepsilon x(1-x), \quad (x \leq 1) \tag{15}$$

where x = T/ε, $\sigma_\varepsilon = \sigma(T = E)$ and 6, = $\varepsilon \left.\frac{d\sigma}{dT}\right|_{T=\ldots}$ One obviously has $\sigma_0 = A$.

I will consider the parameters σ_ε and δ_ε as experimentally given so that only σ_0 remains to be determined. The quantity o, (with its errors) can be taken directly from Table 2; 6, is estimated (with its errors) from the behaviour of the data above E. This evaluation is necessarily rough, because the data in question are poor: as a consequence, the assumed values for $\delta_\varepsilon^{(\pm)}$ (which are reported in Appendix III) show errors of the order of 50% or larger. However, the contribution of the 6, term to the real parts turns

out to be of little weight, so that the large uncertainty associated to it increases the errors on the real parts only moderately.(*)

After inserting Eq. (15) into the dispersion relation (5) and introducing the values of f^2 and $a^{(+)}$ (Eq. (9)), Eq. (12) can be solved for $\sigma_0^{(-)}$ (it becomes a quadratic equation in this quantity). The errors on $\sigma_0^{(-)}$, statistical and systematic, can also be obtained straightforwardly by the standard methods previously outlined.

Once $\sigma_0^{(-)}$ is known, one can deduce $\sigma_0^{(+)}$ and its errors from Eq. (13) and thus, reverting again to the dispersion relations (4) and (5) (where now all the parameters are known), one can calculate the real parts $D^{(\pm)}$ around threshold, complete with the errors, in addition to the cross sections obtained directly from formula (15). All cross sections and real parts below $T = \varepsilon$ (where in Eq. (11) the integral as well as the g's diverge logarithmically, have been deduced by the above procedure. The real parts turn out to be identical to the values obtained through a complete integration over the cross sections reported in Table 2, by treating the values calculated from (15) and reported there as if they were true experimental data.(**)

A few by-products can be obtained from the above analysis. First of all, it can be seen that the cusp structure occuring at threshold is contained only in the functions $g_A^{(\pm)}$ (cf. Eq. (11)), for the even and odd case respectively. Although the magnitude of the errors is larger than the "height" of the cusp, especially in the crossing-odd amplitude(***), however the point-to-point trend is dictated only by the functions $g_A^{(\pm)}$, irrespectively of the value of $A^{(\pm)}$, and thus of the size of its error. The knowledge of this behaviour, obtainable through the expressions of the g's listed in Appendix III, can be useful for those nonlinear dispersion relations where a principal value has to be taken also through the cusp.

(*)One might object that this way of dealing with the cross-section parameters gives too much importance to the experimental data at the particular energy $T = e$. Actually, this is disturbing only because the low-energy data at and above e are poor: however, the physical content of the output will not be altered provided that the errors on the data at $T = e$ be estimated correctly, or, at least, be not underestimated. However, for more ambitious applications of the procedure it will be convenient to treat either δ_ε, or both σ_ε and δ_ε, as parameters, like a_n, to be determined by the analysis.

(**)This is to be expected on the basis of the conclusions reached in Appendix III.

(***)For the crossing-even case, the very definition of $D_{FS}^{(+)}$, which is rigorously zero at threshold, makes all errors vanish proportionally to p^2, so that the cusp structure, although of small size, emerges clearly in a plot of the above quantity.

One can also study the dependence of the low-energy data on the input parameters f^2 and $a^{(+)}$. Fig. 1 shows the dependence of $a_1 - a_3 (= \frac{3}{2} a^{(-)})$ on f^2 (Hohler-Strauss plot[9]) for two different choices of $a_1 + 2a_3 (= \frac{3}{2} a^{(+)})$. As was anticipated, the refined method I used does not alter the conclusions already found in Ref. 9: only the error has been underestimated in the latter work (see later). It may be interesting to notice that the dependence of $a^{(-)}$ on $a^{(+)}$ is very weak(*). The same situation can be visualized from another angle, through the diagram shown in Fig. 2, where the constant J introduced by HS (and equal to $\frac{1}{2} D_F^{(-)}(\mu)$ in my notation) is plotted against the same variables as in Fig. 1(**). This quantity has been evaluateú directly from Eq. (11), with the values of $A^{(-)}$ corresponding to the particular choices of f^2 and $a(+)$.

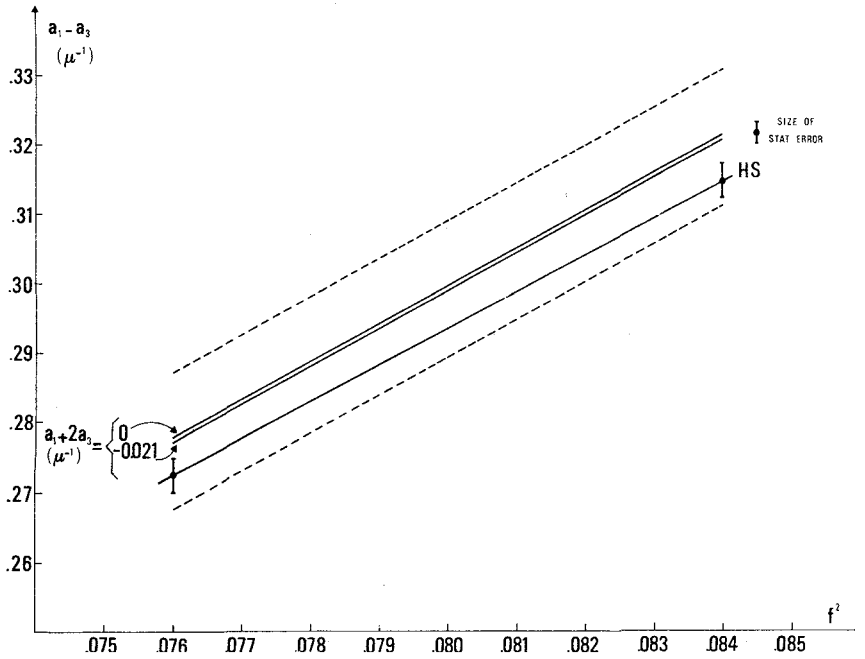

Fig. 1 - Plot of a, – a, (in natural units) versus f^2, for two typicai values of $a_1 + 2a_3$. The dashed lines represent the systematic errors referred to the case $a_1 + 2a_3 = -0.021$. The line denoted by HS reports the result found by Hohler and Strauss (Ref. 9) with its error.

(*)A slight dependence of comparable size is obtained by changing the asymptotic Reggepole fit for $\sigma^{(-)}$ within reasonable limits.

(**)Strictly speaking, J is not a constant; however, one can see that its dependence on the input parameters is extremely weak.

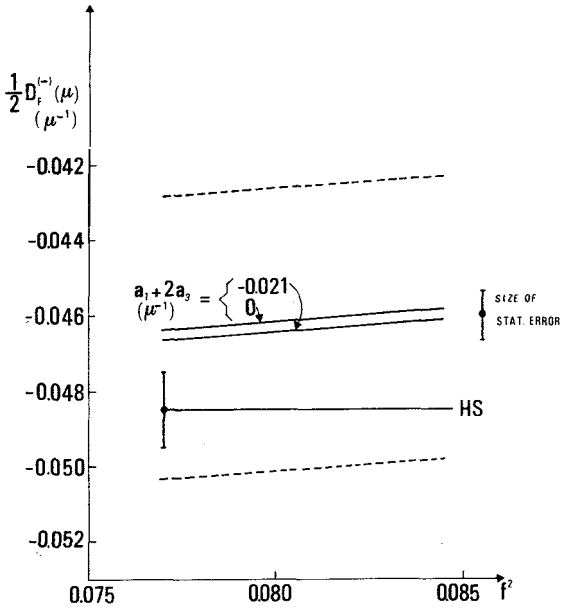

Fig. 2 - Plot of the Höhler-Strauss constant $J = \frac{1}{2}D_F^{(-)}(\mu)$ versus f^2, for two choices of $a_1 + 2a_3$. The meaning of the curves is the same as in Fig. 1.

Let me remark that, in addition to the direct evaluation (that they use as a check), HS calculate J via a more complicated method, involving high-energy charge-exchange experimental cross sections. However, this method is equivalent to the simpler one, once it is checked (as done in the next Section) that the charge-exchange data do not show a violent disagreement with the dispersion-relation predictions. Indeed, by inspection of formula (2.1) of Ref. 9, it can be easily seen that, at high energies, the contribution from the experimental real parts to the determination of J is small (—7%); and that, by properly taking into account also the systematic errors on the total cross sections, one does not get the high accuracy claimed in Ref. 9, but rather find a situation like the one shown in Fig. 2 of the present paper.

Finally, Fig. 3 reports the threshold values of the cross sections $\sigma^{(+)}$ and $\sigma^{(-)}$, again for fixed f^2 and $a^{(+)}$. Let me point out that the errors shown in this plot are only those with an experimental origin (they include the uncertainties on a_1 and a_3). This diagram is interesting, insofar as it shows

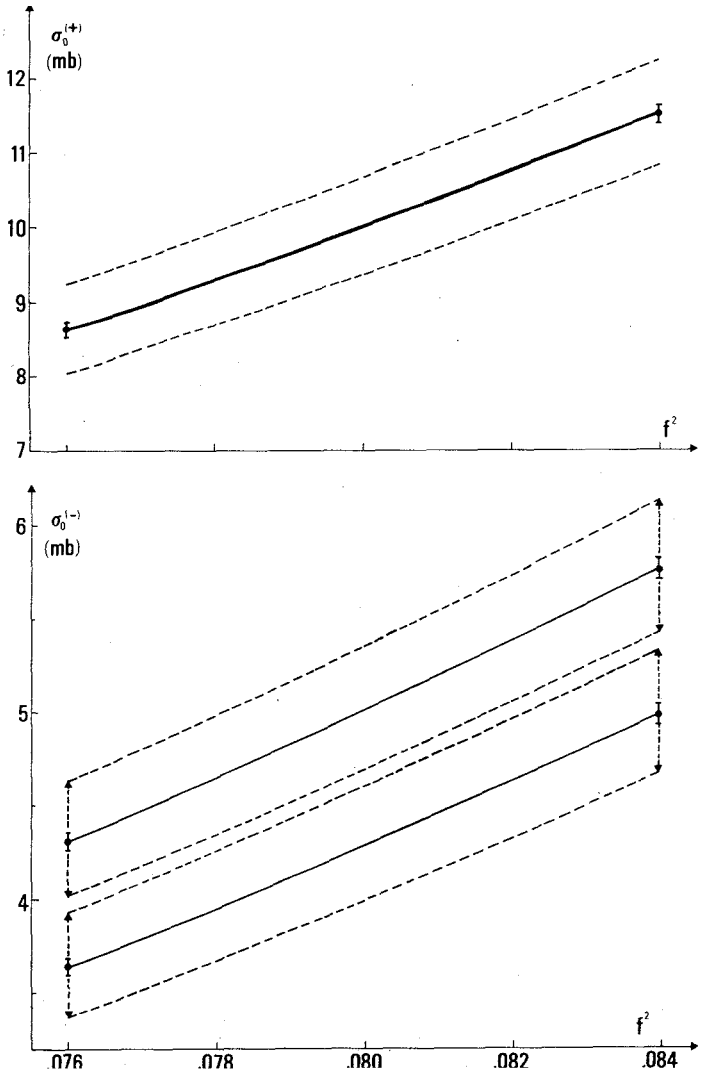

Fig. 3 - Plot of the threshold cross section $\sigma_0^{(\pm)}$ as a function of f^2, for the same two choices of $a_1 + 2a_3$ as in Figures 1 and 2. The error flags represent the statistical errors; the dashed lines, the systematic errors. For $\sigma_0^{(+)}$, the plots corresponding to the two choices of $a_1 + 2a_3$ overlap; for $\sigma_0^{(-)}$, the upper plot corresponds to $a_1 + 2a_3 = 0$.

that the dependence of both σ's on f^2 and of $\sigma^{(-)}$ on $a^{(+)}$ is strong enough as to permit a fair resolution, provided a further relation between the various low-energy parameters can be found.

7. Comparison with Experiment

The calculations performed in the previous Sections allow different ways of comparison with the experiment. Knowing the imaginary parts A, of the $\pi^{\pm}$ p scattering amplitudes through the optical theorem, one can predict the values of the differential cross sections at zero degrees:

$$\left(\frac{d\sigma_{\pm}}{d\Omega}\right)_{0^\circ} = D_{\pm}^2 + A_{\pm}^2 . \tag{16}$$

If we are interested in making the comparison in the laboratory system(*), A, $= (p/4\pi)\sigma_{\pm}$, whereas $D_{\pm} = 1/2(D^{(+)} \mp D^{(-)})$, where $D^{(\pm)}$ are to be taken from Eqs. (4) and (5).

Through the principle of charge independence, one can also directly predict the forward differential cross section for charge-exchange scattering $(\pi^- p \to \pi^\circ n)$:

$$\left(\frac{d\sigma^{ex}}{d\Omega}\right)_{0^\circ} = \tfrac{1}{2}\,[D^{(-)2} + A^{(-)2}]. \tag{17}$$

When using relations (16) or (17), one must always be wary about the proper choice of the units.

Another type of comparison can be made with the experimental real parts directly measured from the interference between nuclear and Coulomb interactions. The best data obtained in this way can be found at high energy[25]. A collection of forward differential cross-section data can be found in Ref. 1.

It is easily seen that the direct comparison with the interference data

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(*)The amplitude in the centre-of-mass (c.m.) system is obtained from the lab. amplitude by dividing the latter by the factor $F = [(2v/M) + 1 + (\mu/M)^2]^{1/2}$. Obviously, the same factor relates the magnitudes of the incident momenta in the two systems. At threshold, F reduces to the value F_0 occurring in Eq. (14).

provides a source of information that is more complete, because it involves also the sign of D, whereas in Eqs. (16) and (17) only the magnitude of D is requested.

I shall examine the whole amount of experimental information available to me.

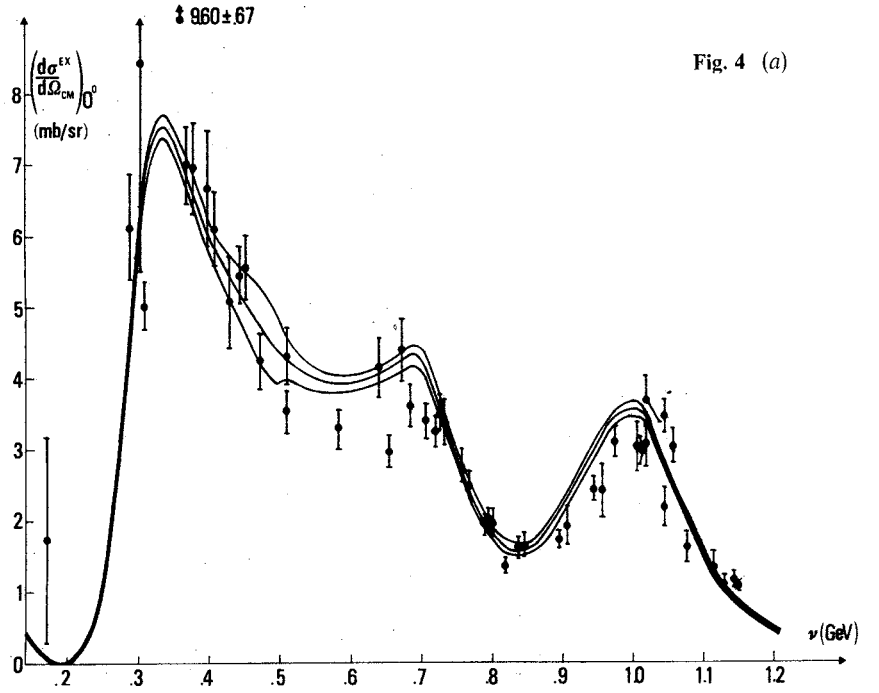

Fig. 4 (*a*)

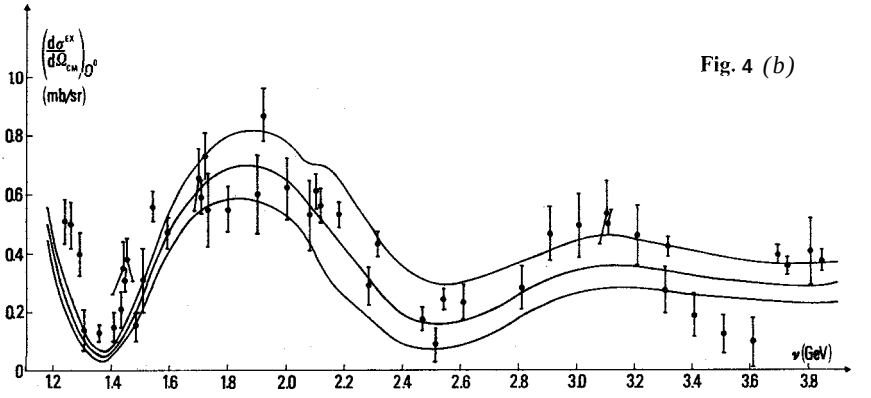

Fig. 4 (*b*)

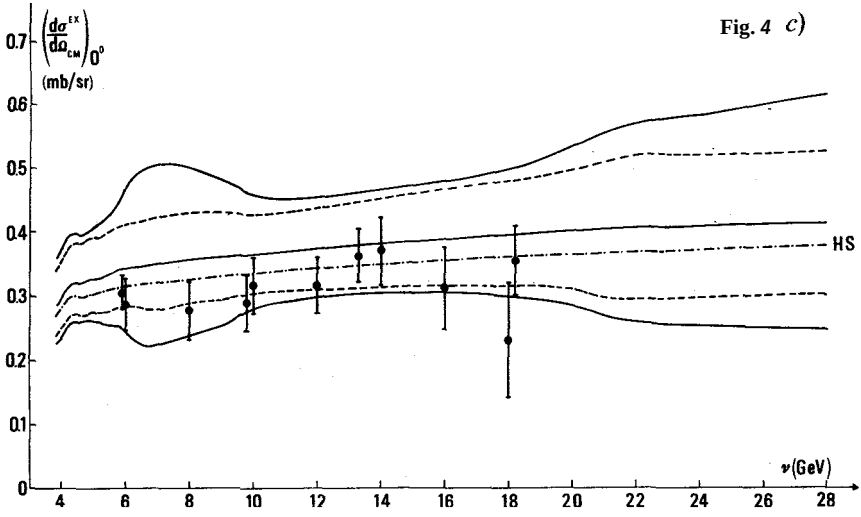

Fig. 4 - Experimental forward charge-exchange cross sections compared with dispersion-relation predictions: a) up to ν = 1.2 GeV; b) between 1.2 and 3.9 GeV; c) above 3.9 GeV. The predicted values are reported together with their maximum errors (combined quadratically). For the experimental references, see text. In Part c) also the Hohler-Strauss prediction from Ref. 3 (dash-dotted line) and the curves obtained by using the correlated systematic errors instead of the maximum ones (dotted lines) are shown for comparison.

Let me start with the charge-exchange cross section, which is particularly interesting because it involves only one of the "primary" input real parts. I shall take most of the experimental data from the compilation of Ref. 1 and consider also the results from a few additional experimental papers[26-28] which either add new data, or provide a later modification of some of the results collected in Ref. 1. The theoretical prediction is directly evaluated by using Table 4 as input. As far as the error treatment is concerned, I have combined quadratically the given statistical and systematic errors for all experimental points (and therefore also for my theoretical points). Indeed, the experimental data are taken from many different sources, whose ranges often overlap; in such a situation a separate treatment of the systematic errors is not appropriate. On the other hand, on the theoretical side there is no reason of introducing a correlation between the errors on $D^{(-)}$ and $A^{(-)}$ at the same energy: thus, I have used the maximum systematic errors on $D^{(-)}$. Fig. 4 displays the results of this analysis. It should be pointed out that there is no

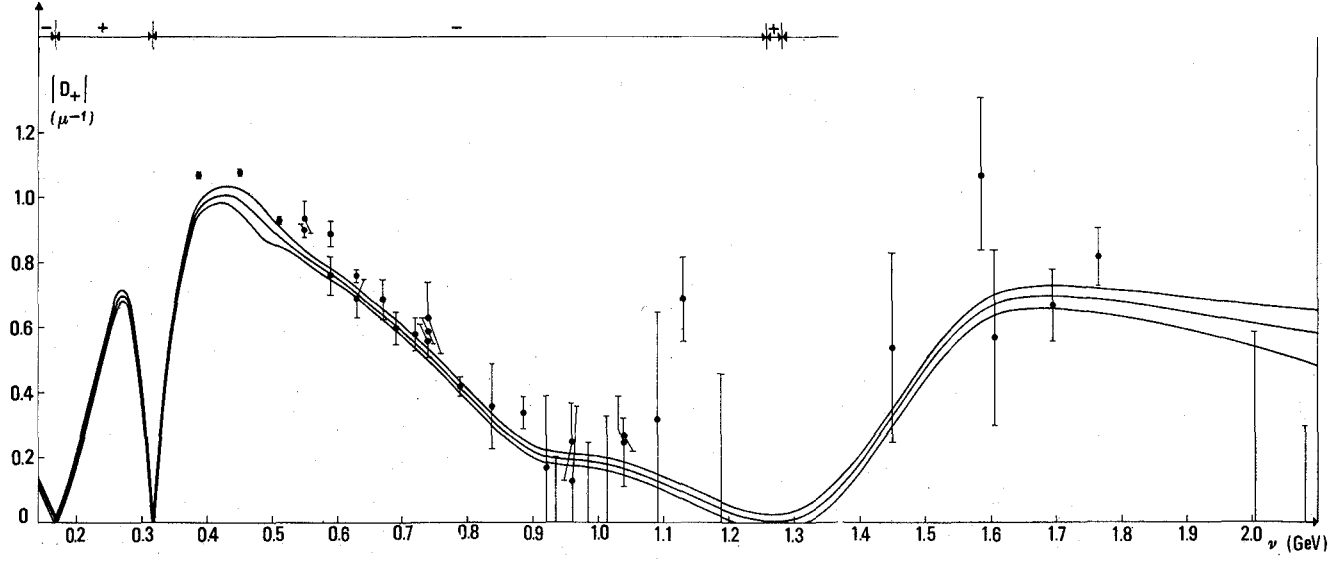

Fig. 5 - The magnitudes of the experimental real parts for $\pi^+ p$ scattering, as deduced by Dumbrais[29], compared with dispersion-relation predictions below 2 GeV, reported together with their maximum errors (combined quadratically). The upper part of the Figure shows the sign of the real part, as predicted by dispersion relations.

intrinsic meaning in the "structures" shown by the theoretical curves taking account of the errors; see Appendix III for further discussion on this point,

I shall postpone the discussion to the end of this Section and pass to an analogous comparison for the forward $\pi^{\pm}$p cross sections separately. However, in this case, unlike charge-exchange, the bulk of the cross section is given by the imaginary part; thus a plot like that of Fig. 4 is inadequate to study the real-part contribution. Furthermore, some of the experimental data reported in Ref. 1 have been extrapolated to zero degrees by just neglecting the real part. Fortunately, one can refer to a recent paper by Dumbrais[29], who has accurately re-examined the existing data, made the extrapolation to the forward direction, and deduced the magnitude of the real part (with its error) on a purely experimental basis, without extra hypotheses. Therefore, direct comparison with Dumbrais' values is the most appropriate one: it is carried out in Figures 5 (for π^{+}p) and 6 (for π^{-}p). The errors (in the experimental points as well as in the theoretical predictions) are again quadratic combinations of the statistical and

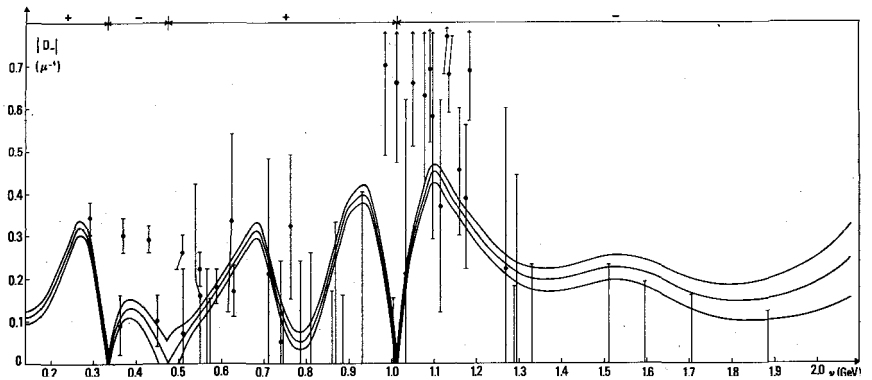

Fig. 6 - The same as in Fig. 5 for π^{-}p scattering.

(*)In all Figures of this Section the systematic error attached to the theoretical values are obviously the maximum ones (cf. the preceding discussion).

the systematic ones(*). The curves stop at about 2 GeV because the ratio between real and imaginary parts becomes smaller and smaller as energy increases beyond this value, and thus to obtain significant real-part determinations from the forward cross sections becomes more and more difficult.

Instead, above 2 GeV one begins to find real-part measurements made through the Coulomb-interference method. Indeed, at high energy this method is more accurate than the bare cross-section extrapolation to zero angle, and provides also the sign of the real part. Most of the available data have been obtained in a single experiment[25], performed in the energy range from 7 to 30 GeV; however, there exist also some additional $\pi^- p$ values at lower energies (see Ref. 29). Figure 7 shows the comparison of the measured values with the values predicted from dispersion relations (DR). Fig. 8 exploits the result of an analysis already performed in Ref. 25, where the experimentalists have "combined" their data in such a way as to construct "experimental" points for the crossing-even and odd real parts, $D^{(\pm)}$, which can be compared directly with the predictions from the DR (4) and (5). Since one deals with a single experiment, I have plotted in Fig. 8 the statistical and systematic errors separately. Notice that, as stated in Ref. 25, the crossing-even real part $D^{(+)}$ can be considered as unaffected by systematic errors, whereas $D^{(-)}$ carries a systematic error only on the positive side(*). In Fig. 8 (as well as in Fig. 4*c*) I have reported also the curves obtained from the Hohler-Strauss (HS) real parts[3]; also for the other Figures their curves are always consistent with mine within the error strip.

Coming to the discussion of the above comparison, let me first point out that, generally speaking, the experimental data reported are of rather poor quality (as can be seen, e.g., from the discrepancies between different experiments). Thus the disagreement between the predictions and some of the experimental points can be better attributed to inadequacies of the latter rather than to a violation of the causality principle. This applies particularly to the low-energy region (less than 1.5 GeV), where the uncertainties of the theoretical curves are very small. Taking this fact into account, one can say that the general agreement of the experiment with the DR predic-

(*)As a matter of fact, since a partial combination of statistical and systematic errors has been made in Ref. (25), in Fig. 8 I have reported the errors as given in Ref. (20), where the two effects are kept separate.

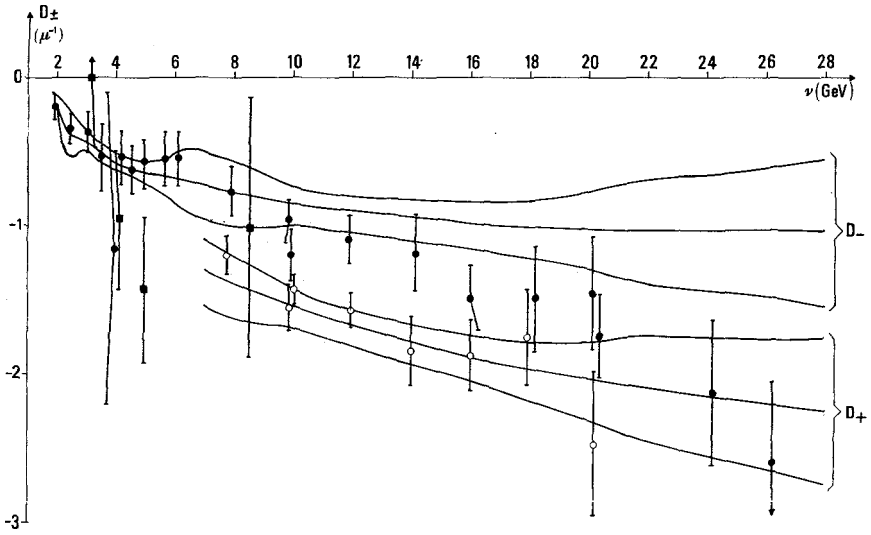

Fig. 7 - Plot of the experimental $\pi^{\pm}$p real parts measured from Coulomb interference and compared with dispersion-relation predictions (shown with their maximum combined errors). The data have been taken from Dumbrais' compilation[2g]. Black circles: π^{-}p data. Black squares: π^{-}p data from forward differential cross sections, for which only the magnitude has been measured. Blank circles: π^{-}p data.

tions is fair, thus giving a confirmation (although a loose one) to the basic postulates involved. However, further experimental study of the most controversial situations should be anyway necessary.

For charge-exchange (Fig. 4), an analysis like mine has been already made by HS in Ref. 9; there is little to add to their conclusions as far as the low-energy region is concerned (Figures 4a and b)(*). For the high-energy region (Fig. 4c), the large uncertainty on the DR predictions (due to insufficient knowledge about the asymptotic region, as well as to the rather poor quality of high-energy total-cross-section data) seems to indicate

(*)Among the various discrepancies discussed in Ref. 9, the most serious is perhaps the one occuring between 2.8 and 4 GeV, where the data come from only two experiments: indeed, the agreement with the DR prediction cannot be restored via an over-all systematic effect. This is, in my opinion, one of the points where further experimental investigation would be useful.

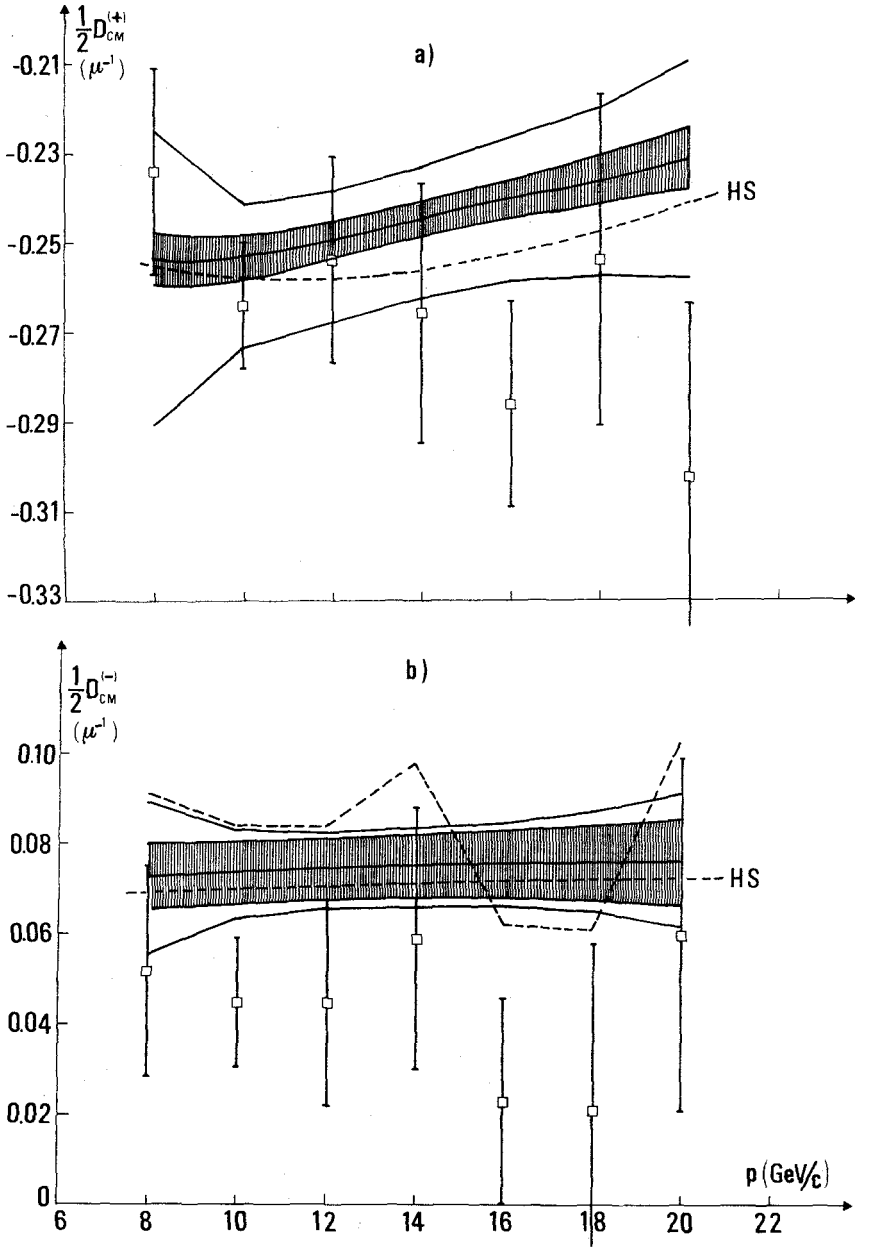

Fig. 8 - Centre-of-mass dispersion-relation predicted real parts: a) for the crossing-even amplitude; ***b)*** for the crossing-odd one, together with the experimental points from Ref. 25. Shaded region: calculated statistical error. Other full lines: calculated maximum systematic errors. Dot-dashed line: Hohler-Strauss prediction[3]. In Part ***b),*** the dashed broken line connects the experimental points shifted by the experimental systematic error.

that the comparasison between the experiment and a *particular* DR curve cannot be expected to be very significant. True. one would get a better agreement (as HS did) by choosing a lower value of the Regge p-pole intercept (of Appendix II); however, I intentionally avoided to link the Regge analysis uniquely to the charge-exchange data, and rather preferred to consider a wider spectrum of possibilities suggested by different sources (like direct total-cross-section fitting and finite-energy sum rules; see Appendix II for details).

Coming to Figures 5 and 6, the poor quality of the experimental data becomes here most evident (especially for π^- p scattering)(*). This is hardly surprising, because of the difficulty of extracting the real parts from the forward π^- p differential cross sections. Again, the general agreement is fair, although several discrepancies still occur. As for the charge-exchange case, the interpretation of the latter is doubtful(**).

Let me finally come to the discussion of the Coulomb-interference measured real parts (Figures 7 and 8). This comparison is perhaps the most interesting, because, as discussed in Ref. 20, the analysis might in principle cast light about the most proper continuation of the amplitude into the asymptotic region. However, the present experimental accuracy of the data (including high-energy total cross sections, whose uncertainty reflects into the uncertainty on the DR predictions) is not sufficient to carry out a programme of this kind. (For example, without the experimental systematic error, one could infer from Fig. 8b that the Regge p-pole intercept should be even lower than the HS value). In Fig. 7 the agreement is good, except for the high-energy tail of the π^- p data, for which an independent experimental check is needed. Let me remark that recently Hohler and Krubasik[30] have criticized the way how the real-part values have been derived in Ref. 25. They correctly point out that such values depend on

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(*)Let me recall that Dumbrais' analysis[29] shows that several experimental forward cross sections (particulary for π^- p) would provide a negative D^2 within the errors if inserted in Eq. (16). Such data are obviously neither taken into account in Ref. 29 nor here In Figures 5 and 6, I have omitted a few data from Ref. 29 carrying errors comparable with the size of the Figure.

(**)The same can be said about the comparison between DR predictions and forward real parts calculated from the available phase-shift sets (e.g., those from Ref. 14), which is not presented here. Generally, such values follow the trend of the DR curve closely, but show local discrepancies. One can hardly judge about the meaning of the latter, because of the difficulty of evaluating the true errors affecting the phase-shift-reconstructed experimental points.

the way how the nuclear differential cross section is parametrized away from the forward direction, and that the parametrization chosen in Ref. 25 is likely not to be the right one. However, their alternative solution gives too much weight to the forward real parts obtained through DR, which, as previously shown, at these energies are affected by large uncertainties.

8. Tables

This Section is intended to introduce the reader to the use of the Tables that are found at the end of the present work, although the notation used there is largely self-explanatory.

Table 1 contains the experimental input data (including errors) for σ_- and σ_+, deduced according to the prescriptions of Appendix I; Table 2 contains the same data for the combinations $\sigma^{(+)}$ and $\sigma^{(-)}$.

For easy referencing, all the current energy values in the lab. system (pion momentum, p; pion kinetic energy, T, and total energy, ν) are listed separately for each point. In the following Tables, instead, only ν will be reported as reference variable.

Three decimal digits have been kept for the cross sections, even when some of them are not significant. The errors have two or three decimal digits, according to the experimental accuracy.

The Regge formulae for the extension of $\sigma^{(\pm)}$ into the asymptotic region can be found in Appendix II.

Table 3 shows the subtracted real parts $D_F^{(-)}/\nu$ and $D_{FS}^{(+)}$ (see Sec. 4), calculated directly via Eqs. (7) and (8)(*). As outlined previously, two sets of systematic errors are given; the correlated ones (to be used in NLDR or similar relations having the form of the integral over both real and imaginary parts), and the maximum ones. As emphasized in Appendix III. the latter show apparent "structures" at the transition energies between different experimental input sets; such structures merely reflect the larger

(*)For the operational details of the oalculation, see Appendix III.

uncertainty of the input data in these energy regions and should not be taken too literally. As far as units are concerned, I preferred to maintain mb and mb · GeV instead of the currently used "natural units" ($\mu = 1$).

Table 3 includes also the unphysical region ($\nu < \mu$), which is not covered by the other Tables. All real-part lists include part of the asymptotic region, where the Regge expansion has been used for the input cross section. Obviously, in such region the given real-part values depend strongly on the assumed behaviour of the input data, and are expected to undergo sizable changes as long as our knowledge about the asymptotic region progresses. Wherever they occur, the unphysical-region data and the asymptotic data are separated from the bulk of the Tables by breaks.

Finally, Tables 4 to 7 list the complete amplitudes for $\pi^{\pm}$ p scattering and their crossing-even and-odd combinations, in the customary natural units. A word of caution is needed for the interpretation of the errors attached to the real parts. Indeed, both the experimental errors on the input cross section and the uncertainty on the theoretical input parameters f^2 and $a^{(+)}$ (Eq. (9)) contribute to the uncertainty on the real parts. I took the errors on f^2 and $a^{(+)}$ as statistical, and kept as systematic errors on D only those originating from the systematic errors on a. However, this procedure is questionable, because it can be argued that the uncertainties on f^2 and $a^{(+)}$, whatever they are, act always in the same direction over the entire energy range. On the other hand, if such uncertanties were treated as systematic, there would arise the question of how to combine them with the corresponding experimental effects. In my opinion, such a problem lacks an unambiguous solution unless: a) all the errors are combined quadratically (as made in Sect. 7); b) the uncertanties on f^2 and $a^{(+)}$ produce a negligible effect (as happens at energies > 6 GeV); c) the elaboration to make is such that the parts containing f^2 and $a^{(+)}$ can be worked out separately, and one is left to operate only with the quantities listed in Table 3, for which the separation between statistical and systematic effects is clear-cut (such is the NLDR discussed in Ref. 7). From the above arguments, it follows that the errors attributed to the real parts in Tables 4 to 7 provide an estimate of the magnitude of the various effects, but they are generally not suited for detailed theoretical handling, apart from the cases discussed above. Furthermore, the very concept of "correlated systematic errors breaks down for $D_{\pm}$, because the errors on $D^{(+)}$ and $D^{(-)}$ are mutually independent. Therefore, in Tables 6 and 7, I reported only the maximum systematic errors.

As far as the rounding-off of the data in Tables 3 to 7 is concerned, I did not stick to rigid criteria, but rather preferred to maintain a certain uniformity in the presentation of the data. Generally speaking, I dropped a decimal digit only when definitely redundant.

This work has been partly performed during a stay at CERN (Geneva), with a grant from the ***Fondazione Francesco Somaini,*** Como, Italy. I thank the Foundation ***Francesco Somaini*** for having awarded the grant to me, and Prof. B. Zumino, Director of the CERN theoretical group, for the hospitality. I thank Professors T. Ericson, M. Fidecaro, M. Jacob, L. Van Hove, A. Wetherell and B. Zumino for interesting discussions and fruitful criticism about most of the topics contained in this paper. I acknowledge also useful suggestions by Professors G. Giacomelli and G. Violini.

Appendix I

In this Appendix I shall give a few details about how I have obtained the Tables of the input data (Tables 1 and 2). Further details can be made available on request.

As stated in Sec. 3, I took the data from a selected set of experiments showing a good point-to-point precision and practically covering the full energy range up to 65 GeV. However, I could not simply report the raw data because, both for the uniformity of the Tables and for the calculation of the combinations $\sigma^{(\pm)}$, I needed the values of the cross sections at ***the same energies*** for $\pi^+ p$ and $\pi^- p$ scattering. This coincidence does not occur for the data from Refs. 13, 15, 17-19; thus I had to use an interpolation procedure, in order to reduce the experimental values to common energies, with a spacing more regular than the original one. (I was not rigid in enforcing a regular spacing to my chosen energy values, but I varied it according to the experimental point density and to the requirement of a satisfactory description of the various cross-section structures). I found empirically that the best interpolation was obtained through a polinomial of 3rd degree, using the two nearest points on both sides of the chosen energy(*). The same formula

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(*) The interpolation formula for a function $f(x)$ of a variable x, known at the points x_i ($i=1$ to 4) can be easily written in the Lagrange form:

$$f(x) = \sum_{i=1}^{4} f(x_i) \frac{(x-x_j)(x-x_k)(x-x_l)}{(x_i-x_j)(x_i-x_k)(x_i-x_l)}, \tag{18}$$

where j, k, l are the other three indices different from i. As a rule I took $x, < x_2 < x < x_3 < x_4$; however, near the first or the last point of an experiment, x may occasionally fall between x_1 and x_2 or between x_3 and x,. Formula (18) can be straightforwardly generalized to the case of any number of points.

was used to interpolate the errors, also the statistical ones. Indeed, I found that this procedure, on the average, gives a larger statistical error than other methods of interpolation (e.g., quadratic); and, when facing a choice, I generally preferred to allow for an overestimate of the errors rather than for an underestimate.

However, even in the accurate experiments considered, there are a few scattered points patently off the trend of the neighbouring ones. In a data parametrization, such points would anyway lie away from the best-fit curve; and also in my collection, as explained in the text, I had to look for a way to "smooth out" them consistently. In order to fix the ideas, let me refer to the ideal case shown in Fig. 9a. Here, by considering the middle point alone, the probability of the true value being at the position of the cross (interpolated value) would be small; however, it is obvious that, due to the presence of the other points, the above probability is actually much larger than that of finding the true value at the position indicated by the measurement. A reasonable conclusion to draw is that the actual statistical fluctuation at that point is larger than the declared one. As a consequence, a picture like the one shown in Fig. 9 is likely to represent

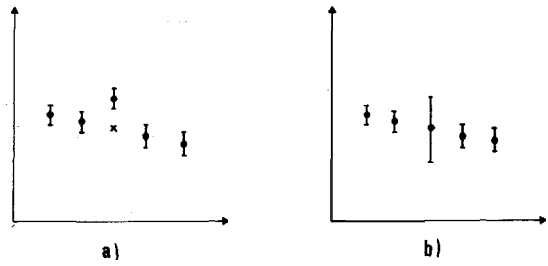


Fig. 9 - Schematic example of smoothing-out of an off-trend point (see text).

the true situation better. This is the criterion I followed in order to "smooth out" the off-trend points. For the "extended" statistical error (cf. Fig. 9*b*), I took the quadratic combination of the original statistical error and of the discrepancy between the measured and the interpolated value. In this way, the presence in Table 1 and 2 of a few points with a larger statistical error is explained. From inspection, one can see that the above procedure has been used only occasionally. As emphasized in the text, the aim was

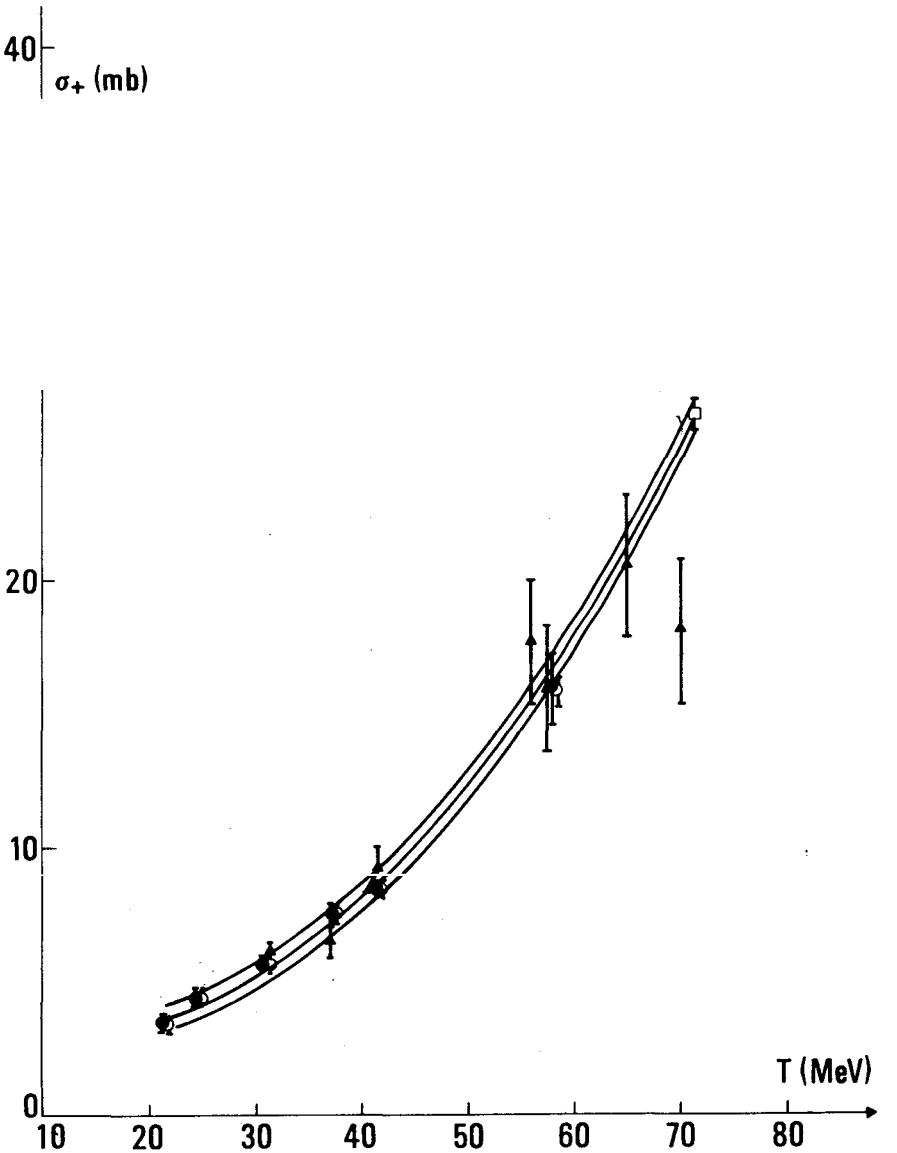
to avoid unphysical humps of the real-parts at these particular points, where instead the real-part error turns out to be increased.

Another ticklish problem is provided by the junctions between different experiments, whenever the trends do not match properly. It is difficult to lay down a general rule for such cases: I shall discuss them separately below, by recalling how I treated the data in each of the various energy regions.

In the low-energy region [apart for the near-threshold region ($T < 21.5$ MeV), which has been handled theoretically in Sec. 6], the main problem is to determine an acceptable behaviour of the cross sections at the energies below those covered by Ref. 13 (i.e., for $T < 70$ MeV). In this region, the direct experimental measurements are scanty (especially for $\pi^- p$) and the main source of information is provided by the set of phase shifts worked out at CERN[14], that start just at 21.5 MeV. The successive elaborations listed under Ref. 14 have produced two sets of phase shifts (carrying statistical errors): I shall call them "experimental phase shifts (EPS) I and II"(*)(**). Together with the earlier set of data, the Authors have produced a parallel set of smoothed-out values (without error), based on dispersion relations; I shall call it "dispersion relation phase shifts (DRPS)". The available data (including phase-shift-reconstructed total cross sections) are shown in the plots of Fig. 10. One sees that for σ_+ the DRPS curve mediates the various existing data quite well, and furthermore it connects directly with the beginning of the data set from Ref. 13. Thus I could safely assume this curve as the most suitable smooth representation of the data in the very-low-energy region. As far as the errors are concerned, I assumed a "blanket" error of 0.5 mb (statistical as well as systematic)(***), which ensured a complete covering of the existing data (cf. Fig. 10a). I think that such a kind of rough, but generous evaluation of the errors be the best procedure to follow in a situation of experimental uncertainty. For σ_- there is the additional difficulty that the DRPS curve does not fit well the (although scanty) existing data, and

(*)I thank Drs. F. Wagner and C. Michael for having made the EPS II data available to me.
(**)After completion of this work, I became aware of a third version of the CERN phase shifts (S. Almehed and C. Lovelace, CERN report TH 1408 (1971)). It can be easily checked that the total cross sections provided by this analysis in the low-energy region are consistent with the previous determinations and do not alter the conclusions reached in the present paper.
(***)The statistical error has been doubled around 60 MeV, where the data spread is larger.

FIG. 10
a)



does not connect at 70 MeV with the points from Ref. 13. Thus I referred to the Hohler-Strauss parametrization[3], to which I attached a larger "blanket" error (0.8 mb) in order to ensure an adequate covering of the data (cf. Fig. 10b).

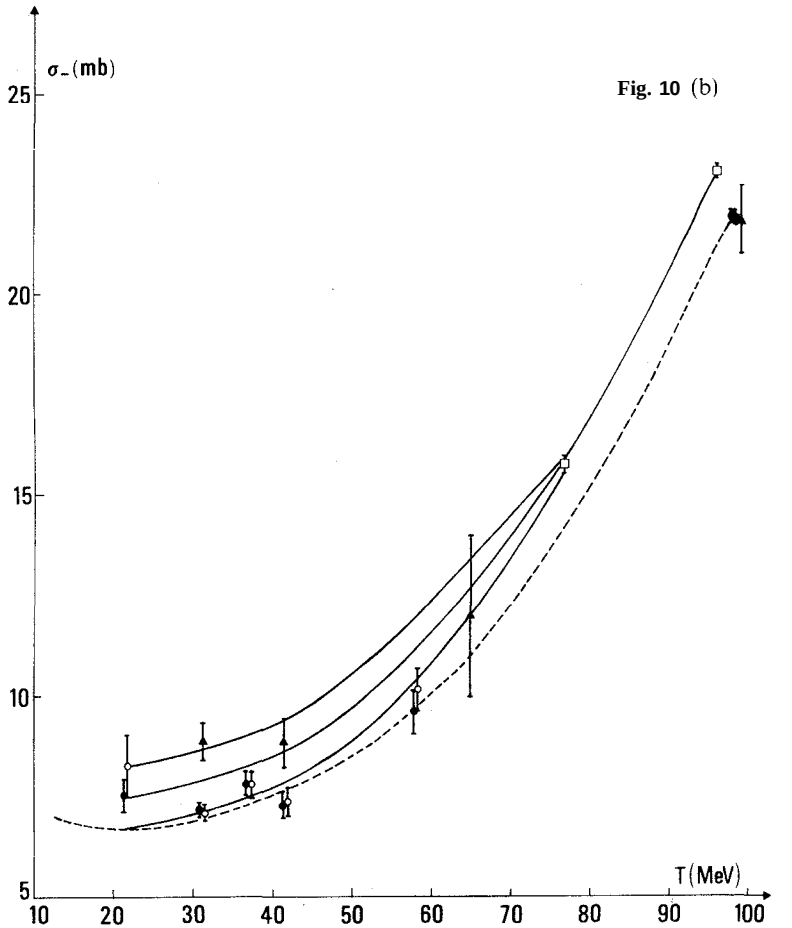


Fig. 10 (b)

Fig. 10 - Low-energy total cross sections as functions of the incident kinetic energy T : a) for $\pi^+ p$; b) for $\pi^- p$ scattering. Full lines: assumed trends and errors. Black and blank circles: experimental values calculated from the CERN phase shifts EPS I and II respectively. Black triangles: direct measurements reported in Ref. 1. Blanck squares: first points from Ref. 13. In part ***b)*** the dottrd line indicates the DRPS curve (see text). The DRPS curve for σ_+ coincides with the assumed reference curve.

The data from Ref.13 (ranging from T = 70 to T = 290 MeV) need almost no comment. I undid the combined errors reported in the paper, and deduced the corresponding systematic errors. I increased the latter by the amount of 0.1% of the measured cross section, in order to account for the uncertainty of the mean value of the beam momentum (D. V. Bugg, private comunication). The junction between the data from Refs. 13 and 15 is easy, since the trends of the two experiments "go into" each other very nicely, both for $\pi^+ p$ and $\pi^- p$. For the error size in this transition region, a previous $\pi^- p$ experiment[31] suggests a value of 0.6 mb for the statistical error: the systematic errors, being of the same size on both sides, have been straightforwardly connected by interpolation.

Also the data from Ref. 15 need only a few words of clarification, since most of the necessary information is straightforwardly obtained from the experimental paper. In the latter, the Tables of data exhibit the systematic errors only, the statistical error being always not larger than 0.1% of the measured cross section. Thus I assumed the above value for do, throughout (with the exception of the few "of-trend" points recalculated by interpolation, for which the error is obviously larger). It must also be remarked that some of the systematic-error sources act in the same direction for $\pi^- p$ and $\pi^+ p$ scattering, thus producing a partia1 cancellation of the effect in the difference $\sigma^{(-)}$. According to a private communication by J. D. Dowell, the systematic errors on σ, should be considered as independent until a minimum is reached (this occurs at $p \sim 1$ GeV/c); then, the systematic error on $\sigma^{(-)}$ should be kept equal to this minimum (= 0.35 mb) as energy increases.

A more serious problem is raised by the junction of the data from Refs. 15 and 16. Indeed, whereas the $\pi^+ p$ data match well at $p \sim 2.10$ GeV/c, the $\pi^- p$ data from Ref. 15 above 2.45 GeV/c are systematically lower than the corresponding ones from Ref. 16(*). In order to avoid an abrupt discontinuity, I used a chain of interpolated values between 2.40 and 2.72 GeV/c, with large errors (statistical as well as systematic), evaluated

(*)A high-accuracy $\pi^- p$ experiment by Giordenescu *et al.*[32] seems actually to indicate that a negative systematic error should be applied to the $\pi^- p$ data from Ref. 16. However, the data from Ref. 32 cannot be used in the present elaboration, because they consist of only four values between 3.8 and 6 GeV/c, without $\pi^+ p$ counterpart.

from the discrepancies between measured and interpolated values. In this transition region, a discontinuity requiring a smooth connection of the same type occurs also for the systematic errors on the quantities $\sigma^{(\pm)}$.

For the data from Ref. 16 up to 6 GeV, I did not use the published values, but (as now currently accepted) the corresponding ones reported in Ref. 1, which include a correction coming from an improved extrapolation to zero angle. I had to smooth out a few $\pi^{\pm}$p values slightly off the trend in order to avoid discontinuities in the difference $\sigma^{(-)}$, which, in this region, is very sensitive to small changes of trend in σ_t, and can be used to spot what points is best to "amend". Notice that also in this experiment there is a partial compensation of the systematic effects for $\sigma^{(-)}$; the appropriate systematic errors (not given by Eqs. (2) and (3)) have been taken from the experimental paper.

In the energy region above 6 GeV, one first meets the problem of the bad junction between the π^{+}p data sets from Refs. 16 and 17. In order to obtain a satisfactory connection, I had to use interpolated values over a sizable range of energies, with large errors associated to the points that do not "match" well. The connection of the π^{-}p data, instead, does not create difficulties. The combined errors reported for the points from Ref. 17 have been undone by assuming a statistical error equal to 0.1% of the measured cross section, as indicated in the experimental paper. However, the quoted errors seem to have been underestimated, in view of the not too good point-to-point precision shown by the data in question, especially around 20 GeV. As a consequence of this, also in this region there are some "smoothed-out" points with a larger statistical error.

Coming finally to the data from the Serpukhov experiments[18,19], they have a poor point-to-point precision and a zigzagging trend, which makes it impossible to extract a smooth reference behaviour from the data themselves. Therefore, I used them in order to derive the Regge asymptotic behaviour of the cross sections (to be also used as reference trend above 30 GeV) through a best-fit procedure. The statistical errors on my points, lying on the reference Regge curve, have been evaluated again according to the criterion of Fig. 9; the systematic errors have been taken directly from the experiment. Details on the Regge-pole fitting procedure can be found in Appendix II.

Notice that the Tables for $\sigma^{(\pm)}$ stop at 35 GeV because, above this energy, the crossing-even and -odd cross sections are completely represented by the asymptotic formula. For $\sigma_{\pm}$, on the contrary, the presence of experi-

mental measurements calls for an independent evaluation of the errors. This fact créates a slight difficulty in Tables 6 and 7, where, for the sake of completeness, the values of A, have been calculated also above 70 GeV by combining the Regge expression assumed for $A^{(\pm)}$. In this way, at 70 GeV there would occur a strong discontinuity in the errors, which, however, has been "amended by interpolation. It is perhaps superfluous to recall that, in this region, the higher the energy, the more dependent the amplitudes on the details of the assumed Regge behaviour, and the less reliable the indications of the Tables. However, a remarkable feature of the amplitudes, namely the marked difference in value and trend of D_+ and D_- above 100 GeV, is shown also by the data listed in Ref. 3, which have been obtained under different assumptions about the asymptotic behaviour of the total cross sections.

Appendix II

As mentioned previously, the treatment of the high-energy data is strictly connected with the problem of finding an extrapolation of the scattering amplitude into the asymptotic region not yet experimentally reached. Before the data at today's highest energies became available, the situation looked rather simple and clear-cut, because the asymptotic trend could be easily parametrized in terms of a few leading Regge poles. In particular, the crossing-odd amplitude (to which only Regge poles with the quantum numbers of the ρ meson can contribute) was well represented by a single pole term (the p pole), yielding the following formula for the total cross section:

$$\sigma^{(-)} = 2\beta_\rho p^{\alpha_\rho - 1} \tag{19}$$

(where the factor of 2 has been inserted in order to conform to the current notation). Instead, the crossing-even amplitude (built up from the poles with the quantum numbers of the vacuum) required one leading singularity (P)with the maximum value possible for the intercept (a, = 1), that ensured a constant limit for all cross sections at infinite energy(*), plus one or two additional poles with lower intercepts (P', P''). For example, a two-pole fit for $\sigma^{(+)}$ reads:

$$\sigma'' = 2(\beta_P + \beta_P\ p^{\alpha_{P'}-1}). \tag{20}$$

(*)The possibility of having α_P slightly lower than 1 was also investigated, but no conclusive evidence was obtained on this point.

The recent Serpukhov data[18,19], and the indication, which seems to come from the colliding-beam experiments performed at CERN, that the total proton-proton cross section at 1500 GeV may be larger than at 50 GeV (Ref. 33), have failed to confirm the simple picture implied by the validity of equations like (19) or (20) and have shown the likely presence of other Regge singularities together with (or instead of) the poles. In spite of the large effort spent in order to clarify this matter, the situation is still quite confused today. Until further experimental information becomes available, a paper like the present one, or another one of similar kiiid (e.g. Ref. 3), cannot venture into a discussion of this problem and must be content with some heuristic assumptions about the high-energy behaviour of the cross sections, allowing one to calculate the dispersion integrals.

For this purpose, I have retained the simple expressions (19) and (20), even if they are clearly inadequate; indeed as long as one manages to fit the data below 60 GeV reasonably, this choice should not have a strong influence on the real parts at low and intermediate energies. (Instead, the values given for the real parts at high energies are likely to change as soon as a reliable asymptotic theory becomes available). The choice of the parameters appearing in these expressions is to be obtained from some sort of fitting of today's high-energy experimental data, and the observed, unavoidable discrepancies should be accounted for by a proper choice of the errors.

I performed a best fit on the experimental values of $\sigma^{(-)}$ above 6 GeV (Refs. 16 to 19), by using expression (19) and statistical errors only, and I obtained the values of a, and β_ρ presented in Table A1 below under the heading "set BF"(*). Instead, Hohler and Strauss[3,9] noticed that a lower value of α_ρ is required in order to fit the high-energy charge-exchange cross sections[27,28]; they suggested the parameters presented in Table A1 under the heading "set HS". In this work, I compromised with an intermediate solution, giving halfway values for $\sigma^{(-)}$ in the range 6-60 GeV/c, and I attached a statistical error to both β_ρ and a,, such that the values of the other two sets fall within them(**). I attributed also a pair of syste-

(*)It should be noticed that a fit based on finite-energy sum rules (Ref. (4)) yields a larger value for α_ρ ($-$ 0.6).

(**)The errors on α_ρ and β_ρ are treated as independent, although they are obviously correlated. By neglecting such a correlation, the final error on the real parts is increased: however, I am not going to be worried by such an overestimate, in view of the uncertain shape in which the asymptotic theory is.

matic errors to β_ρ, in order to get a rough reproduction of the systematic errors in the high-energy $\sigma^{(-)}$ values listed in Table 2, and to match them at the highest energy considered there (35 GeV). The final set of values is reported in Table A1 under the heading "set F .

For the crossing-even amplitude, the situation is even less favourable. Indeed, the change of trend between the data below and above 20 GeV/c is so sharp that a best-fit procedure with a formula of the type (20) is bound to give unsatisfactory results(*); neither there is additional information (like $\pi^- p$ charge-exchange for the antisymmetric amplitude) giving a further hint for the choice of the parameters(**). I shall then proceed by an indirect way, namely: i) by considering $\sigma^{(-)}$ as given by Eq. (19), with the parameters taken from set F; *ii)* by fitting the $\pi^- p$ and $\pi^+ p$ data above 30 GeV simultaneously, using linear combinations of Eqs. (19) and (20). In such a fit, the only free parameters are those of the vacuum poles; however, a three-parameter fit is inconclusive, in the sense that several combinations of $\alpha_{P'}$, β_P, $\beta_{P'}$ allow a fit with a reasonable χ^2 value. However, in all such fits $\alpha_{P'}$ turns out to be small (of the order of 0.1); a discussion on this point can be found in Ref. 6. Thus, I fixed $\alpha_{P'} = 0.1$ and found the parameters β_P and $\beta_{P'}$ listed in Table A2 below. As far as the errors are concerned, in the present situation it is meaningless to attribute a separate error to each parameter; I introduced a set of overall scale errors (also reported in Table A2), which roughly reproduces the errors on $\sigma^{(+)}$, obtained by combining the errors on σ_+ and σ_- in the standard way.

Set	α_ρ	β_ρ	Syst. errors in β_ρ
BF	0.58	2.637	
F	0.56 ± 0.02	2.74 ± 0.10	± 0.25
HS	0.55	2.76	

Table A1. Values of the parameters for the asymptotic expression of $\sigma^{(-)}$, Eq. (19).[The units for the β's are chosen in such a way that, when p is expressed in GeV/c in Eqs. (19) and (20), σ comes out in mb].

(*)In order to cope with this difficulty, Hohler and Strauss in Ref. 3 (latest version) used a different parametrization for $\sigma^{(+)}$, namely, a constant plus an exponential. I am reluctant to adopt this choice because it is extraneous to most current theoretical models. See anyway Ref. 3 and the papers quoted there for a discussion about the influence of the asymptotic parametrization on the high-energy real parts.

(**)There would be one if $\pi^0 p$ elastic scattering could be performed experimentally.

$\alpha_{P'}$	$\beta_{P'}$	β_P	Scale errors
Q1 (fixed)	17.51	23.29	Stat. = $\pm$ 0.006 Syst. = $\pm$ 0.005

Table A2. Values of the parameters for the asymptotic expression of $\sigma^{(+)}$, **Eq.** (20).[For the units used for the β's, see caption of Table A1].

Appendix III

This Appendix will be devoted to the discussion of the computational problems arising in the calculation of the real parts and their errors. Since the primary output of the DR calculations are the subtracted real parts listed in Table 3, 1 will, in this Appendix, refer to such quantities only.

First of all, in the physical region, in order not to waste part of the information supplied by the input data, I did not calculate Eqs. (7) and (8) directly at the energies where also the input cross sections are given; instead, I calculated the above relations (together with the corresponding errors) at the mid-points between two consecutive energy values and then I interpolated all the results at the required energies through formula (18)(*). Of course in the unphysical region and in the Regge region the evaluation of the dispersive integrals (7) and (8) has been directly performed at the energies of interest.

Coming to the evaluation of the errors, of course I cannot agree with what has been written on this subject in the latest version of the compilation by Hohler and Strauss[3], namely: "To our knowledge, a convincing method for calculating errors on Re f does not exist, since principal-value integrals are involved. It is clear that one has to smooth the experimental $\sigma_{\pm}$ data, but in general one does not know whether a small structure should be taken seriously or ignored as an experimental error". In my opinion. the above dilemma does not exist, because, by the mere fact of smoothing out the data, one assumes (and could not do otherwise) that there are no relevant structures of the input cross sections over energy intervals of the

(*)See the remark made in Appendix I about the use of this formula for the interpolation of the errors.

order of the present experimental resolution. This hypothesis is not made just for the sake of convenience, in order that the results obtained be meaningful, but it stems from our present knowledge about the experimental situation and the theoretical pattern on which we believe it is based. Thus the use of the propagation formula for the calculation of the statistical errors is certainly correct, at least as far as the size of the effect is concerned(*).

In order to judge about the reliability of such an estimate in more detail, the question to raise should rather be of the following kind: even by admitting the smoothness of the input data, there are many ways to perform a smooth connection within a given set of points. How does the choice of the interpolating function influence the final result and its calculated error?

A further question is whether the numerical calculation, usually carried out by means of a computer, may introduce unpredictable errors in the delicate process of principal-value integration.

I tried to give an answer to these questions by choosing different alternatives and by comparing their results. The reference values reported in Table 3 have been obtained by integration of a function built by connecting any two consecutive a values by means of the same cubic interpolation formula, Eq. (18), used for the rearrangement of the cross sections. The interpolation was made in the variable v. Alternatively, I tried also a linear connection between pairs of consecutive o values, and interpolated also in the variable p for both cases. All such interpolations have the advantage that the integrals can be performed analytically, thus cancelling the possible source of error coming from the numerical approximations of the computer routines. Comparison of the results has shown that the interpolations in v and p are substantially equivalent, even at low energies.

Instead, substituion of the linear in place of the cubic interpolation changes the real parts by an amount which is generally small with respect to the corresponding calculated statistical error, but for certain points can be of its size; the situation is a little less favourable in the case of $D_{FS}^{(+)}$, for which occasionally the discrepancy can amount to about twice the calculated statistical error. However, above 1.2-1.4 GeV, such discrepancies

(*)Let me also add that the smoothing criterion adopted in this work (cf. Fig. 9) takes partly account of the presence of the mentioned "small structures".

become negligible. It can be safely concluded that the operation of folding quadratically this additional discrepancy into the obtained error would be more than adequately represented by multiplying the latter by a factor of $\sqrt{2}$.

An additional remark is that the error from a propagation formula depends on the number N of points used, and decreases like $1/\sqrt{N}$ for increasing N. Now, in order to obtain a regular energy spacing and to bring the data to common energies, I have increased the number of experimental points reported in Tables 1 and 2 with respect to the original raw data by about a factor of 2. Taking a further factor of $\sqrt{2}$ on the error to account for this effect, I can conclude that the calculated statistical errors listed in Table 3 are reliable, loosely speaking, within a factor of 2. In any case, they are generally smaller than the systematic errors, on which the choice of the interpolation procedure causes a negligible variation.

At this point, I have only to explain how I obtained the sets of systematic errors presented in the Tables. The criterion for the calculation of the correlated systematic errors has been already outlined in the text (Sec. 2). I increased (decreased) the input cross sections by their maximum positive (negative) systematic errors; I repeated the real-part calculation with such sets and I deduced the positive and negative systematic errors affecting the central values by taking the difference with the latter. For the maximum systematic errors, I used the same difference criterion; however, the input values were partly increased, partly decreased, with the aim of maximizing the discrepancy on either side of the obtained real parts. However, I subjected this procedure to the constraint that systematic errors should be taken with a constant sign within each energy range spanned by a single experiment. Considering positive errors for definiteness, it is clear that the maximum effect at a given energy v would be obtained by matching the sign of the assumed input systematic errors with that of the weight function: namely, by assuming negative systematic errors on $\sigma(v')$ for $v' < v$ and positive ones for $v' > v$(*). If v falls in a transition region between two experiments, this is just the choice I made. Instead, if v falls into the "body" of an experimental set, I applied the above criterion only to the points not belonging to that set; within the set, for each energy, I tried both signs (kept constant) and retained the one giving the larger discrepancy. Thus the oscillating behaviour of such maximum errors, increasing

(*)I am grateful to G. Violini for pointing out this procedure to me.

from the centre to the ends of the experimental sets, and showing marked humps in the transition regions (cf. the plots of Sec. 7) is explained. However, such "structures" merely reflect the fact that the input data at the transition regions are affected by a larger uncertainty than elsewhere; they should not be taken too literally. For pratica1 reasons, I had to introduce some oversimplifications in the above analysis: in particular, I (improperly) treated the points in the very-low-energy region and in the Regge region as experimental sets (in the sense previously explained); moreover, I neglected possible variations of the systematic error size within each set. As a consequence, in the above computation, one should not claim an accuracy of evaluation which is practically unattainable, but one should rather consider the obtained maximum errors as fair estimates of the effect. As previously stated, the systematic errors are insensitive to the change of the interpolating function.

In order to close, I shall list a few data concerning the theoretical treatment of the threshold region (Sections 5 and 6): namely, the assumed values for the parameters $\delta_\varepsilon^{(\pm)}$ and the expressions of the functions g (as defined by Eq. (11) for the crossing-odd case and by an analogous formula valid for $D_{FS}^{(+)}$ in the crossing-even case). Table A3 below gives the list of all these quantities.

Table **A3.** Parameters and functions necessary for the calculation of the amplitudes in the very-low-energy region (cf. Sections 5 and 6):

$$\delta_\varepsilon^{(-)} = (-3.4 \pm 2.6)\,\text{mb};\ \text{syst. errors} = (+1.2,\ -2.4)\,\text{mb};$$

$$\delta_\varepsilon^{(+)} = (4.3 \pm 2.6)\,\text{mb};\ \text{syst. errors} = (+2.4,\ -1.2)\,\text{mb};$$

$$g_A^{(-)} = (2\pi)^{-2}\{2\log[(v_\varepsilon + p_\varepsilon)/\mu] + F_1(v)\},$$

$$g_B^{(-)} = (2\pi)^{-2}\{2[p_\varepsilon - \mu\log[(v_\varepsilon + p_\varepsilon)/\mu]] - \mu F_1(v) + F_2(v)\},$$

$$g_C^{(-)} = (2\pi)^{-2}\{p_\varepsilon(v_\varepsilon - 4\mu) + (2\nu^2 + \mu^2)\log[(v_\varepsilon + p_\varepsilon)/\mu] + (\nu^2 + \mu^2)F_1(v) - 2\mu F_2(v)\},$$

$$g_A^{(+)} = (2\pi)^{-2}F_2(v),$$

$$g_B^{(+)} = (2\pi)^{-2}\{2p^2\log[(v_\varepsilon + p_\varepsilon)/\mu] + \nu^2 F_1(v) - \mu F_2(v)\},$$

$$g_C^{(+)} = (2\pi)^{-2}\{2p^2[p_\varepsilon - 2\mu\log[(p_\varepsilon + v_\varepsilon)/\mu]] - 2\mu\nu^2 F_1(v) - \mu F_2(v)\},$$

where $v_\varepsilon = \mu + \varepsilon$, $p_\varepsilon = [\varepsilon(2\mu + \varepsilon)]^{1/2}$; the functions F_1 and F_2 are defined as follows:

	$\nu > \mu$	$\nu < \mu$
F_1	$(p/\nu)\log\lvert(\nu p_\varepsilon - p\nu_\varepsilon)/(\nu p_\varepsilon + p\nu_\varepsilon)\rvert$	$-(\sqrt{-p^2}/\nu)[\pi - 2\arctan(\nu_\varepsilon\sqrt{-p^2}/\nu p_\varepsilon)]$
F_2	$p\log\lvert(p_\varepsilon - p)/(p_\varepsilon + p)\rvert$	$-\sqrt{-p^2}\,[\pi - 2\arctan(\sqrt{-p^2}/p_\varepsilon)]$

TABLE 1

TCTAL CROSS SECTICNS FOR PI+P AND PI- P SCATTERING

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA- (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA+ (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.
0.00000	0.00000	0. 13958	7.407	0.97	0.50	0.47	2.953	0.97	0.50	0.48
0.03769	0.00500	0. 14458	7.367	0.72	0.50	0.55	2.519	0.72	0.40	0.60
0.05093	0.00900	0. 14858	7.362	0.71	0.55	0.60	2.423	0.71	0.45	0.75
0.06163	0.01300	0. 15258	7.382	0.73	0.60	0.75	2.552	0.73	0.60	0.80
0.07150	0.01725	0. 15683	7.429	0.70	0.70	0.80	2.933	0. 70	0.60	0.65
0.08040	0.02150	0. 16108	7.506	0.80	0.80	0.80	3.569	0.50	0.50	0.50
0.08682	0.02480	0. 16438	7.623	0.80	0.80	0.80	4.168	0.50	0.50	0.50
0.09806	0.03100	0. 17058	7.902	0.80	0.80	0.80	5.512	0.50	0.50	0.50
0.10816	0.03700	0. 17658	8.278	0. 80	0.80	0.80	7.206	0.50	0.50	0.50
0.11536	0.04150	0.18108	8.657	0.80	0.80	0.80	8.716	0.50	0.50	0.50
0.12829	0.05000	0.18958	9.738	0.80	0.80	0.80	12.357	1.00	0.50	0.50
0.13984	0.05800	0. 19758	11.170	0.80	0.80	0.80	16.712	1.00	0.50	0.50
0.14957	0.06500	0.20458	12.721	0.80	0.70	0.70	21.174	1.00	0.50	0.50
0.15848	0.07160	0.21 118	14.448	0.40	0.35	0.45	26.140	0.26	0.48	0.48
0.16560	0.07700	0.21658	15.875	0.19	0.09	0.09	30.248	0.23	0.33	0.33
0.17848	0.08700	0.22658	19.554	0.15	0.08	0.08	40.473	0.21	0.20	0.20
0.18978	0.09600	0.23558	23.080	0. 13	0.10	0.10	52.618	0.23	0.19	0.19
0.20206	0.10600	0.24558	28.049	0.12	0.15	0.15	69.426	0.28	0.26	0.26
0.21171	0.11400	0.25358	33.392	0.13	0.17	0.17	85.417	0.33	0.36	0.36
0.21767	0.11900	0.25858	37.625	0.15	0.18	0.18	96.583	0.36	0.41	0.41
0.21933	0.12040	0.25998	38.820	0.15	0.18	0.18	100.018	1.11	0.43	0.43
0.22712	0.12700	0.26658	44.258	0. 18	0.15	0.15	116.943	0.42	0. 50	0.50
0.23762	0.13600	0.27558	51.518	0. 17	0.17	0.17	141.270	0.44	0.51	0.51
0.24224	0.14000	0.27958	54.625	0.15	0.18	0.18	152.214	0.43	0.48	0.48
0.25372	0.15000	0.28958	62.014	0.18	0.20	0.20	177.574	0.45	0.57	0.57
0.26395	0.15900	0.29858	67.553	0.20	0.22	0.22	195.248	0.45	0.66	0.66
0.26846	0.16300	0.30258	69.590	0.20	0.22	0.22	200.483	0.44	0.67	0.67
0.27409	0.16800	0.30758	70.790	0.20	0.22	0.22	204.270	0.45	0.67	0.67
0.27968	0.17300	0.31258	70.723	0. 19	0.23	0.23	205.765	0.46	0.68	0.68
0.28526	0.17800	0.31758	70.562	0.18	0.23	0.23	205.125	0.47	0.69	0.69
0.29304	0.18500	0.32458	69.656	0. 18	0.23	0.23	200.956	0.47	0.68	0.68
0.30407	0.19500	0.33458	66.304	0.18	0.22	0.22	189.495	0.46	0.63	0.63
0.31504	0.20500	0.34458	61.528	0.18	0.20	0.20	173.926	0.43	0.57	0.57
0.32813	0.21700	0.35658	55.172	0.18	0.18	0.18	154.050	0.37	0.50	0.50
0.34113	0.22900	0.36858	48.863	0.16	0.15	0.15	134.005	0.31	0.44	0.44
0.35513	0.24200	0.38158	43.174	0. 14	0.12	0.12	115.575	0.29	0.38	0.38
0.36907	0.25500	0.39458	38.597	0.12	0.12	0.12	99.561	0.28	0.32	0.32
0.38506	0.27000	0.40958	34.258	0.10	0.09	0.09	84.421	0.25	0.27	0.27
0.39780	0.28200	0.42158	31.500	0.10	0.09	0.09	74.372	0.23	0.26	0.26

TABLE 1 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA- (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA+ (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.
0.41155	0.29500	0.43458	29.239	0.10	0.13	0.13	64.899	0.30	0.37	0.37
0.42736	0.31000	0.44958	27.549	0.60	0.27	0.27	55.821	0.60	0.56	0.56
0.44207	0.32400	0.46358	22.653	0.60	0.43	0.43	48.966	0.60	0.74	0.74
0.45882	0.34000	0.47958	26.269	0.60	0.59	0 59	42.802	0.60	0.88	0.88
0.4750	0.3555	0.4951	26.382	0.026	0.67	0.67	38.421	0.038	0.84	0.84
0.5000	0.3795	0.5191	27.071	0.027	0.59	0.59	33.201	0.033	0.67	0.67
0.5250	0.4036	0.5432	27.775	0.028	0.52	0.52	29.140	0.029	0.57	0.57
0.5500	0.4278	0.5674	28.520	0.029	0.50	0.50	25.946	0.026	0.50	0.50
0.5750	0.4521	0.5917	29.529	0.030	0.42	0.42	23.311	0.023	0.40	0.40
0.6000	0.4764	0.6160	31.212	0.031	0.38	0.38	20.919	0.021	0.36	0.36
0.6250	0.5008	0.6404	33.219	0.033	0.30	0.30	18.950	0.019	0.27	0.27
0.6500	0.5252	0.6648	36.489	0.036	0.27	0.27	17.324	0.017	0.24	0.24
0.6750	0.5497	0.6893	41.278	0.041	0.21	0.21	16.318	0.016	0.23	0.23
0.6875	0.5619	0.7015	44.564	0.045	0.24	0.24	15.921	0.016	0.22	0.22
0.7000	0.5742	0.7138	45.896	0.22	0.24	0.24	15.494	0.015	0.21	0.21
0.7100	0.5840	0.7236	46.315	0.046	0.24	0.24	15.188	0.015	0.21	0.21
0.7300	0.6036	0.7432	45.233	0.045	0.24	0.24	14.802	0.20	0.21	0.21
0.7500	0.6233	0.7629	43.333	0.043	0.24	0.24	14.663	0.015	0.20	0.20
0.7625	0.6356	0.7752	41.826	0.042	0.23	0.23	14.699	0.015	0.20	0.20
0.7750	0.6479	0.7875	40.254	0.040	0.23	0.23	14.833	0.015	0.19	0.19
0.7875	0.6602	0.7998	38.733	0.039	0.22	0.22	15.058	0.015	0.18	0.18
0.8000	0.6725	0.8121	37.418	0.44	0.21	0.21	15.373	0.015	0.18	0.18
0.8125	0.6848	0.8244	36.455	0.036	0.21	0.21	15.767	0.016	0.18	0.18
0.8250	0.6971	0.8367	35.762	0.036	0.21	02 1	16.250	0.016	0.18	0.18
0.8375	0.7095	0.8491	35.758	0.036	0.21	0.21	16.863	0.017	0.18	0.18
0.8500	0.7218	0.8614	36.303	0.036	0.21	0.21	17.541	0.018	0.18	0.18
0.8625	0.7341	0.8737	37.181	0.037	0.21	0.21	18.269	0.018	0.18	0.18
0.8750	0.7465	0.8861	38.786	0.039	0.20	0.20	19.028	0.019	0.18	0.18
0.8875	0.7588	0.8984	41.002	0.041	0.19	0.19	19.799	0.020	0.18	0.18
0.9000	0.7712	0.9108	43.150	0.043	0.19	0 19	20.564	0.021	0.18	0.18
0.9125	0.7835	0.9231	45.495	0.045	0.19	0.19	21.307	0.021	0.18	0.18
0.9250	0.7959	0.9355	48.177	0.048	0.19	0 19	21.991	0.022	0.18	0.18
0.9375	0.8082	0.9478	51.206	0.051	0.19	0 19	22.561	0.023	0.18	0.18
0.9500	0.8206	0.9602	54.038	0.054	0.18	0 18	23.014	0.023	0.18	0.18
0.9625	0.8330	0.9726	56.417	0.056	0.18	0.18	23.394	0.023	0.18	0.18
0.9750	0.8453	0.9849	58.377	0.058	0.17	0.17	23.725	0.024	0.18	0.18
0.9875	0.8577	0.9973	59.836	0.060	0.17	0 17	24.008	0.024	0.17	0.17
0.9950	0.8651	1.0047	60.386	0.37	0.18	0.18	24.157	0.024	0.17	0.17
1.0000	0.8701	1.0097	60.561	0.061	0.18	0.18	24.249	0.024	0.17	0.17
1.0050	0.8750	1.0146	60.543	0.061	0.18	0 18	24.336	0.024	0.17	0.17

TABLE 1 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA- (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	SIGMA+ (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.
1.0100	0.8800	1.0196	60.315	0.060	0.18	0.18	24.420	0.024	0.17	0.17
1.0250	0.8949	1.0345	58.198	0.058	0.18	0.18	24.666	0.025	0.17	0.17
1.0375	0.9072	1.0468	55.954	0.056	0.18	0.18	24.886	0.025	0.17	0.17
1.0500	0.9196	1.0592	53.800	0.054	0.18	0.18	25.116	0.20	0.17	0.17
1.0625	0.9320	1.0716	51.888	0.052	0.18	0.18	25.360	0.025	0.18	0.18
1.0750	0.9444	1.0840	49.750	0.050	0.18	0.18	25.623	0.026	0.18	0.18
1.0875	0.9568	1.0964	47.010	0.047	0.19	0.19	25.910	0.026	0.18	0.18
1.1000	0.9692	1.1088	44.585	0.045	0.19	0.19	26.230	0.026	0.18	0.18
1.1125	0.9816	1.1212	42.674	0.043	0.19	0.19	26.580	0.027	0.18	0.18
1.1250	0.9940	1.1336	41.217	0.041	0.19	0.19	26.958	0.027	0.18	0.18
1.1500	1.0188	1.1584	39.357	0.039	0.19	0.19	27.798	0.028	0.19	0.19
1.1750	1.0437	1.1833	38.137	0.038	0.19	0.19	28.785	0.029	0.19	0.19
1.2000	1.0685	1.2081	37.178	0.037	0.19	0.19	29.940	0.030	0.19	0.19
1.2250	1.0933	1.2329	36.780	0.037	0.19	0.19	31.182	0.031	0.19	0.19
1.2500	1.1182	1.2578	36.575	0.037	0.19	0.19	32.621	0.033	0.19	0.19
1.2625	1.1306	1.2702	36.500	0.037	0.19	0.19	33.446	0.033	0.19	0.19
1.2750	1.1430	1.2826	36.450	0.05	0.19	0.19	34.331	0.034	0.19	0.19
1.2875	1.1554	1.2950	36.464	0.036	0.19	0.19	35.145	0.035	0.19	0.19
1.3000	1.1679	1.3075	36.507	0.037	0.19	0.19	35.916	0.036	0.19	0.19
1.3250	1.1927	1.3323	36.607	0.037	0.19	0.19	37.582	0.038	0.18	0.18
1.3500	1.2176	1.3572	36.669	0.08	0.19	0.19	38.949	0.039	0.17	0.17
1.3750	1.2425	1.3821	36.683	0.037	0.19	0.19	39.942	0.040	0.16	0.16
1.4000	1.2673	1.4069	36.647	0.037	0.19	0.19	40.831	0.041	0.16	0.16
1.4250	1.2922	1.4318	36.569	0.037	0.18	0.18	41.371	0.041	0.16	0.16
1.4500	1.3171	1.4567	36.449	0.05	0.18	0.18	41.419	0.041	0.16	0.16
1.4750	1.3420	1.4816	36.256	0.19	0.18	0.18	41.041	0.041	0.16	0.16
1.5000	1.3669	1.5065	35.978	0.036	0.18	0.18	40.431	0.040	0.18	0.18
1.5170	1.3838	1.5234	35.738	0.036	0.18	0.18	39.883	0.20	0.18	0.18
1.5350	1.4017	1.5413	35.491	0.035	0.18	0.18	39.206	0.039	0.18	0.18
1.5500	1.4167	1.5563	35.317	0.035	0.18	0.18	38.582	0.039	0.18	0.18
1.5750	1.4416	1.5812	35.046	0.035	0.18	0.18	37.455	0.037	0.18	0.18
1.6000	1.4665	1.6061	34.786	0.035	0.19	0.19	36.284	0.036	0.17	0.17
1.6250	1.4914	1.6310	34.604	0.035	0.19	0.19	35.229	0.035	0.18	0.18
1.6500	1.5163	1.6559	34.526	0.035	0.19	0.19	34.293	0.25	0.19	0.19
1.6750	1.5412	1.6808	34.534	0.11	0.19	0.19	33.459	0.033	0.20	0.20
1.7000	1.5661	1.7057	34.610	0.035	0.20	0.20	32.730	0.033	0.22	0.22
1.7250	1.5910	1.7306	34.731	0.035	0.20	0.20	32.115	0.032	0.23	0.23
1.7500	1.6160	1.7556	34.879	0.035	0.21	0.21	31.635	0.032	0.24	0.24
1.7750	1.6409	1.7805	35.043	0.06	0.22	0.22	31.221	0.031	0.25	0.25
1.8000	1.6658	1.8054	35.201	0.035	0.23	0.23	30.835	0.031	0.25	0.25

TABLE 1 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA- (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA+ (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.
1.8250	1.6907	1.8303	35.348	0.19	0.25	0.25	30.476	0.030	0.26	0.26
1.8500	1.7157	1.8553	35.485	0.035	0.26	0.26	30.162	0.030	0.26	0.26
1.8750	1.7406	1.8802	35.612	0.036	0.26	0.26	29.916	0.030	0.26	0.26
1.9160	1.7815	1.9211	35.857	0.17	0.25	0.25	29.608	0.030	0.28	0.28
1.9500	1.8154	1.9550	36.074	0.036	0.25	0.25	29.419	0.029	0.29	0.29
2.0000	1.8653	2.0049	36.333	0.036	0.26	0.26	29.259	0.08	0.30	0.30
2.0500	1.9151	2.0547	36.420	0.036	0.30	0.30	29.210	0.08	0.32	0.32
2.0750	1.9401	2.0797	36.401	0.08	0.30	0.30	29.208	0.08	0.36	0.31
2.1000	1.9650	2.1046	36.347	0.25	0.30	0.30	29.221	0.08	0.40	0.30
2.1500	2.0149	2.1545	36.152	0.036	0.29	0.29	29.281	0.035	0.45	0.25
2.2000	2.0648	2.2044	35.876	0.036	0.36	0.36	29.389	0.030	0.45	0.20
2.2500	2.1147	2.2543	35.557	0.036	0.40	0.40	29.546	0.025	0.45	0.20
2.3000	2.1646	2.3042	35.169	0.035	0.40	0.40	29.751	0.020	0.45	0.20
2.3500	2.2145	2.3541	34.751	0.035	0.39	0.39	30.033	0.020	0.45	0.20
2.4000	2.2645	2.4041	34.426	0.034	0.43	0.43	30.331	0.020	0.45	0.20
2.4500	2.3144	2.4540	34.152	0.25	0.47	0.40	30.564	0.020	0.45	0.20
2.5200	2.3843	2.5239	33.800	0.26	0.50	0.30	30.762	0.020	0.45	0.20
2.6200	2.4841	2.6237	33.365	0.10	0.48	0.24	30.824	0.020	0.45	0.20
2.7200	2.5840	2.7236	33.017	0.020	0.45	0.20	30.618	0.020	0.45	0.20
2.8200	2.6839	2.8235	32.758	0.020	0.45	0.20	30.150	0.020	0.45	0.20
2.9200	2.7837	2.9233	32.560	0.024	0.45	0.20	29.661	0.020	0.45	0.20
3.0200	2.8836	3.0232	32.411	0.020	0.45	0.20	29.167	0.020	0.45	0.20
3.1200	2.9835	3.1231	32.299	0.015	0.45	0.20	28.831	0.015	0.45	0.20
3.2200	3.0834	3.2230	32.174	0.015	0.45	0.20	28.594	0.015	0.45	0.20
3.3200	3.1833	3.3229	31.973	0.015	0.45	0.20	28.431	0.031	0.45	0.20
3.4200	3.2832	3.4228	31.777	0.034	0.45	0.20	28.317	0.015	0.45	0.20
3.5200	3.3832	3.5228	31.571	0.015	0.45	0.20	28.226	0.015	0.45	0.20
3.6200	3.4831	3.6227	31.337	0.015	0.45	0.20	28.157	0.034	0.45	0.20
3.7200	3.5830	3.7226	31.115	0.031	0.45	0.20	28.089	0.022	0.45	0.20
3.8200	3.6829	3.8225	30.908	0.010	0.45	0.20	28.002	0.010	0.45	0.20
3.9300	3.7929	3.9325	30.701	0.048	0.45	0.20	27.859	0.010	0.45	0.20
4.0300	3.8928	4.0324	30.532	0.010	0.45	0.20	27.731	0.010	0.45	0.20
4.1300	3.9928	4.1324	30.381	0.010	0.45	0.20	27.571	0.010	0.45	0.20
4.2300	4.0927	4.2323	30.236	0.041	0.45	0.20	27.407	0.010	0.45	0.20
4.3300	4.1926	4.3322	30.093	0.010	0.45	0.20	27.262	0.010	0.45	0.20
4.4300	4.2926	4.4322	29.947	0.010	0.45	0.20	27.116	0.010	0.45	0.20
4.5300	4.3925	4.5321	29.800	0.010	0.45	0.20	27.002	0.010	0.45	0.20
4.6300	4.4925	4.6321	29.667	0.010	0.45	0.20	26.905	0.010	0.45	0.20
4.7300	4.5925	4.7321	29.549	0.020	0.45	0.20	26.812	0.012	0.45	0.20
4.8300	4.6924	4.8320	29.441	0.014	0.45	0.20	26.723	0.010	0.45	0.20

TABLE 1 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA- (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	SIGMA+ (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.
4.9300	4.7924	4.9320	29.339	0.010	0.45	0.20	26.638	0.021	0.45	0.20
5.0300	4.8923	5.0319	29.239	0.010	0.45	0.20	26.557	0.010	0.45	0.20
5.1300	4.9923	5.1319	29.134	0.016	0.45	0.20	26.479	0.026	0.45	0.20
5.2300	5.0923	5.2319	29.030	0.010	0.45	0.20	26.403	0.010	0.45	0.20
5.3300	5.1922	5.3318	28.931	0.010	0.45	0.20	26.330	0.016	0.45	0.20
5.4400	5.3022	5.4418	28.832	0.031	0.45	0.20	26.253	0.018	0.45	0.20
5.5400	5.4022	5.5418	28.749	0.038	0.45	0.20	26.186	0.010	0.45	0.20
5.6400	5.5021	5.6417	28.670	0.025	0.45	0.20	26.121	0.025	0.45	0.20
5.7400	5.602 1	5.7417	28.593	0.025	0.45	0.20	26.050	0.047	0.45	0.20
5.8400	5.7021	5.8417	28.523	0.027	0.45	0.20	25.989	0.028	0.45	0.20
5.9400	5.8020	5.9416	28.460	0.041	0.43	0.20	25.939	0.038	0.45	0.20
6.0400	5.9020	6.0416	28.406	0.045	0.41	0.20	25.901	0.057	0.45	0.20
6.440	6.302	6.442	28.194	0. 09	0.33	0.19	25.754	0 13	0.44	0.20
7.000	6.861	7.001	27.927	0.16	0.25	0.18	25.566	0 19	0.43	0.19
8.000	7.861	8.001	27.494	0.030	0.15	0.15	25.263	0.25	0.37	0.17
9.000	8.861	9.001	27.120	0.028	0.11	0.11	25.003	0.19	0.29	0.15
10.000	9.861	10.001	26.800	0.027	0.080	0.080	24.781	0 13	0.20	0.12
11.000	10.861	11.001	26.528	0.030	0.079	0.079	24.593	0. 10	0.13	0.09
12.000	11.861	12.001	26.297	0.033	0.079	0.079	24.436	0.071	0.074	0.074
13.000	12.861	13.001	26.102	0.030	0.078	0.078	24.304	0.047	0.075	0.075
14.000	13.861	14.001	25.935	0. 026	0.077	0.077	24.194	0.024	0.077	0.077
15.000	14.861	15.001	25.788	0.026	0.077	0.077	24.101	0.024	0.075	0.075
16.000	15.861	16.001	25.663	0.031	0.077	0.077	24.022	0.024	0.072	0.072
17.000	16.861	17.001	25.545	0.025	0.077	0.077	23.944	0.047	0.075	0.075
18.000	17.861	18.001	25.433	0. 072	0.077	0.077	23.873	0.070	0.077	0.077
19.000	18.861	19.001	25.330	0.027	0.077	0.077	23.807	0. 046	0.076	0.076
20.000	19.860	20.000	25.238	0.078	0.077	0.077	23.747	0.023	0.075	0.075
22.000	21.860	22.000	25.087	0.030	0.077	0.077	23.657	0.24	0.08	0.08
24.000	23.860	24.000	24.969	0.025	0.078	0.078	23.595	0.18	0.09	0.09
26.000	25.860	26.000	24.873	0.050	0.075	0.075	23.551	0.20	0.10	0.10
28.000	27.860	28.000	24.797	0.025	0.079	0.079	23.520	0.20	0.11	0.11
30.000	29.860	30.000	24.727	0.10	0.09	0.09	23.497	0.21	0.12	0.12
35.000	34.860	35.000	24.576	0. 18	0.10	0.10	23.431	0.39	0.12	0.12
40.000	39.860	40.000	24.464	0. 17	0.10	0.10	23.382	0.32	0.12	0.12
45.000	44.860	45.000	24.373	0.12	0.10	0.10	23.346	0. 24	0.12	0.12
50.000	49.860	50.000	24.298	0.09	0.10	0.10	23.318	0.24	0.12	0.12
55.000	54.860	55.000	24.235	0. 09	0.10	0.10	23.295	0.20	0.12	0.12
60.000	59.860	60.000	24. 182	0. 09	0.10	0.10	23.277	0.21	0.12	0.12
65.000	64.860	65.000	24.136	0. 14	0.10	0.10	23.263	0. 34	0.12	0.12

TABLE 2

TOTAL CROSS SECTIONS FOR THE CROSSING-EVEN AND -ODD COMBINATIONS

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA(+) (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	SIGMA(-) (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.
0.00000	0.00000	0.13958	10.360	1.48	0.69	0.64	4.454	1.26	0.32	0.30
0.03769	0.00500	0.14458	9.886	1.06	0.50	0.70	4.848	0.97	0.60	0.30
0.05093	0.00900	0.14858	9.785	1.02	0.50	0.80	4.939	0.99	0.70	0.40
0.06163	0.01300	0.15258	9.933	1.03	0.60	0.90	4.830	1.03	0.90	0.60
0.07150	0.01725	0.15683	10.362	0.99	0.95	1.10	4.496	0.99	1.10	0.95
0.08040	0.02150	0.16108	11.075	0.94	1.30	1.30	3.937	0.94	1.30	1.30
0.08682	0.02480	0.16438	11.791	0.94	1.30	1.30	3.455	0.94	1.30	1.30
0.09806	0.03100	0.17058	13.414	0.94	1.30	1.30	2.390	0.94	1.30	1.30
0.10816	0.03700	0.17658	15.484	0.94	1.30	1.30	1.072	0.94	1.30	1.30
0.11536	0.04150	0.18108	17.373	0.94	1.30	1.30	-0.059	0.94	1.30	1.30
0.12829	0.05000	0.18958	22.095	1.28	1.30	1.30	-2.619	1.28	1.30	1.30
0.13984	0.05800	0.19758	27.882	1.28	1.30	1.30	-5.542	1.28	1.30	1.30
0.14957	0.06500	0.20458	33.895	1.28	1.20	1.20	-8.453	1.28	1.20	1.20
0.15848	0.07160	0.21118	40.588	0.48	0.85	0.95	-11.692	0.48	0.85	0.95
0.16560	0.07700	0.21658	46.123	0.30	0.42	0.42	-14.373	0.30	0.42	0.42
0.17848	0.08700	0.22658	60.027	0.26	0.28	0.28	-20.920	0.26	0.28	0.28
0.18978	0.09600	0.23558	75.698	0.27	0.29	0.29	-29.538	0.27	0.29	0.29
0.20206	0.10600	0.24558	97.475	0.31	0.41	0.41	-41.378	0.31	0.41	0.41
0.21171	0.11400	0.25358	118.809	0.35	0.53	0.53	-52.025	0.35	0.53	0.53
0.21767	0.11900	0.25858	134.208	0.39	0.59	0.59	-58.958	0.39	0.59	0.59
0.21933	0.12040	0.25998	138.838	1.12	0.61	0.61	-61.198	1.12	0.61	0.61
0.22712	0.12700	0.26658	161.201	0.46	0.65	0.65	-72.685	0.46	0.65	0.65
0.23762	0.13600	0.27558	192.788	0.47	0.68	0.68	-89.752	0.47	0.68	0.68
0.24224	0.14000	0.27958	206.839	0.45	0.66	0.66	-97.589	0.45	0.66	0.66
0.25372	0.15000	0.28958	239.588	0.48	0.67	0.67	-115.559	0.48	0.67	0.67
0.26395	0.15900	0.29858	262.801	0.49	0.88	0.88	-127.695	0.49	0.88	0.88
0.26846	0.16300	0.30258	270.073	0.48	0.89	0.89	-130.892	0.48	0.89	0.89
0.27409	0.16800	0.30758	275.060	0.49	0.89	0.89	-133.480	0.49	0.89	0.89
0.27968	0.17300	0.31258	276.488	0.50	0.91	0.91	-135.043	0.50	0.91	0.91
0.28526	0.17800	0.31758	275.687	0.50	0.92	0.92	-134.562	0.50	0.92	0.92
0.29304	0.18500	0.32458	270.612	0.50	0.91	0.91	-131.300	0.50	0.91	0.91
0.30407	0.19500	0.33458	255.799	0.49	0.85	0.85	-123.190	0.49	0.85	0.85
0.31504	0.20500	0.34458	235.454	0.47	0.77	0.77	-112.397	0.47	0.77	0.77
0.32813	0.21700	0.35658	209.221	0.41	0.68	0.68	-98.878	0.41	0.68	0.68
0.34113	0.22900	0.36858	182.867	0.35	0.59	0.59	-85.142	0.35	0.59	0.59
0.35513	0.24200	0.38158	158.749	0.32	0.50	0.50	-72.402	0.32	0.50	0.50
0.36907	0.25500	0.39458	138.158	0.30	0.44	0.44	-60.964	0.30	0.44	0.44
0.38506	0.27000	0.40958	118.679	0.28	0.36	0.36	-50.163	0.28	0.36	0.36
0.39780	0.28200	0.42158	105.872	0.25	0.35	0.35	-42.871	0.25	0.35	0.35

TABLE 2 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA(+) (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA(-) (MB)	STAT. ERR.	SYST. ERRORS PCS.	NEG.
0.41155	0.29500	0.43458	94.138	0.32	0.50	0.50	-35.660	0.32	0.50	0.50
0.42736	0.31000	0.44958	83.369	0.85	0.84	0.84	-28.272	0.85	0.84	0.84
0.44207	0.32400	0.46358	75.619	0.85	1.17	1.17	-22.313	0.85	1.17	1.17
0.45882	0.34000	0.47958	69.071	0.85	1.47	1.47	-16.533	0.85	1.47	1.47
0.4750	0.3555	0.4951	64.803	0.046	1.51	1.51	-12.039	0.046	1.51	1.51
0.5000	0.3795	0.5191	60.272	0.043	1.26	1.26	-6.130	0.043	1.26	1.26
0.5250	0.4036	0.5432	56.915	0.040	1.09	1.09	-1.365	0.040	1.09	1.09
0.5500	0.4278	0.5674	54.466	0.039	1.00	1.00	2.574	0.039	1.00	1.00
0.5750	0.4521	0.5917	52.840	0.038	0.82	0.82	6.218	0.038	0.82	0.82
0.6000	0.4764	0.6160	52.131	0.037	0.74	0.74	10.293	0.037	0.74	0.74
0.6250	0.5008	0.6404	52.169	0.038	0.57	0.57	14.269	0.038	0.57	0.57
0.6500	0.5252	0.6648	53.813	0.040	0.51	0.51	19.165	0.040	0.51	0.51
0.6750	0.5497	0.6893	57.596	0.044	0.44	0.44	24.960	0.044	0.44	0.44
0.6875	0.5619	0.7015	60.485	0.048	0.46	0.46	28.643	0.048	0.46	0.46
0.7000	0.5742	0.7138	61.390	0.221	0.45	0.45	30.402	0.221	0.45	0.45
0.7100	0.5840	0.7236	61.503	0.048	0.45	0.45	31.127	0.048	0.45	0.45
0.7300	0.6036	0.7432	60.035	0.205	0.45	0.45	30.431	0.205	0.45	0.45
0.7500	0.6233	0.7629	57.996	0.046	0.44	0.44	28.670	0.046	0.44	0.44
0.7625	0.6356	0.7752	56.525	0.045	0.43	0.43	27.127	0.045	0.43	0.43
0.7750	0.6479	0.7875	55.087	0.043	0.42	0.42	25.421	0.043	0.42	0.42
0.7875	0.6602	0.7998	53.791	0.042	0.40	0.40	23.675	0.042	0.40	0.40
0.8000	0.6725	0.8121	52.791	0.440	0.39	0.39	22.045	0.440	0.39	0.39
0.8125	0.6848	0.8244	52.222	0.039	0.39	0.39	20.688	0.039	0.39	0.39
0.8250	0.6971	0.8367	52.012	0.039	0.39	0.39	19.512	0.039	0.39	0.39
0.8375	0.7095	0.8491	52.621	0.040	0.39	0.39	18.895	0.040	0.39	0.39
0.8500	0.7218	0.8614	53.844	0.040	0.39	0.39	18.762	0.040	0.39	0.39
0.8625	0.7341	0.8737	55.450	0.041	0.39	0.39	18.912	0.041	0.39	0.39
0.8750	0.7465	0.8861	57.814	0.043	0.38	0.38	19.758	0.043	0.38	0.38
0.8875	0.7588	0.8984	60.801	0.046	0.37	0.37	21.203	0.046	0.37	0.37
0.9000	0.7712	0.9108	63.714	0.048	0.37	0.37	22.586	0.048	0.37	0.37
0.9125	0.7835	0.9231	66.802	0.050	0.37	0.37	24.188	0.050	0.37	0.37
0.9250	0.7959	0.9355	70.168	0.053	0.37	0.37	26.186	0.053	0.37	0.37
0.9375	0.8082	0.9478	73.767	0.056	0.37	0.37	28.645	0.056	0.37	0.37
0.9500	0.8206	0.9602	77.052	0.059	0.36	0.36	31.024	0.059	0.36	0.36
0.9625	0.8330	0.9726	79.811	0.061	0.36	0.36	33.023	0.061	0.36	0.36
0.9750	0.8453	0.9849	82.102	0.063	0.35	0.35	34.652	0.063	0.35	0.35
0.9875	0.8577	0.9973	83.844	0.065	0.34	0.34	35.828	0.065	0.34	0.34
0.9950	0.8651	1.0047	84.543	0.371	0.35	0.35	36.229	0.371	0.35	0.35
1.0000	0.8701	1.0097	84.810	0.066	0.35	0.35	36.312	0.066	0.35	0.35
1.0050	0.8750	1.0146	84.879	0.066	0.35	0.35	36.207	0.066	0.35	0.35

TABLE 2 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA(+) (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA(-) (MB)	STAT. ERR.	SYST. ERRORS PCS.	NEG.
1.0100	0.8800	1.0196	84.735	0.065	0.35	0.35	35.895	0.065	0.35	0.35
1.0250	0.8949	1.0345	82.864	0.063	0.35	0.35	33.532	0.063	0.35	0.35
1.0375	0.9072	1.0468	80.840	0.061	0.35	0.35	31.068	0.061	0.35	0.35
1.0500	0.9196	1.0592	78.916	0.207	0.35	0.35	28.684	0.207	0.35	0.35
1.0625	0.9320	1.0716	77.248	0.058	0.36	0.36	26.528	0.058	0.35	0.35
1.0750	0.9444	1.0840	75.373	0.056	0.36	0.36	24.127	0.056	0.35	0.35
1.0875	0.9568	1.0964	72.920	0.054	0.37	0.37	21.100	0.054	0.35	0.35
1.1000	0.9692	1.1088	70.815	0.052	0.37	0.37	18.355	0.052	0.35	0.35
1.1125	0.9816	1.1212	69.254	0.051	0.37	0.37	16.094	0.051	0.35	0.35
1.1250	0.9940	1.1336	68.175	0.049	0.37	0.37	14.259	0.649	0.35	0.35
1.1500	1.0188	1.1584	67.155	0.048	0.38	0.38	11.559	0.048	0.35	0.35
1.1750	1.0437	1.1833	66.922	0.048	0.38	0.38	9.352	0.048	0.35	0.35
1.2000	1.0685	1.2081	67.118	0.048	0.38	0.38	7.238	0.048	0.35	0.35
1.2250	1.0933	1.2329	67.962	0.048	0.38	0.38	5.598	0.048	0.35	0.35
1.2500	1.1182	1.2578	69.196	0.050	0.38	0.38	3.954	0.050	0.35	0.35
1.2625	1.1306	1.2702	69.946	0.050	0.38	0.38	3.054	0.050	0.35	0.35
1.2750	1.1430	1.2826	70.781	0.060	0.38	0.38	2.119	0.060	0.35	0.35
1.2875	1.1554	1.2950	71.609	0.050	0.38	0.38	1.319	0.050	0.35	0.35
1.3000	1.1679	1.3075	72.423	0.052	0.38	0.38	0.591	0.052	0.35	0.35
1.3250	1.1927	1.3323	74.189	0.053	0.37	0.37	-0.975	0.053	0.35	0.35
1.3500	1.2176	1.3572	75.618	0.089	0.36	0.36	-2.280	0.089	0.35	0.35
1.3750	1.2425	1.3821	76.625	0.054	0.35	0.35	-3.259	0.054	0.35	0.35
1.4000	1.2673	1.4069	77.478	0.055	0.35	0.35	-4.184	0.055	0.35	0.35
1.4250	1.2922	1.4318	77.940	0.055	0.34	0.34	-4.802	0.055	0.35	0.35
1.4500	1.3171	1.4567	77.868	0.065	0.34	0.34	-4.970	0.065	0.35	0.35
1.4750	1.3420	1.4816	77.297	0.194	0.34	0.34	-4.785	0.194	0.35	0.35
1.5000	1.3669	1.5065	76.409	0.054	0.36	0.36	-4.453	0.054	0.35	0.35
1.5170	1.3838	1.5234	75.621	0.203	0.36	0.36	-4.145	0.203	0.35	0.35
1.5350	1.4017	1.5413	74.697	0.052	0.36	0.36	-3.715	0.052	0.35	0.35
1.5500	1.4167	1.5563	73.899	0.052	0.36	0.36	-3.265	0.052	0.35	0.35
1.5750	1.4416	1.5812	72.501	0.051	0.36	0.36	-2.409	0.051	0.35	0.35
1.6000	1.4665	1.6061	71.070	0.050	0.36	0.36	-1.498	0.050	0.35	0.35
1.6250	1.4914	1.6310	69.833	0.049	0.37	0.37	-0.625	0.049	0.35	0.35
1.6500	1.5163	1.6559	68.819	0.252	0.38	0.38	0.233	0.252	0.35	0.35
1.6750	1.5412	1.6808	67.993	0.115	0.39	0.39	1.075	0.115	0.35	0.35
1.7000	1.5661	1.7057	67.340	0.048	0.42	0.42	1.880	0.048	0.35	0.35
1.7250	1.5910	1.7306	66.846	0.047	0.43	0.43	2.616	0.047	0.35	0.35
1.7500	1.6160	1.7556	66.514	0.047	0.45	0.45	3.244	0.047	0.35	0.35
1.7750	1.6409	1.7805	66.264	0.068	0.47	0.47	3.822	0.068	0.35	0.35
1.8000	1.6658	1.8054	66.036	0.047	0.48	0.48	4.366	0.047	0.35	0.35

TABLE 2 (CTD.)

P (GEV/C)	T (CEV)	NU (GEV)	SIGMA(+) (MB)	STAT. ERR.	SYST. ERRORS POS.	NEG.	SIGMA(-) (MB)	STAT. ERR.	SYST. ERRORS PCS.	NEG.
1.8250	1.6907	1.8303	65.824	0.192	0.51	0.51	4.872	0.192	0.35	0.35
1.8500	1.7157	1.8553	65.647	0.046	0.52	0.52	5.323	0.046	0.35	0.35
1.8750	1.7406	1.8802	65.528	0.047	0.52	0.52	5.696	0.047	0.35	0.35
1.9160	1.7815	1.9211	65.465	0.173	0.53	0.53	6.249	0.173	0.35	0.35
1.9500	1.8154	1.9550	65.493	0.046	0.54	0.54	6.655	0.046	0.35	0.35
2.0000	1.8653	2.0049	65.592	0.088	0.56	0.56	7.074	0.088	0.35	0.35
2.0500	1.9151	2.0547	65.630	0.088	0.62	0.62	7.210	0.088	0.35	0.35
2.0750	1.9401	2.0797	65.609	0.113	0.66	0.61	7.193	0.113	0.39	0.43
2.1000	1.9650	2.1046	65.568	0.262	0.70	0.60	7.126	0.262	0.44	0.53
2.1500	2.0149	2.1545	65.433	0.050	0.74	0.54	6.871	0.050	0.54	0.74
2.2000	2.0648	2.2044	65.265	0.047	0.81	0.56	6.487	0.047	0.56	0.81
2.2500	2.1147	2.2543	65.103	0.044	0.85	0.60	6.011	0.044	0.60	0.85
2.3000	2.1646	2.3042	64.920	0.040	0.85	0.60	5.418	0.040	0.60	0.85
2.3500	2.2145	2.3541	64.784	0.040	0.84	0.59	4.718	0.040	0.59	0.84
2.4000	2.2645	2.4041	64.757	0.039	0.88	0.63	4.095	0.039	0.50	0.75
2.4500	2.3144	2.4540	64.716	0.251	0.92	0.60	3.588	0.251	0.50	0.60
2.5200	2.3843	2.5239	64.562	0.261	0.95	0.50	3.038	0.261	0.40	0.50
2.6200	2.4841	2.6237	64.189	0.102	0.93	0.44	2.541	0.102	0.33	0.30
2.7200	2.5840	2.7236	63.635	0.030	0.90	0.40	2.399	0.030	0.25	0.20
2.8200	2.6839	2.8235	62.908	0.030	0.90	0.40	2.608	0.030	0.25	0.20
2.9200	2.7837	2.9233	62.221	0.031	0.90	0.40	2.899	0.031	0.25	0.20
3.0200	2.8836	3.0232	61.578	0.030	0.90	0.40	3.244	0.030	0.25	0.20
3.1200	2.9835	3.1231	61.130	0.025	0.90	0.40	3.468	0.025	0.25	0.20
3.2200	3.0834	3.2230	60.768	0.025	0.90	0.40	3.580	0.025	0.25	0.20
3.3200	3.1833	3.3229	60.404	0.034	0.90	0.40	3.542	0.034	0.25	0.20
3.4200	3.2832	3.4228	60.094	0.037	0.90	0.40	3.460	0.037	0.25	0.20
3.5200	3.3832	3.5228	59.797	0.025	0.90	0.40	3.345	0.025	0.25	0.20
3.6200	3.4831	3.6227	59.494	0.037	0.90	0.40	3.180	0.037	0.25	0.20
3.7200	3.5830	3.7226	59.204	0.038	0.90	0.40	3.026	0.038	0.25	0.20
3.8200	3.6829	3.8225	58.910	0.015	0.90	0.40	2.906	0.015	0.25	0.20
3.9300	3.7929	3.9325	58.560	0.049	0.90	0.40	2.842	0.049	0.25	0.20
4.0300	3.8928	4.0324	58.263	0.015	0.90	0.40	2.801	0.015	0.25	0.20
4.1300	3.9928	4.1324	57.952	0.015	0.90	0.40	2.810	0.015	0.25	0.20
4.2300	4.0927	4.2323	57.643	0.042	0.90	0.40	2.829	0.042	0.25	0.20
4.3300	4.1926	4.3322	57.355	0.015	0.90	0.40	2.831	0.015	0.25	0.20
4.4300	4.2926	4.4322	57.063	0.015	0.90	0.40	2.831	0.015	0.25	0.20
4.5300	4.3925	4.5321	56.802	0.015	0.90	0.40	2.798	0.015	0.25	0.20
4.6300	4.4925	4.6321	56.572	0.015	0.90	0.40	2.762	0.015	0.25	0.20
4.7300	4.5925	4.7321	56.361	0.023	0.90	0.40	2.737	0.023	0.25	0.20
4.8300	4.6924	4.8320	56.164	0.017	0.90	0.40	2.718	0.017	0.25	0.20

TABLE 2 (CTD.)

P (GEV/C)	T (GEV)	NU (GEV)	SIGMA(+) (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	SIGMA(-) (MB)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.
4.9300	4.7924	4.9320	55.977	0.023	0.90	0.40	2.701	0.023	0.25	0.20
5.0300	4.8923	5.0319	55.796	0.015	0.90	0.40	2.682	0.015	0.25	0.20
5.1300	4.9923	5.1319	55.613	0.031	0.90	0.40	2.655	0.031	0.25	0.20
5.2300	5.0923	5.2319	55.433	0.015	0.90	0.40	2.627	0.015	0.25	0.20
5.3300	5.1922	5.3318	55.261	0.019	0.90	0.40	2.601	0.019	0.25	0.20
5.4400	5.3022	5.4418	55.085	0.036	0.90	0.40	2.579	0.036	0.25	0.20
5.5400	5.4022	5.5418	54.935	0.039	0.90	0.40	2.563	0.039	0.25	0.20
5.6400	5.5021	5.6417	54.791	0.040	0.90	0.40	2.549	0.040	0.25	0.20
5.7400	5.6021	5.7417	54.643	0.053	0.90	0.40	2.543	0.053	0.25	0.20
5.8400	5.7021	5.8417	54.512	0.045	0.90	0.40	2.534	0.040	0.25	0.20
5.9400	5.8020	5.9416	54.399	0.069	0.88	0.40	2.521	0.051	0.25	0.20
6.0400	5.9020	6.0416	54.307	0.097	0.86	0.40	2.505	0.042	0.25	0.20
6.440	6.302	6.442	53.948	0.21	0.77	0.39	2.440	0.07	0.25	0.20
7.000	6.861	7.001	53.493	0.25	0.68	0.37	2.361	0.25	0.24	0.19
8.000	7.861	8.001	52.757	0.23	0.52	0.32	2.231	0.20	0.21	0.17
9.000	8.861	9.001	52.123	0.19	0.40	0.26	2.117	0.19	0.18	0.15
10.000	9.861	10.001	51.581	0.14	0.28	0.20	2.019	0.10	0.14	0.12
11.000	10.861	11.001	51.121	0.10	0.21	0.17	1.935	0.10	0.11	0.10
12.000	11.861	12.001	50.733	0.07	0.15	0.15	1.861	0.09	0.08	0.08
13.000	12.861	13.001	50.406	0.06	0.15	0.15	1.798	0.06	0.08	0.08
14.000	13.861	14.001	50.129	0.04	0.15	0.15	1.741	0.04	0.08	0.08
15.000	14.861	15.001	49.889	0.04	0.15	0.15	1.687	0.04	0.08	0.08
16.000	15.861	16.001	49.685	0.04	0.15	0.15	1.641	0.04	0.08	0.08
17.000	16.861	17.001	49.489	0.05	0.15	0.15	1.601	0.04	0.08	0.08
18.000	17.861	18.001	49.306	0.10	0.15	0.15	1.560	0.04	0.08	0.08
19.000	18.861	19.001	49.137	0.05	0.15	0.15	1.523	0.05	0.08	0.08
20.000	19.860	20.000	48.985	0.08	0.15	0.15	1.491	0.08	0.08	0.08
22.000	21.860	22.000	48.744	0.24	0.16	0.16	1.430	0.21	0.09	0.09
24.000	23.860	24.000	48.564	0.18	0.17	0.17	1.374	0.10	0.10	0.10
26.000	25.860	26.000	48.424	0.20	0.18	0.18	1.322	0.10	0.11	0.11
28.000	27.860	28.000	48.317	0.20	0.19	0.19	1.277	0.10	0.11	0.11
30.000	29.860	30.000	48.224	0.25	0.21	0.21	1.230	0.10	0.11	0.11
35.000	34.860	35.000	48.007	0.31	0.24	0.24	1.145	0.09	0.10	0.10

TABLE 3

SUBTRACTED REAL PARTS FOR THE CROSSING-EVEN AND -ODD COMBINATIONS

NU (GEV)	DF(-)/NU (MB)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.	DF(+) (MBGEV)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.
0.00000	-1.3221	0.0173	0.114	0.112	0.114	0.112	-0.6590	0.0037	-0.0085	-0.0089	0.0089	0.0085
0.02000	-1.3322	0.0174	0.114	0.113	0.114	0.113	-0.6488	0.0037	-0.0084	-0.0088	0.0088	0.0084
0.04000	-1.3629	0.0174	0.115	0.114	0.115	0.114	-0.6175	0.0037	-0.0082	-0.0085	0.0085	0.0082
0.06000	-1.4161	0.0175	0.117	0.115	0.117	0.115	-0.5638	0.0037	-0.0077	-0.0081	0.0081	0.0077
0.08000	-1.4947	0.0177	0.120	0.118	0.120	0.118	-0.4847	0.0036	-0.0070	-0.0074	0.0074	0.0070
0.10000	-1.6035	0.0181	0.124	0.122	0.124	0.122	-0.3752	0.0034	-0.0059	-0.0063	0.0063	0.0059
0.12000	-1.7472	0.0191	0.131	0.129	0.131	0.129	-0.2258	0.0031	-0.0043	-0.0046	0.0046	0.0043
0.13000	-1.8296	0.0205	0.138	0.135	0.138	0.135	-0.1296	0.0028	-0.0030	-0.0032	0.0032	0.0030
0.13250	-1.8496	0.0212	0.140	0.137	0.140	0.137	-0.1022	0.0026	-0.0025	-0.0027	0.0027	0.0025
0.13500	-1.8674	0.0222	0.143	0.139	0.143	0.139	-0.0727	0.0023	-0.0020	-0.0022	0.0022	0.0020
0.13600	-1.8733	0.0228	0.144	0.140	0.144	0.140	-0.0601	0.0022	-0.0018	-0.0019	0.0019	0.0018
0.13700	-1.8779	0.0236	0.146	0.142	0.146	0.142	-0.0468	0.0020	-0.0015	-0.0016	0.0016	0.0015
0.13800	-1.8801	0.0248	0.148	0.143	0.148	0.143	-0.0325	0.0017	-0.0011	-0.0012	0.0012	0.0011
0.13850	-1.8794	0.0256	0.149	0.144	0.149	0.144	-0.0247	0.0015	-0.0009	-0.0010	0.0010	0.0009
0.13900	-1.8762	0.0269	0.150	0.145	0.150	0.145	-0.0161	0.0012	-0.0007	-0.0007	0.0007	0.0007
0.13925	-1.8725	0.0278	0.151	0.146	0.151	0.146	-0.0111	0.0009	-0.0005	-0.0005	0.0005	0.0005
0.13940	-1.8687	0.0286	0.152	0.146	0.152	0.146	-0.0076	0.0007	-0.0004	-0.0004	0.0004	0.0004
0.13950	-1.8644	0.0295	0.152	0.147	0.152	0.147	-0.0047	0.0005	-0.0003	-0.0002	0.0002	0.0003
0.13954	-1.8616	0.0300	0.152	0.147	0.152	0.147	-0.0031	0.0004	-0.0002	-0.0002	0.0002	0.0002
0.13956	-1.8594	0.0304	0.153	0.147	0.153	0.147	-0.0021	0.0003	-0.0001	-0.0001	0.0001	0.0001
0.13958	-1.8538	0.0314	0.153	0.148	0.153	0.148	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.14458	-1.9483	0.0296	0.160	0.152	0.160	0.152	0.0516	0.0030	0.0003	0.0007	0.0005	0.0007
0.14858	-2.0380	0.0322	0.164	0.159	0.164	0.159	0.0976	0.0041	0.0012	0.0012	0.0012	0.0013
0.15258	-2.1379	0.0349	0.165	0.166	0.165	0.166	0.1478	0.0050	0.0026	0.0018	0.0026	0.0018
0.15683	-2.2528	0.0368	0.164	0.169	0.164	0.169	0.2056	0.0056	0.0038	0.0022	0.0037	0.0022
0.16108	-2.3720	0.0433	0.158	0.162	0.158	0.162	0.2677	0.0067	0.0029	0.0016	0.0030	0.0016
0.16438	-2.4665	0.0454	0.151	0.153	0.151	0.153	0.3187	0.0071	0.0018	0.0008	0.0029	0.0019
0.17058	-2.6527	0.0408	0.143	0.143	0.143	0.143	0.4217	0.0067	0.0007	-0.0002	0.0055	0.0046
0.17658	-2.8418	0.0515	0.135	0.136	0.135	0.136	0.5311	0.0088	-0.0002	-0.0010	0.0080	0.0071
0.18108	-2.9882	0.0563	0.130	0.130	0.131	0.131	0.6197	0.0098	-0.0009	-0.0017	0.0101	0.0093
0.18958	-3.2755	0.0573	0.119	0.119	0.146	0.146	0.8020	0.0106	-0.0026	-0.0033	0.0155	0.0148
0.19758	-3.5549	0.0655	0.104	0.104	0.220	0.221	0.9883	0.0130	-0.0051	-0.0058	0.031	0.030
0.20458	-3.8096	0.0606	0.085	0.087	0.254	0.256	1.1627	0.0127	-0.0088	-0.0091	0.039	0.038
0.21118	-4.0527	0.0443	0.069	0.068	0.239	0.238	1.3340	0.0097	-0.0120	-0.0130	0.038	0.037
0.21658	-4.2654	0.0319	0.072	0.068	0.212	0.208	1.4849	0.0071	-0.0113	-0.0130	0.033	0.031
0.22658	-4.7205	0.0246	0.097	0.095	0.156	0.155	1.7901	0.0054	-0.0057	-0.0067	0.022	0.021
0.23558	-5.1182	0.0249	0.110	0.109	0.155	0.154	2.0718	0.0055	-0.0024	-0.0034	0.022	0.022
0.24558	-5.4509	0.0251	0.119	0.118	0.156	0.155	2.3816	0.0056	0.0004	-0.0006	0.023	0.022
0.25358	-5.6129	0.0269	0.121	0.120	0.152	0.151	2.6064	0.0041	0.0013	0.0003	0.023	0.022
0.25858	-5.7044	0.0713	0.121	0.120	0.149	0.148	2.7217	0.0260	0.0015	0.0005	0.023	0.022
0.25998	-5.7263	0.0755	0.120	0.119	0.148	0.147	2.7475	0.0280	0.0015	0.0004	0.023	0.022
0.26658	-5.7402	0.0329	0.117	0.116	0.142	0.141	2.8229	0.0067	0.0010	-0.0000	0.022	0.021
0.27558	-5.4885	0.0431	0.113	0.112	0.135	0.134	2.7969	0.0115	0.0005	-0.0006	0.021	0.020
0.27958	-5.2547	0.0431	0.113	0.111	0.134	0.132	2.7276	0.0116	0.0005	-0.0006	0.021	0.019
0.28958	-4.3080	0.0304	0.119	0.117	0.137	0.136	2.3704	0.0081	0.0028	0.0016	0.022	0.021
0.29858	-3.0562	0.0416	0.115	0.114	0.131	0.130	1.8148	0.0119	0.0022	0.0010	0.022	0.020

TABLE 3 (CTD.)

NU (GEV)	DF(-)/NU (MB)	STAT. ERR.	CORR.SYST.ERR. POS.	NEG.	MAX.SYST.ERR. POS.	NEG.	DFS(+) (MBGEV)	STAT. ERR	CORR.SYST.ERR. POS.	NEG.	MAX.SYST.ERR. POS.	NEG.
0.30258	-2.4340	0.0403	0.110	0.109	0.126	0.125	1.4983	0.0116	0.0010	-0.0002	0.020	0.019
0.30758	-1.6563	0.0363	0.106	0.105	0.121	0.120	1.0692	0.0105	0.0001	-0.0011	0.019	0.018
0.31258	-0.8549	0.0386	0.103	0.102	0.117	0.116	0.6393	0.0114	-0.0006	-0.0019	0.019	0.018
0.31758	-0.0423	0.0392	0.099	0.098	0.112	0.111	0.2126	0.0117	-0.0017	-0.0030	0.020	0.019
0.32458	1.0147	0.0366	0.093	0.092	0.107	0.106	-0.3833	0.0110	-0.0034	-0.0047	0.023	0.022
0.33458	2.3111	0.0355	0.086	0.084	0.112	0.111	-1.1737	0.0110	-0.0055	-0.0068	0.027	0.026
0.34458	3.3212	0.0349	0.081	0.080	0.121	0.120	-1.8230	0.0111	-0.0066	-0.0080	0.031	0.029
0.35658	4.1901	0.0318	0.079	0.078	0.128	0.127	-2.4045	0.0103	-0.0071	-0.0085	0.035	0.033
0.36858	4.7435	0.0297	0.079	0.078	0.135	0.134	-2.7797	0.0097	-0.0068	-0.0083	0.038	0.036
0.38158	5.0817	0.0281	0.082	0.081	0.140	0.139	-3.0039	0.0093	-0.0053	-0.0069	0.041	0.040
0.39458	5.2568	0.0271	0.087	0.086	0.147	0.145	-3.1173	0.0091	-0.0030	-0.0047	0.045	0.043
0.40958	5.3174	0.0271	0.096	0.095	0.154	0.153	-3.1474	0.0094	0.0014	-0.0003	0.050	0.048
0.42158	5.3255	0.0292	0.110	0.109	0.162	0.161	-3.1206	0.0105	0.0079	0.0061	0.055	0.053
0.43458	5.3030	0.0376	0.127	0.126	0.203	0.202	-3.0506	0.0148	0.0160	0.0140	0.074	0.072
0.44958	5.2247	0.0538	0.135	0.134	0.262	0.260	-2.9270	0.0231	0.0210	0.0190	0.103	0.101
0.46358	5.1128	0.0589	0.129	0.128	0.287	0.286	-2.7872	0.0265	0.0194	0.0172	O 119	0.117
0.47958	4.9553	0.0510	0.106	0.105	0.317	0.316	-2.6131	0.0238	0.0097	0.0074	0.139	0.136
0.4951	4.7995	0.0358	0.077	0.076	0.270	0.269	-2.4507	0.0165	-0.0035	-0.0059	0.120	0.118
0.5191	4.5783	0.0179	0.050	0.049	0.126	0.124	-2.2375	0.0064	-0.0166	-0.0192	0.051	0.049
0.5432	4.3694	0.0171	0.043	0.041	0.098	0.097	-2.0488	0.0053	-0.0206	-0.0234	0.038	0.035
0.5674	4.1940	0.0168	0.035	0.034	0.080	0.079	-1.8625	0.0049	-0.0249	-0.0280	0.036	0.033
0.5917	4.0644	0.0165	0.030	0.029	0.068	0.067	-1.6697	0.0047	-0.0278	-0.0310	0.040	0.036
0.6160	3.9432	0.0164	0.028	0.027	0.060	0.059	-1.4717	0.0045	-0.0294	-0.0329	0.042	0.039
0.6404	3.8195	0.0164	0.028	0.027	0.056	0.055	-1.2582	0.0044	-0.0293	-0.0330	0.043	0.040
0.6648	3.6786	0.0163	0.032	0.031	0.057	0.056	-1.0359	0.0044	-0.0266	-0.0306	0.042	0.038
0.6893	3.4492	0.0166	0.038	0.037	0.060	0.059	-0.8698	0.0049	-0.0227	-0.0270	0.039	0.035
0.7015	3.1927	0.0179	0.039	0.038	0.061	0.059	-0.8985	0.0067	-0.0214	-0.0259	0.039	0.034
0.7138	2.8568	0.0199	0.040	0.039	0.060	0.059	-0.9852	0.0092	-0.0209	-0.0255	0.039	0.034
0.7236	2.5928	0.0201	0.041	0.040	0.060	0.059	-1.0496	0.0096	-0.0203	-0.0250	0.039	0.034
0.7432	2.1205	0.0186	0.041	0.040	0.059	0.058	-1.1381	0.0081	-0.0197	-0.0247	0.039	0.034
0.7629	1.7635	0.0176	0.041	0.040	0.057	0.056	-1.1480	0.0069	-0.0196	-0.0248	0.040	0.035
0.7752	1.5917	0.0169	0.041	0.040	0.057	0.055	-1.1186	0.0058	-0.0195	-0.0249	0.041	0.035
0.7875	1.4643	0.0172	0.041	0.039	0.056	0.055	-1.0576	0.0064	-0.0194	-0.0250	0.041	0.036
0.7998	1.3819	0.0220	0.041	0.040	0.056	0.055	-0.9640	0.0123	-0.0189	-0.0246	0.041	0.036
0.8121	1.3431	0.0265	0.042	0.041	0.056	0.055	-0.8388	0.0177	-0.0178	-0.0237	0.041	0.035
0.8244	1.3376	0.0219	0.043	0.042	0.056	0.055	-0.6890	0.0127	-0.0168	-0.0229	0.041	0.035
0.8367	1.3667	0.0170	0.043	0.042	0.056	0.055	-0.5119	0.0065	-0.0162	-0.0225	0.041	0.035
0.8491	1.4236	0.0165	0.044	0.042	0.056	0.055	-0.3164	0.0054	-0.0157	-0.0222	0.041	0.035
0.8614	1.4838	0.0164	0.044	0.042	0.056	0.055	-0.1306	0.0051	-0.0154	-0.0220	0.042	0.035
0.8737	1.5535	0.0163	0.043	0.042	0.055	0.054	0.0521	0.0049	-0.0153	-0.0222	0.043	0.036
0.8861	1.6262	0.0163	0.043	0.042	0.054	0.053	0.2264	0.0049	-0.0152	-0.0223	0.043	0.036
0.8984	1.6609	0.0163	0.043	0.042	0.054	0.053	0.3529	0.0050	-0.0145	-0.0217	0.044	0.036
0.9108	1.6648	0.0163	0.044	0.043	0.055	0.053	0.4379	0.0050	-0.0137	-0.0211	0.044	0.036
0.9231	1.6613	0.0163	0.044	0.043	0.054	0.053	0.4994	0.0051	-0.0131	-0.0208	0.044	0.036
0.9355	1.6389	0.0164	0.044	0.043	0.054	0.053	0.5261	0.0053	-0.0127	-0.0206	0.044	0.037
0.9478	1.5658	0.0164	0.044	0.043	0.053	0.052	0.4912	0.0054	-0.0126	-0.0207	0.045	0.037
0.9602	1.4240	0.0165	0.044	0.043	0.053	0.052	0.3857	0.0056	-0.0122	-0.0205	0.046	0.038

TABLE 3 (CTD.)

NU (GEV)	DF(-)/NU (MB)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.	DFS(+) (MBGEV)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.
0.9726	1.2323	0.0165	0.044	0.043	0.053	0.052	0.2310	0.0058	-0.0118	-0.0203	0.046	0.038
0.9849	1.0035	0.0164	0.044	0.043	0.053	0.052	0.0365	0.0059	-0.0114	-0.0201	0.047	0.038
0.9973	0.7321	0.0208	0.045	0.044	0.053	0.053	-0.2036	0.0135	-0.0098	-0.0187	0.046	0.037
1.0047	0.5494	0.0252	0.045	0.044	0.053	0.053	-0.3692	0.0202	-0.0092	-0.0183	0.046	0.037
1.0097	0.4175	0.0218	0.045	0.044	0.053	0.052	-0.4898	0.0152	-0.0091	-0.0183	0.047	0.038
1.0146	0.2839	0.0176	0.045	0.044	0.053	0.052	-0.6128	0.0088	-0.0089	-0.0182	0.047	0.038
1.0196	0.1460	0.0173	0.045	0.044	0.053	0.052	-0.7402	0.0080	-0.0086	-0.0180	0.047	0.038
1.0345	-0.2145	0.0166	0.045	0.044	0.053	0.052	-1.0679	0.0064	-0.0079	-0.0175	0.047	0.038
1.0468	-0.4201	0.0179	0.045	0.044	0.053	0.052	-1.2441	0.0093	-0.0071	-0.0170	0.048	0.038
1.0592	-0.5697	0.0190	0.045	0.044	0.053	0.052	-1.3621	0.0117	-0.0061	-0.0163	0.048	0.038
1.0716	-0.7017	0.0178	0.045	0.044	0.053	0.052	-1.4608	0.0093	-0.0055	-0.0159	0.048	0.038
1.0840	-0.8319	0.0165	0.045	0.044	0.052	0.052	-1.5571	0.0064	-0.0049	-0.0156	0.049	0.038
1.0964	-0.9136	0.0164	0.045	0.045	0.052	0.051	-1.5997	0.0060	-0.0045	-0.0155	0.050	0.039
1.1088	-0.9259	0.0164	0.045	0.045	0.052	0.051	-1.5652	0.0058	-0.0045	-0.0157	0.051	0.040
1.1212	-0.9033	0.0164	0.045	0.045	0.052	0.051	-1.4911	0.0060	-0.0041	-0.0156	0.052	0.040
1.1336	-0.8677	0.0164	0.045	0.045	0.052	0.051	-1.4013	0.0059	-0.0035	-0.0153	0.052	0.041
1.1584	-0.7995	0.0162	0.045	0.044	0.051	0.051	-1.2219	0.0053	-0.0027	-0.0151	0.054	0.042
1.1833	-0.7530	0.0162	0.045	0.044	0.051	0.050	-1.0665	0.0055	-0.0025	-0.0154	0.056	0.043
1.2081	-0.7018	0.0162	0.045	0.044	0.051	0.050	-0.9198	0.0056	-0.0018	-0.0154	0.058	0.045
1.2329	-0.6492	0.0162	0.045	0.044	0.050	0.050	-0.7876	0.0055	-0.0012	-0.0154	0.061	0.046
1.2578	-0.6113	0.0164	0.045	0.044	0.050	0.049	-0.6889	0.0064	-0.0005	-0.0154	0.063	0.048
1.2702	-0.5899	0.0164	0.045	0.044	0.050	0.049	-0.6541	0.0066	-0.0002	-0.0154	0.064	0.049
1.2826	-0.5582	0.0164	0.045	0.044	0.050	0.049	-0.6342	0.0065	0.0001	-0.0154	0.065	0.050
1.2950	-0.5194	0.0165	0.045	0.044	0.049	0.049	-0.6296	0.0068	0.0004	-0.0155	0.066	0.051
1.3075	-0.4824	0.0165	0.045	0.044	0.049	0.049	-0.6347	0.0068	0.0005	-0.0158	0.068	0.052
1.3323	-0.4006	0.0165	0.044	0.044	0.049	0.048	-0.6891	0.0069	0.0008	-0.0163	0.071	0.054
1.3572	-0.2939	0.0167	0.044	0.044	0.049	0.048	-0.8101	0.0081	0.0019	-0.0159	0.073	0.055
1.3821	-0.1835	0.0166	0.044	0.044	0.048	0.048	-0.9596	0.0077	0.0038	-0.0149	0.075	0.056
1.4069	-0.0658	0.0165	0.044	0.044	0.048	0.047	-1.1365	0.0072	0.0055	-0.0140	0.077	0.057
1.4318	0.0699	0.0166	0.044	0.044	0.048	0.047	-1.3530	0.0079	0.0075	-0.0129	0.079	0.058
1.4567	0.2079	0.0177	0.044	0.043	0.047	0.047	-1.5876	0.0118	0.0101	-0.0111	0.080	0.059
1.4816	0.3314	0.0186	0.044	0.043	0.047	0.047	-1.8126	0.0150	0.0133	-0.0089	0.081	0.059
1.5065	0.4399	0.0191	0.043	0.043	0.048	0.048	-2.0167	0.0166	0.0152	-0.0079	0.083	0.060
1.5234	0.5090	0.0192	0.043	0.043	0.048	0.048	-2.1388	0.0169	0.0158	-0.0080	0.086	0.062
1.5413	0.5782	0.0178	0.043	0.043	0.049	0.049	-2.2478	0.0129	0.0171	-0.0075	0.088	0.063
1.5563	0.6305	0.0167	0.043	0.043	0.050	0.049	-2.3251	0.0093	0.0183	-0.0070	0.089	0.064
1.5812	0.7015	0.0165	0.043	0.043	0.050	0.050	-2.4262	0.0081	0.0206	-0.0058	0.092	0.066
1.6061	0.7527	0.0166	0.043	0.043	0.051	0.051	-2.4816	0.0091	0.0237	-0.0038	0.094	0.067
1.6310	0.7889	0.0185	0.043	0.043	0.052	0.053	-2.4951	0.0154	0.0270	-0.0017	0.096	0.068
1.6559	0.8144	0.0205	0.043	0.043	0.053	0.054	-2.4856	0.0221	0.0299	-0.0001	0.099	0.069
1.6808	0.8292	0.0191	0.042	0.043	0.054	0.055	-2.4629	0.0181	0.0337	0.0023	0.102	0.070
1.7057	0.8333	0.0170	0.042	0.043	0.055	0.056	-2.4319	0.0111	0.0362	0.0034	0.105	0.073
1.7306	0.8276	0.0165	0.042	0.043	0.057	0.058	-2.3967	0.0089	0.0379	0.0036	0.111	0.076
1.7556	0.8166	0.0166	0.042	0.043	0.058	0.059	-2.3653	0.0092	0.0403	0.0044	0.115	0.080
1.7805	0.8037	0.0167	0.042	0.043	0.059	0.061	-2.3441	0.0101	0.0416	0.0041	0.122	0.084
1.8054	0.7875	0.0177	0.042	0.044	0.061	0.062	-2.3292	0.0145	0.0436	0.0043	0.128	0.089
1.8303	0.7669	0.0187	0.042	0.044	0.062	0.064	-2.3149	0.0187	0.0447	0.0035	0.136	0.095

TABLE 3 (CTD.)

NU (GEV)	DF(-)/NU (MB)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.	DFS(+) (MBGEV)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.
1.8553	0.7421	0.0178	0.042	0.044	0.064	0.066	-2.2985	0.0155	0.0440	0.0007	0.146	0.103
1.8802	0.7159	0.0172	0.042	0.044	0.066	0.068	-2.2813	0.0132	0.0447	-0.0008	0.156	0.111
1.9211	0.6716	0.0183	0.042	0.045	0.070	0.072	-2.2600	0.0181	0.0481	-0.0015	0.172	0.123
1.9550	0.6296	0.0179	0.043	0.047	0.073	0.077	-2.2553	0.0166	0.0514	-0.0021	0.188	0.134
2.0049	0.5580	0.0168	0.044	0.049	0.080	0.085	-2.2753	0.0123	0.0590	-0.0018	0.216	0.155
2.0547	0.4835	0.0180	0.048	0.058	0.086	0.095	-2.3229	0.0181	0.0668	-0.0095	0.264	0.188
2.0797	0.4478	0.0213	0.050	0.063	0.094	0.107	-2.3521	0.0294	0.0687	-0.0152	0.304	0.220
2.1046	0.4139	0.0227	0.051	0.065	0.117	0.131	-2.3824	0.0343	0.0683	-0.0196	0.368	0.280
2.1545	0.3521	0.0178	0.047	0.058	0.161	0.173	-2.4432	0.0184	0.0671	-0.0207	0.467	0.379
2.2044	0.2995	0.0167	0.042	0.046	0.169	0.174	-2.5000	0.0125	0.0649	-0.0158	0.474	0.393
2.2543	0.2551	0.0165	0.037	0.036	0.176	0.175	-2.5552	0.0114	0.0566	-0.0196	0.492	0.416
2.3042	0.2203	0.0166	0.0305	0.0256	0.178	0.173	-2.6060	0.0120	0.0497	-0.0269	0.509	0.433
2.3541	0.2027	0.0169	0.0235	0.0144	0.176	0.167	-2.6488	0.0142	0.0500	-0.0296	0.526	0.447
2.4041	0.2031	0.0194	0.0202	0.0032	0.173	0.156	-2.7010	0.0261	0.0514	-0.0378	0.552	0.463
2.4540	0.2132	0.0228	0.0186	-0.0017	0.163	0.142	-2.7737	0.0402	0.0468	-0.0526	0.561	0.461
2.5239	0.2360	0.0226	0.0147	-0.0026	0.138	0.120	-2.8934	0.0408	0.0352	-0.0608	0.531	0.435
2.6237	0.2795	0.0185	0.0158	-0.0018	0.119	0.102	-3.0773	0.0259	0.0204	-0.0558	0.522	0.446
2.7236	0.3269	0.0166	0.0189	0.0067	0.097	0.085	-3.2619	0.0154	0.0152	-0.0496	0.447	0.382
2.8235	0.3615	0.0162	0.0228	0.0131	0.075	0.065	-3.4153	0.0112	0.0129	-0.0441	0.327	0.270
2.9233	0.3773	0.0161	0.0241	0.0158	0.066	0.058	-3.5275	0.0106	0.0089	-0.0423	0.286	0.234
3.0232	0.3761	0.0161	0.0248	0.0175	0.060	0.053	-3.6035	0.0102	0.0047	-0.0415	0.261	0.214
3.1231	0.3613	0.0160	0.0253	0.0186	0.056	0.049	-3.6624	0.0100	0.0006	-0.0412	0.241	0.200
3.2230	0.3405	0.0161	0.0255	0.0195	0.053	0.047	-3.7341	0.0103	-0.0036	-0.0412	0.226	0.189
3.3229	0.3207	0.0161	0.0256	0.0201	0.050	0.044	-3.8097	0.0113	-0.0079	-0.0414	0.213	0.180
3.4228	0.3056	0.0161	0.0257	0.0205	0.048	0.042	-3.8854	0.0118	-0.0122	-0.0418	0.202	0.172
3.5228	0.2929	0.0161	0.0256	0.0208	0.046	0.041	-3.9688	0.0119	-0.0166	-0.0424	0.192	0.166
3.6227	0.2847	0.0161	0.0255	0.0210	0.044	0.039	-4.0540	0.0128	-0.021 1	-0.0431	0.183	0.161
3.7226	0.2822	0.0161	0.0254	0.0212	0.042	0.038	-4.1402	0.0131	-0.026	-0.044	0.174	0.156
3.8225	0.2838	0.0161	0.0253	0.0213	0.041	0.037	-4.2299	0.0133	-0.030	-0.045	0.166	0.152
3.9325	0.2866	0.0162	0.0251	0.0214	0.040	0.036	-4.3238	0.0145	-0.036	-0.046	0.158	0.147
4.0324	0.2890	0.0161	0.0249	0.0214	0.038	0.035	-4.4047	0.0138	-0.041	-0.047	0.149	0.143
4.1324	0.2905	0.0161	0.0247	0.0214	0.037	0.034	-4.4832	0.0139	-0.046	-0.048	0.150	0.148
4.2323	0.2888	0.0162	0.0245	0.0213	0.036	0.033	-4.5526	0.0154	-0.052	-0.049	0.159	0.161
4.3322	0.2857	0.0161	0.0243	0.0213	0.036	0.032	-4.6163	0.0151	-0.057	-0.050	0.168	0.174
4.4322	0.2813	0.0161	0.0241	0.0212	0.035	0.032	-4.6725	0.0147	-0.063	-0.052	0.177	0.188
4.5321	0.2770	0.0161	0.0238	0.0211	0.034	0.031	-4.7185	0.0154	-0.069	-0.053	0.187	0.203
4.6321	0.2743	0.0161	0.0236	0.0210	0.033	0.030	-4.7622	0.0164	-0.075	-0.055	0.197	0.218
4.7321	0.2723	0.0162	0.0233	0.0209	0.032	0.030	-4.8066	0.0116	-0.082	-0.056	0.209	0.234
4.8320	0.2701	0.0162	0.0231	0.0208	0.032	0.030	-4.8517	0.0187	-0.089	-0.058	0.221	0.252
4.9320	0.2676	0.0162	0.0228	0.0206	0.033	0.031	-4.8979	0.0198	-0.096	-0.060	0.234	0.271
5.0319	0.2648	0.0163	0.0225	0.0205	0.034	0.032	-4.9455	0.0213	-0.104	-0.062	0.249	0.291
5.1319	0.2621	0.0163	0.0223	0.0203	0.035	0.033	-4.9923	0.0229	-0.1 12	-0.064	0.264	0.312
5.2319	0.2599	0.0164	0.0220	0.0202	0.036	0.034	-5.0356	0.0242	-0.120	-0.066	0.282	0.336
5.3318	0.2583	0.0164	0.0217	0.0200	0.036	0.035	-5.0748	0.0261	-0.129	-0.068	0.301	0.363
5.4418	0.2567	0.0166	0.0214	0.0198	0.038	0.036	-5.1150	0.0298	-0.140	-0.070	0.325	0.395
5.5418	0.2552	0.0167	0.0211	0.0196	0.039	0.038	-5.1508	0.0331	-0.150	-0.073	0.350	0.428
5.6417	0.2538	0.0169	0.0208	0.0195	0.041	0.040	-5.187	0.037	-0.162	-0.075	0.379	0.466

TABLE 3 (CTD.)

NU (GEV)	DF(-)/NU (MB)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.	DFS(+) (MBGEV)	STAT. ERR.	CORR.SYST.ERR. POS.	CORR.SYST.ERR. NEG.	MAX.SYST.ERR. POS.	MAX.SYST.ERR. NEG.
5.7417	0.2521	0.0170	0.0205	0.0193	0.043	0.042	-5.219	0.041	-0.175	-0.078	0.413	0.511
5.8417	0.2499	0.0171	0.0202	0.0191	0.046	0.044	-5.244	0.047	-0.194	-0.081	0.456	0.569
5.9416	0.2475	0.0174	0.0199	0.0189	0.049	0.048	-5.267	0.062	-0.212	-0.084	0.513	0.642
6.0416	0.2453	0.0179	0.0196	0.0186	0.054	0.053	-5.294	0.080	-0.227	-0.087	0.597	0.736
6.442	0.2377	0.0195	0.0181	0.0176	0.061	0.059	-5.435	0.097	-0.271	-0.103	0.760	0.870
7.001	0.2285	0.0225	0.0159	0.0160	0.058	0.058	-5.649	0.122	-0.312	-0.124	0.730	0.918
8.001	0.2142	0.0209	0.0130	0.0142	0.049	0.050	-6.033	0.122	-0.372	-0.159	0.668	0.881
9.001	0.2026	0.0199	0.01 10	0.0128	0.038	0.040	-6.384	0.127	-0.408	-0.182	0.515	0.741
10.001	0.1930	0.0183	0.0101	0.0121	0.024	0.026	-6.695	0.116	-0.417	-0.184	0.310	0.542
11.001	0.1848	0.0174	0.0103	0.0123	0.021	0.022	-6.966	0.103	-0.400	-0.170	0.305	0.535
12.001	0.1778	0-0171	0.0116	0.0131	0.020	0.021	-7.204	0.096	-0.361	-0.149	0.319	0.531
13.001	0.1715	0.0166	0.0131	0.0141	0.020	0.021	-7.416	0.095	-0.318	-0.130	0.334	0.521
14.001	0.1658	0.0164	0.0137	0.0144	0.019	0.020	-7.611	0.099	-0.296	-0.118	0.361	0.539
15.001	0.1608	0.0163	0.0140	0.0146	0.019	0.019	-7.792	0.109	-0.280	-0.108	0.396	0.568
16.001	0.1563	0.0164	0.0141	0.0146	0.019	0.019	-7.972	0.124	-0.265	-0.098	0.440	0.606
17.001	0.1520	0.0165	0.0143	0.0147	0.020	0.020	-8.148	0.150	-0.251	-0.088	0.493	0.656
18.001	0.1480	0.0167	0.0144	0.0147	0.021	0.022	-8.307	0.179	-0.238	-0.077	0.560	0.720
19.001	0.1445	0.0174	0.0145	0.0148	0.023	0.023	-8.442	0.207	-0.223	-0.065	0.654	0.813
20.000	0.1411	0.0184	0.0147	0.0150	0.026	0.027	-8.553	0.252	-0.206	-0.049	0.816	0.973
22.000	0.1349	0.0197	0.0150	0.0153	0.032	0.032	-8.725	0.364	-0.170	-0.016	1.114	1.268
24.000	0.1294	0.0190	0.0147	0.0149	0.032	0.033	-8.872	0.430	-0.143	0.009	1.235	1.387
26.000	0.1246	0.0183	0.0139	0.0140	0.033	0.033	-9.009	0.487	-0.117	0.033	1.391	1.542
28.000	0.1204	0.0188	0.0129	0.0130	0.034	0.034	-9.156	0.616	-0.087	0.062	1.590	1.739
30.000	0.1167	0.0192	0.0122	0.0123	0.033	0.033	-9.321	0.758	-0.065	0.084	1.740	1.889
35.000	0.1097	0.0198	0.0109	0.0110	0.024	0.024	-9.722	0.986	-0.092	0.055	1.501	1.648
40.000	0.1038	0.0207	0.0104	0.0104	0.0160	0.0161	-10.047	1.174	-0.138	0.007	1.028	1.173
45.000	0.0985	0.0181	0.0095	0.0096	0.0129	0.0130	-10.343	0.969	-0.143	0.002	0.897	1.043
50.000	0.0941	0.0163	0.0090	0.0090	0.0117	0.0117	-10.618	0.818	-0.149	-0.004	0.869	1.014
55.000	0.0902	0.0152	0.0086	0.0086	0.0107	0.0107	-10.899	0.748	-0.154	-0.009	0.846	0.990
60.000	0.0869	0.0145	0.0082	0.0082	0.0099	0.0100	-11.106	0.707	-0.157	-0.013	0.828	0.973
65.000	0.0839	0.0139	0.0079	0.0079	0.0093	0.0094	-11.307	0.679	-0.160	-0.016	0.815	0.959
70.000	0.0812	0.0134	0.0076	0.0076	0.0088	0.0088	-11.501	0.659	-0.162	-0.018	0.805	0.949
80.000	0.0766	0.0126	0.0071	0.0071	0.0080	0.0081	-11.854	0.632	-0.165	-0.022	0.791	0.934
90.000	0.0727	0.0120	0.0067	0.0068	0.0075	0.0075	-12.172	0.615	-0.168	-0.025	0.781	0.924
100.000	0.0694	0.0116	0.0064	0.0064	0.0070	0.0070	-12.462	0.604	-0.170	-0.027	0.773	0.917
150.000	0.0581	0.0100	0.0053	0.0053	0.0056	0.0056	-13.622	0.575	-0.178	-0.035	0.754	0.897
200.000	0.0512	0.0090	0.0047	0.0047	0.0048	0.0048	-14.467	0.563	-0.183	-0.040	0.745	0.888
500.000	0.0342	0.0066	0.0032	0.0031	0.0032	0.0032	-17.755	0.617	-0.194	-0.054	0.722	0.862

TABLE 4

COMPLETE CROSSING-ODD AMPLITUDE

NU (GEV)	A(-) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(-) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. POS.	MAX. SYST. ERR. NEG.
0.13958	0.0000	0.0000	0.0000	0.0000	0.2330	0.0162	0.0077	0.0074	0.0077	0.0074
0.14458	0.0052	0.0010	0.0005	0.0003	0.2134	0.0156	0.0083	0.0079	0.0083	0.0079
0.14858	0.0072	0.0014	0.0010	0.0006	0.1973	0.0152	0.0087	0.0085	0.0087	0.0085
0.15258	0.0085	0.0018	0.0016	0.0011	0.1808	0.0148	0.0090	0.0091	0.0090	0.0091
0.15683	0.0092	0.0020	0.0022	0.0019	0.1630	0.0145	0.0092	0.0095	0.0092	0.0095
0.16108	0.0090	0.0022	0.0030	0.0030	0.1450	0.0141	0.0091	0.0093	0.0091	0.0093
0.16438	0.0086	0.0023	0.0032	0.0032	0.1309	0.0139	0.0089	0.0090	0.0089	0.0090
0.17058	0.0067	0.0026	0.0036	0.0036	0.1039	0.0134	0.0087	0.0088	0.0087	0.0088
0.17658	0.0033	0.0029	0.0040	0.0040	0.0771	0.0131	0.0086	0.0086	0.0086	0.0086
0.18108	-0.0002	0.0031	0.0043	0.0043	0.0565	0.0129	0.0084	0.0084	0.0085	0.0085
0.18958	-0.0096	0.0047	0.0048	0.0048	0.0167	0.0124	0.0081	0.0081	0.0099	0.0099
0.19758	-0.0221	0.0051	0.0052	0.0052	-0.0223	0.0122	0.0074	0.0074	0.0156	0.0156
0.20458	-0.0361	0.0055	0.0051	0.0051	-0.0578	0.0118	0.0062	0.0064	0.0186	0.0188
0.21118	-0.0529	0.0022	0.0038	0.0043	-0.0921	0.0111	0.0052	0.0051	0.0181	0.0180
0.21658	-0.0679	0.0014	0.0020	0.0020	-0.1219	0.0106	0.0056	0.0052	0.0165	0.0161
0.22658	-0.1065	0.0013	0.0014	0.0014	-0.1834	0.0101	0.0078	0.0077	0.0127	0.0126
0.23558	-0.1599	0.0015	0.0016	0.0016	-0.2399	0.0097	0.0093	0.0092	0.0131	0.0130
0.24558	-0.2385	0.0018	0.0024	0.0024	-0.2954	0.0094	0.0105	0.0104	0.0137	0.0136
0.25358	-0.3142	0.0021	0.0032	0.0032	-0.3316	0.0092	0.0110	0.0109	0.0139	0.0138
0.25858	-0.3661	0.0024	0.0037	0.0037	-0.3536	0.0109	0.0112	0.0111	0.0138	0.0137
0.25998	-0.3829	0.0070	0.0038	0.0038	-0.3595	0.0111	0.0112	0.0111	0.0138	0.0137
0.26658	-0.4709	0.0030	0.0042	0.0042	-0.3787	0.0090	0.0112	0.0111	0.0136	0.0135
0.27558	-0.6084	0.0032	0.0046	0.0046	-0.3779	0.0092	0.0112	0.0111	0.0134	0.0133
0.27958	-0.6744	0.0031	0.0046	0.0046	-0.3647	0.0091	0.0113	0.0112	0.0134	0.0133
0.28958	-0.8364	0.0035	0.0048	0.0048	-0.2908	0.0083	0.0123	0.0122	0.0142	0.0141
0.29858	-0.9615	0.0037	0.0066	0.0066	-0.1755	0.0087	0.0123	0.0122	0.0141	0.0139
0.30258	-1.0024	0.0037	0.0068	0.0068	-0.1144	0.0086	0.0119	0.0118	0.0137	0.0135
0.30758	-1.0437	0.0038	0.0070	0.0070	-0.0354	0.0083	0.0117	0.0116	0.0134	0.0133
0.31258	-1.0775	0.0040	0.0073	0.0073	0.0490	0.0084	0.0116	0.0114	0.0132	0.0130
0.31758	-1.0950	0.0041	0.0075	0.0075	0.1377	0.0083	0.0113	0.0111	0.0128	0.0127
0.32458	-1.0976	0.0042	0.0076	0.0076	0.2575	0.0081	0.0108	0.0107	0.0125	0.0124
0.33458	-1.0686	0.0042	0.0074	0.0074	0.4125	0.0079	0.0103	0.0101	0.0134	0.0133
0.34458	-1.0102	0.0042	0.0069	0.0069	0.5416	0.0078	0.0101	0.0099	0.0149	0.0148
0.35658	-0.9256	0.0038	0.0064	0.0064	0.6626	0.0075	0.0101	0.0100	0.0164	0.0163
0.36858	-0.8286	0.0034	0.0057	0.0057	0.7496	0.0072	0.0105	0.0103	0.0178	0.0177
0.38158	-0.7335	0.0032	0.0051	0.0051	0.8137	0.0070	0.0112	0.0111	0.0192	0.0190
0.39458	-0.6419	0.0032	0.0046	0.0046	0.8583	0.0068	0.0123	0.0121	0.0207	0.0206
0.40958	-0.5510	0.0031	0.0039	0.0039	0.8912	0.0068	0.0141	0.0140	0.0227	0.0225
0.42158	-0.4865	0.0028	0.0040	0.0040	0.9122	0.0069	0.0167	0.0165	0.0245	0.0244
0.43458	-0.4187	0.0038	0.0059	0.0059	0.9303	0.0078	0.0198	0.0196	0.0316	0.0314
0.44958	-0.3447	0.0104	0.0102	0.0102	0.9427	0.0100	0.0218	0.0216	0.0422	0.0420
0.46358	-0.2814	0.0107	0.0148	0.0148	0.9473	0.0109	0.0215	0.0213	0.0477	0.0475
0.47958	-0.2164	0.0111	0.0192	0.0192	0.9463	0.0099	0.0183	0.0181	0.0545	0.0543
0.4951	-0.1631	0.0006	0.0205	0.0205	0.9432	0.0078	0.0138	0.0135	0.0480	0.0478
0.5191	-0.0874	0.0006	0.0180	0.0180	0.9391	0.0054	0.0094	0.0092	0.0234	0.0231
0.5432	-0.0204	0.0006	0.0163	0.0163	0.9341	0.0053	0.0083	0.0081	0.0191	0.0188
0.5674	0.0404	0.0006	0.0157	0.0157	0.9328	0.0052	0.0071	0.0069	0.0164	0.0161
0.5917	0.1020	0.0006	0.0134	0.0134	0.9386	0.0051	0.0064	0.0061	0.0144	0.0142
0.6160	0.1762	0.0006	0.0127	0.0127	0.9442	0.0051	0.0061	0.0059	0.0133	0.0130
0.6404	0.2544	0.0007	0.0102	0.0102	0.9475	0.0051	0.0064	0.0062	0.0129	0.0126
0.6648	0.3554	0.0007	0.0095	0.0095	0.9447	0.0051	0.0077	0.0074	0.0136	0.0134

TABLE 4 (CTD.)

NU (GEV)	AI-, (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(-) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. POS.	MAX. SYST. ERR. NEG.
0.6893	0.4806	0.0008	0.0085	0.0085	0.9179	0.0052	0.0094	0.0091	0.0149	0.0146
0.7015	0.5618	0.0009	0.0090	0.0090	0.8674	0.0055	0.0099	0.0096	0.0152	0.0150
0.7138	0.6071	0.0044	0.0090	0.0090	0.7944	0.0060	0.0102	0.0100	0.0154	0.0151
0.7236	0.6305	0.0010	0.0091	0.0091	0.7351	0.0061	0.0106	0.0103	0.0156	0.0153
0.7432	0.6337	0.0043	0.0094	0.0094	0.6258	0.0058	0.0110	0.0107	0.0157	0.0154
0.7629	0.6134	0.0010	0.0094	0.0094	0.5416	0.0056	0.0112	0.0109	0.0157	0.0154
0.7752	0.5901	0.0010	0.0094	0.0094	0.5007	0.0055	0.0113	0.0110	0.0157	0.0154
0.7875	0.5620	0.0010	0.0093	0.0093	0.4708	0.0056	0.0115	0.0112	0.0158	0.0154
0.7998	0.5319	0.0009	0.0090	0.0090	0.4528	0.0069	0.0117	0.0114	0.0159	0.0156
0.8121	0.5031	0.0100	0.0089	0.0089	0.4467	0.0082	0.0122	0.0119	0.0163	0.0160
0.8244	0.4795	0.0009	0.0090	0.0090	0.4502	0.0070	0.0127	0.0124	0.0167	0.0163
0.8367	0.4592	0.0009	0.0092	0.0092	0.4640	0.0058	0.0130	0.0127	0.0169	0.0166
0.8491	0.4515	0.0009	0.0093	0.0093	0.4866	0.0057	0.0132	0.0129	0.0170	0.0167
0.8614	0.4550	0.0010	0.0094	0.0094	0.5107	0.0057	0.0135	0.0131	0.0172	0.0169
0.8737	0.4653	0.0010	0.0096	0.0096	0.5383	0.0057	0.0135	0.0132	0.0172	0.0169
0.8861	0.4932	0.001 1	0.0095	0.0095	0.5676	0.0058	0.0137	0.0133	0.0172	0.0169
0.8984	0.5368	000 12	0.0094	0.0094	0.5853	0.0058	0.0140	0.0137	0.0175	0.0172
0.9108	0.5799	0.0012	0.0095	0.0095	0.5932	0.0059	0.0144	0.0140	0.0178	0.0175
0.9231	0.6296	C.0013	0.0096	0.0096	0.5988	0.0059	0.0146	0.0143	0.0180	0.0176
0.9355	0.6910	0.0014	0.0098	0.0098	0.5980	0.0060	0.0148	0.0145	0.0181	0.0178
0.9478	0.7661	0.0015	0.0099	0.0099	0.5797	0.0061	0.0149	0.0146	0.0181	0.0178
0.9602	0.8408	0.0016	0.0097	0.0097	0.5373	0.0061	0.0151	0.0147	0.0183	0.0179
0.9726	0.9068	0.0017	0.0099	0.0099	0.4762	0.0062	0.0153	0.0150	0.0184	0.0181
0.9849	0.9638	0.0018	0.0097	0.0097	0.4002	0.0062	0.0155	0.0151	0.0185	0.0182
0.9973	1.0093	0.0018	0.0096	0.0096	0.3071	0.0078	0.0161	0.0157	0.0191	0.0188
1.0047	1.0283	0.0105	0.0099	0.0099	0.2429	0.0093	0.0163	0.0160	0.0193	0.0189
1.0097	1.0359	0.0019	0.0100	0.0100	0.1959	0.0082	0.0163	0.0160	0.0193	0.0190
1.0146	1.0380	0.0019	0.0100	0.0100	0.1478	0.0068	0.0164	0.0161	0.0193	0.0190
1.0196	1.0342	0.0019	0.0101	0.0101	0.0977	0.0067	0.0165	0.0162	0.0194	0.0191
1.0345	0.9805	0.0019	0.0102	0.0102	-0.0358	0.0065	0.0168	0.0164	0.0197	0.0193
1.0468	0.9195	0.0018	0.0104	0.0104	-0.1144	0.0070	0.0170	0.0167	0.0199	0.0195
1.0592	0.8592	0.0062	0.0105	0.0105	-0.1736	0.0075	0.0172	0.0169	0.0200	0.0197
1.0716	0.8040	0.0018	0.0106	0.0106	-0.2274	0.0071	0.0174	0.0171	0.0202	0.0198
1.0840	0.7399	0.0017	0.0107	0.0107	-0.2816	0.0067	0.0176	0.0173	0.0204	0.0200
1.0964	0.6546	0.0017	0.0108	0.0108	-0.3178	0.0068	0.0178	0.0175	0.0205	0.0202
1.1088	0.5760	0.0016	0.0110	0.0110	-0.3272	0.0068	0.0180	0.0177	0.0207	0.0204
1.1212	0.5108	0.0016	0.0111	0.0111	-0.3227	0.0069	0.0182	0.0179	0.0209	0.0205
1.1336	0.4576	0.0016	0.0112	0.0112	-0.3127	0.0069	0.0184	0.0181	0.0210	0.0206
1.1584	0.3792	0.0016	0.0115	0.0115	-0.2930	0.0070	0.0188	0.0185	0.0213	0.0210
1.1833	0.3135	0.0016	0.0118	0.0118	-0.2812	0.0071	0.0192	0.0189	0.0216	0.0213
1.2081	0.2478	0.0016	0.0120	0.0120	-0.2665	0.0073	0.0196	0.0192	0.0219	0.0216
1.2329	0.1956	0.0017	0.0122	0.0122	-0.2502	0.0074	0.0199	0.0196	0.0222	0.0219
1.2578	0.1410	0.0018	0.0125	0.0125	-0.2397	0.0076	0.0202	0.0199	0.0225	0.0222
1.2702	0.1100	0.0018	0.0126	0.0126	-0.2330	0.0077	0.0204	0.0201	0.0227	0.0224
1.2826	0.0771	0.0022	0.0127	0.0127	-0.2214	0.0077	0.0206	0.0203	0.0228	0.0225
1.2950	0.0485	0.0019	0.0129	0.0129	-0.2062	0.0019	0.0208	0.0205	0.0229	0.0226
1.3075	0.0219	0.0019	0.0130	0.0130	-0.1915	0.0079	0.0209	0.0206	0.0231	0.0228
1.3323	-0.0369	0.0020	0.0132	0.0132	-0.1574	0.0081	0.0213	0.0210	0.0234	0.0231
1.3572	-0.0878	0.0034	0.0135	0.0135	-0.1097	0.0083	0.0216	0.0213	0.0236	0.0234
1.3821	-0.1278	0.0021	0.0137	0.0137	-0.0582	0.0084	0.0219	0.0217	0.0239	0.0236
1.4069	-0.1671	0.0022	0.0140	0.0140	-0.0010	0.0085	0.0222	0.0220	0.0242	0.0240
1.4318	-0.1952	0.0023	0.014	0.014	0.0675	0.0087	0.0225	0.0223	0.024	0.024

TABLE 4 (CTD.)

NU (GEV)	A(-) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(-) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. POS.	MAX. SYST. ERR. NEG.
1.4567	-0.2056	0.0027	0.014	0.014	0.1396	0.0094	0.0228	0.0227	0.025	0.025
1.4816	-0.2014	0.0082	0.015	0.015	0.2065	0.0100	0.0231	0.0230	0.025	0.025
1.5065	-0.1905	0.0023	0.015	0.015	0.2676	0.0104	0.0234	0.0233	0.026	0.026
1.5234	-0.1794	0.0088	0.015	0.015	0.3077	0.0106	0.0236	0.0235	0.026	0.026
1.5413	-0.1627	0.0023	0.015	0.015	0.3488	0.0099	0.0239	0.0238	0.027	0.027
1.5563	-0.1444	0.0023	0.015	0.015	0.3808	0.0094	0.0240	0.0240	0.028	0.028
1.5812	-0.1083	0.0023	0.016	0.016	0.4262	0.0095	0.0243	0.0244	0.029	0.029
1.6061	-0.0684	0.0023	0.016	0.016	0.4615	0.0097	0.0246	0.0248	0.030	0.030
1.6310	-0.0290	0.0023	0.016	0.016	0.4890	0.0109	0.0250	0.0251	0.031	0.031
1.6559	0.0110	0.0119	0.017	0.017	0.5108	0.0122	0.0253	0.0255	0.032	0.032
1.6808	0.0514	0.0055	0.017	0.017	0.5265	0.0116	0.0255	0.0258	0.033	0.033
1.7057	0.0912	0.0023	0.017	0.017	0.5361	0.0105	0.0259	0.0263	0.034	0.034
1.7306	0.1287	0.0023	0.017	0.017	0.5396	0.0103	0.0262	0.0267	0.035	0.036
1.7556	0.1619	0.0023	0.017	0.017	0.5397	0.0105	0.0266	0.0272	0.037	0.037
1.7805	0.1935	0.0034	0.018	0.018	0.5384	0.0107	0.0269	0.0276	0.038	0.039
1.8054	0.2242	0.0024	0.018	0.018	0.5347	0.0115	0.0272	0.0282	0.039	0.040
1.8303	0.2537	0.0100	0.018	0.018	0.5279	0.0123	0.0276	0.0287	0.041	0.042
1.8553	0.2809	0.0025	0.018	0.018	0.5179	0.0119	0.0281	0.0293	0.043	0.044
1.8802	0.3047	0.0025	0.019	0.019	0.5066	0.0117	0.0284	0.0300	0.045	0.046
1.9211	0.3416	0.0094	0.019	0.019	0.4861	0.0127	0.0293	0.0313	0.048	0.050
1.9550	0.3702	0.0026	0.019	0.019	0.4644	0.0126	0.0300	0.0326	0.051	0.054
2.0049	0.4036	0.0050	0.020	0.020	0.4236	0.0121	0.0315	0.0353	0.057	0.061
2.0547	0.4216	0.0052	0.020	0.020	0.3781	0.0133	0.0354	0.0427	0.063	0.070
2.0797	0.4258	0.0067	0.023	0.025	0.3556	0.0159	0.0374	0.0468	0.070	0.080
2.1046	0.4269	0.0157	0.026	0.032	0.3338	0.0172	0.0384	0.0488	0.088	0.099
2.1545	0.4214	0.0031	0.033	0.045	0.2929	0.0138	0.0363	0.0450	0.125	0.133
2.2044	0.4071	0.0029	0.035	0.051	0.2572	0.0132	0.0330	0.0366	0.134	0.137
2.2543	0.3858	0.0028	0.039	0.055	0.2262	0.0134	0.0297	0.0289	0.142	0.141
2.3042	0.3555	0.0026	0.039	0.056	0.2016	0.0137	0.0252	0.0211	0.147	0.143
2.3541	0.3163	0.0027	0.040	0.056	0.1903	0.0143	0.0198	0.0122	0.149	0.141
2.4041	0.2804	0.0027	0.034	0.051	0.1939	0.0167	0.0174	0.0028	0.149	0.135
2.4540	0.2508	0.0175	0.035	0.042	0.2060	0.0201	0.0164	-0.0015	0.143	0.125
2.5239	0.2184	0.0187	0.029	0.036	0.2314	0.0205	0.0133	-0.0024	0.124	0.109
2.6237	0.1899	0.0076	0.025	0.022	0.2801	0.0174	0.0149	-0.0017	0.112	0.096
2.7236	0.1862	0.0023	0.019	0.016	0.3358	0.0162	0.0185	0.0065	0.095	0.083
2.8235	0.2098	0.0024	0.020	0.016	0.3819	0.0164	0.0231	0.0133	0.076	0.066
2.9233	0.2415	0.0026	0.021	0.017	0.4109	0.0169	0.0253	0.0166	0.069	0.060
3.0232	0.2795	0.0026	0.022	0.017	0.4226	0.0175	0.0269	0.0190	0.065	0.057
3.1231	0.3087	0.0022	0.022	0.018	0.4190	0.0179	0.0283	0.0208	0.063	0.055
3.2230	0.3288	0.0023	0.023	0.018	0.4074	0.0186	0.0295	0.0225	0.061	0.054
3.3229	0.3354	0.0032	0 024	0.019	0.3956	0.0192	0.0305	0.0239	0.060	0.053
3.4228	0.3376	0.0036	0.024	0.020	0.3882	0.0198	0.0315	0.0252	0.059	0.052
3.5228	0.3359	0.0025	0.025	0.020	0.3827	0.0203	0.0323	0.0263	0.058	0.052
3.6227	0.3284	0.0038	0.026	0.021	0.3822	0.0209	0.0331	0.0273	0.057	0.051
3.7226	0.3211	0.0040	0.027	0.021	0.3887	0.0215	0.0339	0.0283	0.056	0.051
3.8225	0.3167	0.0016	0.027	0.022	0.4007	0.0221	0.0347	0.0292	0.056	0.051
3.9325	0.3186	0.0055	0.028	0.022	0.4155	0.0228	0.0354	0.0302	0.056	0.050
4.0324	0.3221	0.0017	0.029	0.023	0.4290	0.0233	0.0360	0.0309	0.056	0.050
4.1324	0.3311	0.0018	0.029	0.024	0.4413	0.0239	0.0366	0.0317	0.055	0.050
4.2323	0.3414	0.0050	0.030	0.024	0.4489	0.0246	0.0372	0.0323	0.055	0.050
4.3322	0.3497	0.0019	0.031	0.025	0.4541	0.0250	0.0377	0.0331	0.055	0.050
4.4322	0.3578	0.0019	0.032	0.025	0.4572	0.0256	0.038	0.034	0.055	0.050

TABLE 4 (CTD.)

NU (GEV)	A(-) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(-) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. PCS.	MAX. SYST. ERR. NEG.
4.5321	0.3617	0.0019	0.032	0.026	0.4600	0.0262	0.039	0.034	0.055	0.050
4.6321	0.3648	0.0020	0.033	0.026	0.4653	0.0267	0.039	0.035	0.055	0.050
4.7321	0.3693	0.0031	0.034	0.027	0.4715	0.0275	0.040	0.035	0.055	0.050
4.8320	0.3745	0.0024	0.034	0.028	0.4772	0.0281	0.040	0.036	0.056	0.052
4.9320	0.3800	0.0032	0.035	0.028	0.4823	0.0286	0.040	0.036	0.058	0.054
5.0319	0.3848	0.0022	0.036	0.029	0.4867	0.0294	0.041	0.037	0.061	0.057
5.1319	0.3885	0.0046	0.037	0.029	0.4910	0.0300	0.041	0.037	0.063	0.060
5.2319	0.3920	0.0023	0.037	0.030	0.4961	0.0308	0.041	0.038	0.067	0.063
5.3318	0.3955	0.0029	0.038	0.030	0.5022	0.0313	0.041	0.038	0.070	0.067
5.4418	0.4003	0.0057	0.039	0.031	0.5091	0.0324	0.042	0.039	0.074	0.071
5.5418	0.4051	0.0062	0.040	0.032	0.5152	0.0332	0.042	0.039	0.078	0.075
5.6417	0.4102	0.0065	0.040	0.032	0.5213	0.0342	0.042	0.039	0.083	0.080
5.7417	0.4164	0.0086	0.041	0.033	0.5268	0.0350	0.042	0.040	0.089	0.086
5.8417	0.4222	0.0067	0.042	0.033	0.5311	0.0358	0.042	0.040	0.095	0.093
5.9416	0.4273	0.0087	0.042	0.034	0.5348	0.0371	0.042	0.040	0.104	0.102
6.0416	0.4317	0.0071	0.043	0.034	0.5388	0.0388	0.042	0.040	0.116	0.114
6.442	0.448	0.013	0.046	0.037	0.556	0.045	0.042	0.041	0.141	0.136
7.001	0.471	0.050	0.048	0.038	0.580	0.056	0.040	0.040	0.144	0.145
8.001	0.509	0.046	0.048	0.039	0.620	0.060	0.037	0.041	0.141	0.145
9.001	0.543	0.049	0.046	0.038	0.659	0.064	0.035	0.041	0.123	0.128
10.001	0.576	0.029	0.040	0.034	0.696	0.066	0.036	0.043	0.087	0.095
11.001	0.607	0.032	0.035	0.032	0.733	0.069	0.041	0.049	0.081	0.089
12.001	0.637	0.031	0.028	0.028	0.769	0.074	0.050	0.056	0.085	0.091
13.001	0.667	0.022	0.030	0.030	0.803	0.077	0.061	0.066	0.091	0.096
14.001	0.695	0.016	0.032	0.032	0.835	0.082	0.069	0.072	0.095	0.099
15.001	0.722	0.017	0.034	0.034	0.868	0.088	0.075	0.079	0.100	0.103
16.001	0.749	0.018	0.037	0.037	0.899	0.094	0.081	0.084	0.108	0.112
17.001	0.776	0.020	0.039	0.039	0.929	0.101	0.087	0.090	0.121	0.124
18.001	0.801	0.021	0.041	0.041	0.958	0.108	0.093	0.095	0.137	0.139
19.001	0.826	0.027	0.044	0.044	0.987	0.119	0.099	0.101	0.157	0.159
20.000	0.850	0.046	0.046	0.046	1.014	0.132	0.105	0.108	0.190	0.192
22.000	0.898	0.132	0.057	0.057	1.066	0.155	0.118	0.121	0.252	0.254
24.000	0.940	0.069	0.069	0.069	1.115	0.163	0.126	0.128	0.278	0.280
26.000	0.981	0.075	0.082	0.082	1.163	0.171	0.130	0.130	0.308	0.309
28.000	1.020	0.080	0.088	0.088	1.210	0.189	0.129	0.130	0.338	0.340
30.000	1.053	0.086	0.095	0.095	1.257	0.206	0.131	0.132	0.356	0.357
35.000	1.143	0.090	0.100	0.100	1.378	0.248	0.137	0.138	0.300	0.301
40.000	1.233	0.102	0.112	0.112	1.490	0.297	0.149	0.149	0.229	0.231
45.000	1.318	0.111	0.120	0.120	1.590	0.292	0.153	0.155	0.208	0.210
50.000	1.398	0.121	0.128	0.128	1.688	0.292	0.161	0.161	0.210	0.210
55.000	1.475	0.130	0.135	0.135	1.779	0.300	0.170	0.170	0.211	0.211
60.000	1.548	0.139	0.141	0.141	1.870	0.312	0.176	0.176	0.213	0.215
65.000	1.619	0.148	0.148	0.148	1.956	0.324	0.184	0.184	0.217	0.219
70.000	1.688	0.156	0.154	0.154	2.038	0.336	0.191	0.191	0.221	0.221
80.000	1.819	0.173	0.166	0.166	2.197	0.361	0.204	0.204	0.229	0.232
90.000	1.943	O 189	0.177	0.177	2.346	0.387	0.216	0.219	0.242	0.242
100.000	2.061	0.204	0.188	0.188	2.488	0.416	0.229	0.229	0.251	0.251
150.000	2.586	0.276	0.236	0.236	3.125	0.538	0.285	0.285	0.301	0.301
200.000	3.038	0.341	0.277	0.277	3.671	0.645	0.337	0.337	0.344	0.344
500.000	5.075	0.657	0.463	0.463	6.130	1.183	0.574	0.556	0.574	0.574

TABLE 5

COMPLETE CROSSING-EVEN AMPLITUOE

NU (GEV)	A(+) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(+) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. POS.	MAX. SYST. ERR. NEG.
0.13958	0.0000	0.0000	0.0000	0.0000	-0.0161	0.0230	0.0000	0.0000	0.0000	0.0000
0.14458	0.0106	0.0011	0.0005	0.0008	0.0041	0.0230	0.0001	0.0003	0.0002	0.0003
0.14858	0.0142	0.0015	0.0007	0.0011	0.0218	0.0230	0.0004	0.0004	0.0004	0.0005
0.15258	0.0175	0.0018	0.0010	0.0016	0.0409	0.0230	0.0009	0.0006	0.0009	0.0006
0.15683	0.0212	0.0020	0.0019	0.0023	0.0627	0.0231	0.0014	0.0008	0.0013	0.0008
0.16108	0.0254	0.0022	0.0030	0.0030	0.0859	0.0231	0.0010	0.0006	0.0011	0.0006
0.16438	0.0292	0.0023	0.0032	0.0032	0.1050	0.0231	0.0006	0.0003	0.0010	0.0007
0.17058	0.0375	0.0026	0.0036	0.0036	0.1431	0.0231	0.0003	-0.0001	0.0020	0.0016
0.17658	0.0478	0.0029	0.0040	0.0040	0.1834	0.0232	-0.0001	-0.0004	0.0029	0.0025
0.18108	0.0572	0.0031	0.0043	0.0043	0.2159	0.0232	-0.0003	-0.0006	0.0036	0.0033
0.18958	0.0809	0.0047	0.0048	0.0048	0.2826	0.0233	-0.0009	-0.0012	0.0056	0.0053
0.19758	0.1112	0.0051	0.0052	0.0052	0.3504	0.0235	-0.0018	-0.0021	0.0110	0.0107
0.20458	0.1446	0.0054	0.0051	0.0051	0.4137	0.0234	-0.0032	-0.0033	0.0139	0.0138
0.21118	0.1835	0.0022	0.0038	0.0043	0.4758	0.0232	-0.0043	-0.0047	0.0135	0.0131
0.21658	0.2179	0.0014	0.0020	0.0020	0.5304	0.0231	-0.0041	-0.0047	0.0118	0.0112
0.22658	0.3056	0.0013	0.0014	0.0014	0.6407	0.0231	-0.0020	-0.0024	0.0079	0.0075
0.23558	0.4098	0.0015	0.0016	0.0016	0.7424	0.0231	-0.0009	-0.0012	0.0081	0.0077
0.24558	0.5619	0.0018	0.0024	0.0024	0.8541	0.0231	0.0001	-0.0002	0.0084	0.0081
0.25358	0.7175	0.0021	0.0032	0.0032	0.9352	0.0230	0.0005	0.0001	0.0084	0.0081
0.25858	0.8334	0.0024	0.0037	0.0037	0.9768	0.0248	0.0005	0.0002	0.0083	0.0079
0.25998	0.8687	0.0070	0.0038	0.0038	0.9861	0.0251	0.0005	0.0001	0.0082	0.0079
0.26658	1.0445	0.0030	0.0042	0.0042	1.0135	0.0231	0.0004	-0.0000	0.0079	0.0075
0.27558	1.3068	0.0032	0.0046	0.0046	1.0046	0.0234	0.0002	-0.0002	0.0075	0.0071
0.27958	1.4294	0.0031	0.0046	0.0046	0.9799	0.0234	0.0002	-0.0002	0.0074	0.0070
0.28958	1.7341	0.0035	0.0048	0.0048	0.8523	0.0232	0.0010	0.0006	0.0081	0.0076
0.29858	1.9788	0.0037	0.0066	0.0066	0.6535	0.0234	0.0008	0.0004	0.0077	0.0073
0.30258	2.0684	0.0037	0.0068	0.0068	0.5401	0.0234	0.0004	-0.0001	0.0072	0.0068
0.30758	2.1507	0.0038	0.0070	0.0070	0.3865	0.0233	0.0000	-0.0004	0.0068	0.0064
0.31258	2.2060	0.0040	0.0073	0.0073	0.2325	0.0234	-0.0002	-0.0007	0.0067	0.0063
0.31758	2.2435	0.0041	0.0075	0.0075	0.0797	0.0234	-0.0006	-0.0011	0.0072	0.0067
0.32458	2.2622	0.0042	0.0076	0.0076	-0.1337	0.0233	-0.0012	-0.0017	0.0083	0.0079
0.33458	2.2189	0.0043	0.0074	0.0074	-0.4168	0.0233	-0.0020	-0.0024	0.0098	0.0093
0.34458	2.1161	0.0042	0.0069	0.0069	-0.6493	0.0233	-0.0024	-0.0029	0.0111	0.0105
0.35658	1.9584	0.0038	0.0064	0.0064	-0.8575	0.0233	-0.0025	-0.0030	0.0124	0.0118
0.36858	1.7796	0.0034	0.0057	0.0057	-0.9918	0.0233	-0.0024	-0.0030	0.0136	0.0130
0.38158	1.6083	0.0032	0.0051	0.0051	-1.0719	0.0232	-0.0019	-0.0025	0.0148	0.0142
0.39458	1.4546	0.0032	0.0046	0.0046	-1.1124	0.0232	-0.0011	-0.0017	0.0162	0.0155
0.40958	1.3037	0.0031	0.0039	0.0039	-1.1229	0.0232	0.0005	-0.0001	0.0179	0.0172
0.42158	1.2015	0.0028	0.0040	0.0040	-1.1132	0.0233	0.0028	0.0022	0.0196	0.0189
0.43458	1.1052	0.0038	0.0059	0.0059	-1.0879	0.0236	0.0057	0.0050	0.0265	0.0257
0.44958	1.0164	0.0104	0.0103	0.0103	-1.0435	0.0244	0.0075	0.0068	0.0369	0.0362
0.46358	0.9536	0.0107	0.0148	0.0148	-0.9932	0.0249	0.0070	0.0062	0.0426	0.0418
0.47958	0.9041	0.0111	0.0193	0.0193	-0.9307	0.0245	0.0035	0.0027	0.0498	0.0489
0.4951	0.8781	0.0006	0.0205	0.0205	-0.8723	0.0238	-0.0013	-0.0021	0.0430	0.0422
0.5191	0.8597	0.0006	0.0180	0.0180	-0.7957	0.0231	-0.0060	-0.0069	0.0184	0.0174
0.5432	0.8523	0.0006	0.0163	0.0163	-0.7279	0.0231	-0.0074	-0.0084	0.0134	0.0124
0.5674	0.8545	0.0006	0.0157	0.0157	-0.6610	0.0231	-0.0089	-0.0100	0.0130	0.0119
0.5917	0.8667	0.0006	0.0134	0.0134	-0.5918	0.0231	-0.0100	-0.0111	0.0142	0.0130
0.6160	0.8923	0.0006	0.0127	0.0127	-0.5207	0.0231	-0.0105	-0.0118	0.0152	0.0140
0.6404	0.9302	0.0007	0.0101	0.0101	-0.4440	0.0231	-0.0105	-0.0118	0.0156	0.0142
0.6648	0.9978	0.0008	0.0095	0.0095	-0.3643	0.0231	-0.0095	-0.0110	0.0150	0.0136

TABLE 5 (CTD.)

NU (GEV)	A(+) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	SYST. ERRORS NEG.	D(+) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	CORR. SYST. ERR. NEG.	MAX. SYST. ERR. POS.	MAX. SYST. ERR. NEG.
0.6893	1.1091	0.0009	0.0085	0.0085	-0.3046	0.0231	-0.0081	-0.0097	0.0140	0.0125
0.7015	1.1862	0.0009	0.0090	0.0090	-0.3149	0.0231	-0.0077	-0.0093	0.0138	0.0123
0.7138	1.2260	0.0044	0.0090	0.0090	-0.3460	0.0232	-0.0075	-0.0091	0.0139	0.0122
0.7236	1.2457	0.0010	0.0091	0.0091	-0.3690	0.0233	-0.0073	-0.0090	0.0138	0.0121
0.7432	1.2502	C.0043	0.0094	0.0094	-0.4007	0.0232	-0.0071	-0.0089	0.0140	0.0122
0.7629	1.2409	0.0010	0.0094	0.0094	-0.4042	0.0231	-0.0070	-0.0089	0.0144	0.0125
0.7752	1.2296	0.0010	0.0094	0.0094	-0.3936	0.0231	-0.0070	-0.0089	0.0146	0.0126
0.7875	1.2180	0.0010	0.0093	0.0093	-0.3717	0.0231	-0.0070	-0.0090	0.0148	0.0128
0.7998	1.2085	0.0009	0.0090	0.0090	-0.3382	0.0234	-0.0068	-0.0088	0.0149	0.0128
0.8121	1.2048	0.0100	0.0089	0.0089	-0.2933	0.0239	-0.0064	-0.0085	0.0147	0.0126
0.8244	1.2104	0.0009	0.0090	0.0090	-0.2395	0.0235	-0.0060	-0.0082	0.0147	0.0125
0.8367	1.2241	0.0009	0.0092	0.0092	-0.1760	0.0231	-0.0058	-0.0081	0.0147	0.0125
0.8491	1.2573	0.0010	0.0093	0.0093	-0.1059	0.0231	-0.0056	-0.0080	0.0148	0.0125
0.8614	1.3056	0.0010	0.0095	0.0095	-0.0393	0.0231	-0.0055	-0.0079	0.0150	0.0127
0.8737	1.3643	0.0010	0.0096	0.0096	0.0262	0.0231	-0.0055	-0.0080	0.0153	0.0129
0.8861	1.4432	C.OO1l	0.0095	0.0095	0.0887	0.0231	-0.0054	-0.0080	0.0156	0.0130
0.8984	1.5393	0.001 1	0.0094	0.0094	0.1341	0.0231	-0.0052	-0.0078	0.0156	0.0130
0.9108	1.6359	0.0012	0.0095	0.0095	0.1646	0.0231	-0.0049	-0.0076	0.0156	0.0130
0.9231	1.7389	0.0013	0.0096	0.0096	0.1866	0.0231	-0.0047	-0.0075	0.0158	0.0130
0.9355	1.8517	C.0014	0.0098	0.0098	0.1962	0.0231	-0.0046	-0.0074	0.0160	0.0132
0.9478	1.9728	0.0015	0.0099	0.0099	0.1837	0.0231	-0.0045	-0.0074	0.0162	0.0134
0.9602	2.0882	0.0016	0.0098	0.0098	0.1459	0.0231	-0.0044	-0.0073	0.0164	0.0135
0.9726	2.1915	0.0017	0.0099	0.0099	0.0905	0.0231	-0.0042	-0.0073	0.0166	0.0136
0.9849	2.2835	0.0018	0.0098	0.0098	0.0208	0.0231	-0.0041	-0.0072	0.0168	0.0137
0.9973	2.3619	0.0018	0.0096	0.0096	-0.0653	0.0235	-0.0035	-0.0067	0.0166	0.0134
1.0047	2.3996	0.0105	0.0099	0.0099	-0.1247	0.0241	-0.0033	-0.0066	0.0166	0.0134
1.0097	2.4194	0.0019	0.0100	0.0100	-0.1679	0.0236	-0.0033	-0.0066	0.0167	0.0134
1.0146	2.4334	0.0019	0.0100	0.0100	-0.2120	0.0232	-0.0032	-0.0065	0.0168	0.0135
1.0196	2.4414	0.0019	0.0101	0.0101	-0.2577	0.0232	-0.0031	-0.0065	0.0168	0.0135
1.0345	2.4231	C.0018	0.0102	0.0102	-0.3751	0.0231	-0.0028	-0.0063	0.0170	0.0136
1.0468	2.3925	0.0018	0.0104	0.0104	-0.4383	0.0232	-0.0025	-0.0061	0.0172	0.0136
1.0592	2.3638	0.0062	0.0105	0.0105	-0.4806	0.0234	-0.0022	-0.0058	0.0172	0.0136
1.0716	2.3413	0.0018	0.0109	0.0109	-0.5159	0.0232	-0.0020	-0.0057	0.0174	0.0136
1.0840	2.3114	0.0017	0.0110	0.0110	-0.5504	0.0231	-0.0018	-0.0056	0.0175	0.0137
1.0964	2.2622	0.0017	0.0115	0.0115	-0.5657	0.0231	-0.0016	-0.0056	0.0178	0.0139
1.1088	2.2221	0.0016	0.0116	0.0116	-0.5533	0.0231	-0.0016	-0.0056	0.0182	0.0142
1.1212	2.1978	0.0016	0.0118	0.0118	-0.5268	0.0231	-0.0015	-0.0056	0.0185	0.0144
1.1336	2.1879	0.0016	0.0119	0.0119	-0.4946	0.0231	-0.0013	-0.0055	0.0187	0.0146
1.1584	2.2030	0.0016	0.0125	0.0125	-0.4302	0.0231	-0.0010	-0.0054	0.0194	0.0149
1.1833	2.2433	0.0016	0.0127	0.0127	-0.3745	0.0231	-0.0009	-0.0055	0.0202	0.0156
1.2081	2.2976	0.0016	0.0130	0.0130	-0.3219	0.0231	-0.0006	-0.0055	0.0209	0.0161
1.2329	2.3750	0.0017	0.0133	0.0133	-0.2745	0.0231	-0.0004	-0.0055	0.0217	0.0166
1.2578	2.4675	C.0018	0.0136	0.0136	-0.2391	0.0231	-0.0002	-0.0055	0.0225	0.0172
1.2702	2.5192	0.0018	0.0137	0.0137	-0.2266	0.0231	-0.0001	-0.0055	0.0229	0.0175
1.2826	2.5744	C.0022	0.0138	0.0138	-0.2195	0.0231	0.0000	-0.0055	0.0234	0.0178
1.2950	2.6300	0.0018	0.0139	0.0139	-0.2178	0.0231	0.0001	-0.0056	0.0238	0.0181
1.3075	2.6859	0.0019	0.0141	0.0141	-0.2197	0.0231	0.0002	-0.0057	0.0244	0.0185
1.3323	2.8042	0.0020	0.0140	0.0140	-0.2391	0.0231	0.0003	-0.0058	0.0254	0.0193
1.3572	2.9122	0.0034	0.0139	0.0139	-0.2825	0.0232	0.0007	-0.0057	0.0262	0.0199
1.3821	3.0057	0.0071	0.0137	0.0137	-0.3361	0.0232	0.0014	-0.0053	0.0269	0.0202
1.4069	3.0943	0.0022	0.0140	0.0140	-0.3995	0.0232	0.0020	-0.0050	0.0275	0.0206
1.4318	3.1683	0.0022	0.0138	0.0138	-0.4771	0.0232	0.0027	-0.0046	0.0282	0.0209

TABLE 5 (CTD.)

NU (GEV)	A(+) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D(+) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	NEG.	MAX. SYST. ERR. POS.	NEG.
1.4567	3.2210	0.0027	0.0141	0.0141	-0.5612	0.0234	0.0036	-0.0040	0.0287	0.0210
1.4816	3.2525	0.0082	0.0143	0.0143	-0.6419	0.0236	0.0048	-0.0032	0.0290	0.0211
1.5065	3.2697	0.0023	0.0154	0.0154	-0.7150	0.0238	0.0054	-0.0028	0.0299	0.0216
1.5234	3.2726	0.0088	0.0156	0.0156	-0.7588	0.0238	0.0057	-0.0029	0.0308	0.0222
1.5413	3.2709	0.0023	0.0158	0.0158	-0.7979	0.0235	0.0061	-0.0027	0.0315	0.0227
1.5563	3.2677	0.0023	0.0159	0.0159	-0.8256	0.0232	0.0066	-0.0025	0.0321	0.0231
1.5812	3.2576	0.0023	0.0162	0.0162	-0.8618	0.0232	0.0074	-0.0021	0.0331	0.0236
1.6061	3.2439	0.0023	0.0164	0.0164	-0.8817	0.0232	0.0085	-0.0014	0.0338	0.0239
1.6310	3.2373	0.0023	0.0171	0.0171	-0.8865	0.0237	0.0097	-0.0006	0.0346	0.0243
1.6559	3.2394	0.0119	0.0179	0.0179	-0.8831	0.0243	0.0107	-0.0000	0.0356	0.0248
1.6808	3.2489	0.0055	0.0186	0.0186	-0.8749	0.0239	0.0121	0.0008	0.0364	0.0252
1.7057	3.2657	0.0023	0.0204	0.0204	-0.8638	0.0233	0.0130	0.0012	0.0378	0.0261
1.7306	3.2894	0.0023	0.0212	0.0212	-0.8512	0.0232	0.0136	0.0013	0.0396	0.0274
1.7556	3.3207	0.0023	0.0225	0.0225	-0.8399	0.0232	0.0144	0.0016	0.0414	0.0285
1.7805	3.3554	0.0034	0.0238	0.0238	-0.8323	0.0233	0.0149	0.0015	0.044	0.030
1.8054	3.3909	0.0024	0.0247	0.0247	-0.8270	0.0236	0.0156	0.0015	0.046	0.032
1.8303	3.4269	0.0100	0.0266	0.0266	-0.8218	0.0240	0.0160	0.0013	0.049	0.034
1.8553	3.4647	0.0024	0.0275	0.0275	-0.8160	0.0237	0.0158	0.0003	0.052	0.037
1.8802	3.5050	0.0025	0.0278	0.0278	-0.8098	0.0235	0.0160	-0.0003	0.056	0.040
1.9211	3.5783	0.0095	0.0290	0.0290	-0.8022	0.0239	0.0172	-0.0005	0.062	0.044
1.9550	3.6433	0.0025	0.0300	0.0300	-0.8005	0.0238	0.0184	-0.0008	0.067	0.048
2.0049	3.7424	0.0050	0.0319	0.0319	-0.8076	0.0234	0.0212	-0.0006	0.077	0.056
2.0547	3.8380	0.0052	0.036	0.036	-0.8247	0.0239	0.0239	-0.0034	0.095	0.067
2.0797	3.8837	0.0067	0.039	0.036	-0.8352	0.0253	0.0246	-0.0054	0.109	0.079
2.1046	3.9280	0.0157	0.042	0.036	-0.8460	0.0261	0.0245	-0.0070	0.132	0.100
2.1545	4.0132	0.0031	0.045	0.033	-0.8678	0.0239	0.0241	-0.0074	0.167	0.136
2.2044	4.0960	0.0029	0.051	0.035	-0.8882	0.0234	0.0233	-0.0057	0.170	0.141
2.2543	4.1787	0.0028	0.055	0.039	-0.9079	0.0234	0.0203	-0.0070	0.176	0.149
2.3042	4.2595	0.0026	0.056	0.039	-0.9262	0.0234	0.0178	-0.0096	0.183	0.155
2.3541	4.3430	0.0027	0.056	0.040	-0.9415	0.0236	0.0179	-0.0106	0.189	0.160
2.4041	4.4337	0.0027	0.060	0.043	-0.9602	0.0248	0.0184	-0.0136	0.198	0.166
2.4540	4.5232	0.0175	0.064	0.042	-0.9863	0.0271	0.0168	-0.0189	0.201	0.165
2.5239	4.6414	0.0187	0.068	0.036	-1.0292	0.0273	0.0126	-0.0218	0.190	0.156
2.6237	4.7976	0.0076	0.070	0.033	-1.0951	0.0248	0.0073	-0.0200	0.187	0.160
2.7236	4.9378	0.0023	0.070	0.031	-1.1613	0.0237	0.0054	-0.0178	0.160	0.137
2.8235	5.0609	0.0024	0.072	0.032	-1.2162	0.0234	0.0046	-0.0158	0.117	0.097
2.9233	5.1830	0.0026	0.075	0.033	-1.2565	0.0233	0.0032	-0.0152	0.102	0.084
3.0232	5.3051	0.0026	0.078	0.034	-1.2837	0.0233	0.0017	-0.0149	0.093	0.077
3.1231	5.4409	0.0022	0.080	0.036	-1.3048	0.0233	0.0002	-0.0148	0.087	0.072
3.2230	5.5820	0.0023	0.083	0.037	-1.3305	0.0233	-0.0013	-0.0148	0.081	0.068
3.3229	5.7209	0.0032	0.085	0.038	-1.3576	0.0234	-0.0028	-0.0148	0.076	0.064
3.4228	5.8629	0.0036	0.088	0.039	-1.3848	0.0234	-0.0044	-0.0150	0.072	0.062
3.5228	6.0047	0.0025	0.090	0.040	-1.4146	0.0234	-0.0060	-0.0152	0.069	0.060
3.6227	6.1439	0.0038	0.093	0.041	-1.4452	0.0235	-0.0076	-0.0155	0.066	0.058
3.7226	6.2828	0.0040	0.096	0.042	-1.4761	0.0235	-0.0092	-0.0157	0.062	0.056
3.8225	6.4196	0.0016	0.098	0.044	-1.5082	0.0235	-0.0109	-0.0161	0.060	0.054
3.9325	6.5654	0.0055	0.101	0.045	-1.5419	0.0236	-0.0128	-0.0164	0.056	0.053
4.0324	6.6982	0.0017	0.103	0.046	-1.5709	0.0235	-0.0147	-0.0168	0.054	0.051
4.1324	6.8279	0.0018	0.106	0.047	-1.5990	0.0235	-0.0165	-0.0172	0.054	0.053
4.2323	6.9559	0.0051	0.109	0.048	-1.6239	0.0237	-0.0185	-0.0176	0.057	0.058
4.3322	7.0846	0.0019	0.111	0.049	-1.6468	0.0236	-0.0205	-0.0181	0.060	0.063
4.4322	7.2114	0.0019	0.114	0.051	-1.6669	0.0236	-0.023	-0.019	0.063	0.067

TABLE 5 (CTD.)

NU (GEV)	A(+) (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D(+) (N.U.)	STAT. ERR.	CORR. SYST. ERR. POS.	NEG.	MAX. SYST. ERR. PCS.	NEG.
4.5321	7.3404	0.0019	0.116	0.052	-1.6834	0.0237	-0.025	-0.019	0.067	0.073
4.6321	7.4721	0.0020	0.119	0.053	-1.6991	0.0237	-0.027	-0.020	0.071	0.078
4.7321	7.6051	0.0031	0.121	0.054	-1.7150	0.0239	-0.029	-0.020	0.075	0.084
4.8320	7.7387	0.0023	0.124	0.055	-1.7311	0.0240	-0.032	-0.021	0.079	0.090
4.9320	7.8726	0.0032	0.127	0.056	-1.7477	0.0241	-0.034	-0.021	0.084	0.097
5.0319	8.0063	0.0022	0.129	0.057	-1.7648	0.0242	-0.037	-0.022	0.089	0.104
5.1319	8.1387	0.0046	0.132	0.059	-1.7815	0.0244	-0.040	-0.023	0.095	0.112
5.2319	8.2706	0.0022	0.134	0.060	-1.7971	0.0246	-0.043	-0.024	0.101	0.121
5.3318	8.4025	0.0029	0.137	0.061	-1.8111	0.0248	-0.046	-0.024	0.108	0.130
5.4418	8.5486	0.0056	0.140	0.062	-1.8255	0.0254	-0.050	-0.025	0.117	0.141
5.5418	8.6821	0.0062	0.142	0.063	-1.8384	0.0259	-0.054	-0.026	0.125	0.153
5.6417	8.8155	0.0065	0.145	0.064	-1.8513	0.0265	-0.058	-0.027	0.136	0.167
5.7417	8.9477	0.0087	0.147	0.065	-1.8627	0.0273	-0.063	-0.028	0.148	0.183
5.8417	9.0818	0.0075	0.150	0.067	-1.8717	0.0284	-0.069	-0.029	0.163	0.204
5.9416	9.2180	0.0117	0.149	0.068	-1.8802	0.0320	-0.076	-0.030	0.184	0.230
6.0416	9.3574	0.0167	0.148	0.069	-1.8897	0.0369	-0.081	-0.031	0.214	0.264
6.442	9.912	0.039	0.141	0.072	-1.940	0.042	-0.097	-0.037	0.272	0.312
7.001	10.682	0.050	0.136	0.074	-2.017	0.050	-0.112	-0.044	0.262	0.329
8.001	12.040	0.052	0.119	0.073	-2.155	0.050	-0.133	-0.057	0.240	0.316
9.001	13.382	0.049	0.103	0.067	-2.280	0.051	-0.146	-0.065	0.185	0.265
10.001	14.715	0.040	0.080	0.057	-2.392	0.048	-0.149	-0.066	0.111	0.194
11.001	16.042	0.031	0.066	0.053	-2.489	0.044	-0.144	-0.061	0.109	0.192
12.001	17.368	0.024	0.051	0.051	-2.574	0.041	-0.129	-0.054	0.114	0.190
13.001	18.694	0.022	0.056	0.056	-2.651	0.041	-0.114	-0.047	0.120	0.187
14.001	20.021	0.016	0.060	0.060	-2.720	0.042	-0.106	-0.042	0.130	0.193
15.001	21.349	0.017	0.064	0.064	-2.785	0.045	-0.100	-0.039	0.142	0.204
16.001	22.679	0.018	0.068	0.068	-2.850	0.050	-0.095	-0.035	0.158	0.217
17.001	24.001	0.024	0.073	0.073	-2.913	0.059	-0.090	-0.032	0.177	0.235
18.001	25.319	0.051	0.077	0.077	-2.970	0.068	-0.085	-0.028	0.201	0.258
19.001	26.634	0.027	0.081	0.081	-3.018	0.078	-0.080	-0.023	0.235	0.291
20.000	27.948	0.046	0.086	0.086	-3.058	0.093	-0.074	-0.018	0.293	0.349
22.000	30.591	0.151	0.100	0.100	-3.120	0.132	-0.061	-0.006	0.399	0.454
24.000	33.249	0.123	0.116	0.116	-3.172	0.156	-0.051	0.003	0.443	0.497
26.000	35.916	0.148	0.134	0.134	-3.221	0.176	-0.042	0.012	0.499	0.553
28.000	38.594	0.160	0.152	0.152	-3.274	0.222	-0.031	0.022	0.570	0.624
30.000	41.271	0.214	0.180	0.180	-3.333	0.273	-0.023	0.030	0.624	0.677
35.000	47.933	0.310	0.240	0.240	-3.477	0.354	-0.033	0.020	0.538	0.591
40.000	54.597	0.328	0.273	0.273	-3.594	0.421	-0.050	0.003	0.368	0.421
45.000	61.258	0.368	0.306	0.306	-3.700	0.348	-0.051	0.001	0.322	0.374
50.000	67.918	0.408	0.340	0.340	-3.798	0.294	-0.053	-0.002	0.311	0.363
55.000	74.576	0.447	0.373	0.373	-3.899	0.269	-0.055	-0.003	0.303	0.355
60.000	81.233	0.487	0.406	0.406	-3.973	0.254	-0.056	-0.005	0.297	0.349
65.000	87.889	0.527	0.439	0.439	-4.045	0.244	-0.057	-0.006	0.292	0.344
70.000	94.544	0.567	0.473	0.473	-4.115	0.237	-0.058	-0.007	0.289	0.340
80.000	107.853	0.647	0.539	0.539	-4.241	0.228	-0.059	-0.008	0.283	0.335
90.000	121.159	0.727	0.606	0.606	-4.355	0.222	-0.060	-0.009	0.280	0.331
100.000	134.464	0.807	0.672	0.672	-4.459	0.218	-0.061	-0.010	0.277	0.329
150.000	200.970	1.206	1.005	1.005	-4.875	0.207	-0.064	-0.013	0.270	0.322
200.000	267.458	1.605	1.337	1.337	-5.178	0.203	-0.065	-0.014	0.267	0.318
500.000	666.262	3.998	3.331	3.331	-6.357	0.222	-0.070	-0.019	0.259	0.309

TABLE 6

COMPLETE AMPLITUDE FOR PI-P SCATTERING

NU (GEV)	A- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.
0.13958	0.0000	0.0000	0.0000	0.0000	0.1085	0.0140	0.0038	0.0037
0.14458	0.0079	0.0008	0.0005	0.0006	0.1088	0.0139	0.0042	0.0041
0.14858	0.0107	0.0010	0.0008	0.0009	0.1095	0.0138	0.0046	0.0045
0.15258	0.0130	0.0013	0.001 1	0.0013	0.1109	0.0137	0.0050	0.0049
0.15683	0.0160	0.0015	0.0015	0.0017	0.1128	0.0136	0.0053	0.0052
0.16108	0.0172	0.0018	0.0018	0.0018	0.1155	0.0135	0.0051	0.0050
0.16438	0.0189	0.0020	0.0020	0.0020	0.1179	0.0135	0.0050	0.0048
0.17058	0.0221	0.0022	0.0022	0.0022	0.1235	0.0133	0.0053	0.0052
0.17658	0.0255	0.0025	0.0025	0.0025	0.1303	0.0133	0.0057	0.0056
0.18108	0.0285	0.0026	0.0026	0.0026	0.1363	0.0133	0.0061	0.0059
0.18958	0.0356	0.0029	0.0029	0.0029	0.1496	0.0132	0.0077	0.0076
0.19758	0.0446	0.0032	0.0032	0.0032	0.1641	0.0132	0.0133	0.0132
0.20458	0.0543	0.0034	0.0030	0.0030	0.1780	0.0131	0.0163	0.0163
0.21118	0.0653	0.0018	0.0016	0.0020	0.1918	0.0129	0.0158	0.0156
0.21658	0.0750	0.0009	0.0004	0.0004	0.2043	0.0127	0.0141	0.0137
0.22658	0.0996	0.0008	0.0004	0.0004	0.2286	0.0126	0.0103	0.0100
0.23558	0.1250	0.0007	0.0005	0.0005	0.2512	0.0125	0.0106	0.0104
0.24558	0.1617	0.0007	0.0009	0.0009	0.2794	0.0125	0.0111	0.0108
0.25358	0.2017	0.0008	0.0010	0.0010	0.3018	0.0124	0.01 11	0.0109
0.25858	0.2336	0.0009	0.001 1	0.0011	0.3116	0.0135	0.01 11	0.0108
0.25998	0.2429	0.0009	0.001 1	0.001 1	0.3133	0.0137	0.01 10	0.0108
0.26658	0.2868	0.0012	0.0010	0.0010	0.3174	0.0124	0.0107	0.0105
0.27558	0.3492	0.0012	0.0012	0.0012	0.3134	0.0125	0.0104	0.0102
0.27958	0.3775	0.0010	0.0012	0.0012	0.3076	0.0125	0.0104	0.0101
0.28958	0.4489	0.0013	0.0014	0.0014	0.2807	0.0123	0.01 11	0.0109
0.29858	0.5087	0.0015	0.0017	0.0017	0.2390	0.0125	0.0109	0.0106
0.30258	0.5330	0.0015	0.0017	0.0017	0.2129	0.0124	0.0105	0.0102
0.30758	0.5535	0.0016	0.0017	0.0017	0.1755	0.0124	0.0101	0.0098
0.31258	0.5643	0.0015	0.0018	0.0018	0.1408	0.0124	0.0100	0.0097
0.31758	0.5742	0.0015	0.0019	0.0019	0.1087	0.0124	0.0100	0.0097
0.32458	0.5823	0.0015	0.0019	0.0019	0.0619	0.0123	0.0104	0.0101
0.33458	0.5752	0.0016	0.0019	0.0019	-0.0022	0.0123	0.01 16	0.0113
0.34458	0.5530	0.0016	0.0018	0.0018	-0.0539	0.0123	0.0130	0.0127
0.35658	0.5164	0.0017	0.0017	0.0017	-0.0975	0.0122	0.0144	0.0140
0.36858	0.4755	0.0016	0.0015	0.0015	-0.1211	0.0122	0.0157	0.0154
0.38158	0.4374	0.0014	0.0012	0.0012	-0.1291	0.012'1	0.0170	0.0166
0.39458	0.4064	0.0013	0.0013	0.0013	-0.1271	0.0121	0.0185	0.0180
0.40958	0.3763	0.0011	0.0010	0.0010	-0.1159	0.0121	0.0203	0.0198
0.42158	0.3575	0.0011	0.0010	0.0010	-0.1005	0.0122	0.0221	0.0217
0.43458	0.3433	0.0012	0.0015	0.0015	-0.0788	0.0124	0.0290	0.0286
0.44958	0.3359	0.0073	0.0033	0.0033	-0.0504	0.0132	0.0396	0.0391
0.46358	0.2857	0.0076	0.0054	0.0054	-0.0230	0.0136	0.0452	0.0447
0.47958	0.3438	0.0079	0.0077	0.0077	0.0078	0.0132	0.0521	0.0516
0.4951	0.3575	0.0004	0.0091	0.0091	0.0355	0.0125	0.0455	0.0450
0.5191	0.3861	0.0004	0.0084	0.0084	0.0717	0.01 19	0.0209	0.0203
0.5432	0.4160	0.0004	0.0078	0.0078	0.1031	0.0118	0.0163	0.0156
0.5674	0.4475	0.0005	0.0078	0.0078	0.1359	0.0118	0.0147	0.0140
0.5917	0.4844	0.0005	0.0069	0.0069	0.1734	0.0118	0.0143	0.0136
0.6160	0.5342	0.0005	0.0065	0.0065	0.2118	0.0118	0.0143	0.0135
0.6404	0.5923	0.0006	0.0053	0.0053	0.2517	0.0118	0.0142	0.0134
0.6648	0.6766	0.0007	0.0050	0.0050	0.2902	0.0118	0.0143	0.0135
0.6893	0.7949	0.0008	0.0040	0.0040	0.3066	0.01 18	0.0144	0.0136
0.7015	0.8740	0.0009	0.0047	0.0047	0.2762	0.0119	0.0145	0.0136
0.7138	0.9165	0.0044	0.0048	0.0048	0.2242	0.0120	0.0146	0.0137
0.7236	0.9381	0.0009	0.0049	0.0049	0.1830	0.0120	0.0147	0.0137
0.7432	0.9419	0.0009	0.0050	0.0050	0.1126	0.0120	0.0149	0.0138
0.7629	0.9272	0.0009	0.0051	0.0051	0.0687	0.0119	0.0150	0.0140
0.7752	0.9098	0.0009	0.0050	0.0050	0.0535	0.01 19	0.0151	0.0140
0.7875	0.8900	0.0009	0.0051	0.0051	0.0495	0.0119	0.0153	8.0141
0.7998	0.8702	0.0009	0.0049	0.0049	0.0573	0.0122	0.0154	0.0142
0.8121	0.8540	0.0100	0.0048	0.0048	0.0767	0.0126	0.0155	0.0143
0.8244	0.8450	0.0008	0.0049	0.0049	0.1053	0.0122	0.0157	0.0144
0.8367	0.8416	0.0008	0.0049	0.0049	0.1440	0.0119	0.0158	0.0145
0.8491	0.8544	0.0009	0.0050	0.0050	0.1903	0.0119	0.0159	0.0146
0.8614	0.8803	0.0009	0.0051	0.0051	0.2357	0.01 19	0.0161	0.0148
0.8737	0.9148	0.0009	0.0052	0.0052	0.2823	0.01 19	0.0163	0.0149
0.8861	0.9682	0.0010	0.0050	0.0050	0.3282	0.01 19	0.0164	0.0150
0.8984	1.0381	0.0010	0.0048	0.0048	0.3597	0.0119	0.0166	0.0151
0.9108	1.1079	0.0011	0.0049	0.0049	0.3789	0.01 19	0.0167	0.0152

TABLE 6 (CTD.)

NU (GEV)	A- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.
0.9231	1.1843	0.0012	0.0049	0.0049	0.3927	0.0119	0.0169	0.0153
0.9355	1.2713	0.0013	0.0050	0.0050	0.3971	0.0119	0.0170	0.0155
0.9478	1.3694	0.0014	0.0051	0.0051	0.3817	0.01151	0.0172	0.0156
0.9602	1.4645	0.0015	0.0049	0.0049	0.3416	0.0119	0.0173	0.0157
0.9726	1.5491	0.0015	0.0049	0.0049	0.2833	0.0120	0.0175	0.0158
0.9849	1.6236	0.0016	0.0047	0.0047	0.2105	0.0120	0.0177	0.0160
0.9973	1.6856	0.0017	0.0048	0.0048	0.1209	0.0124	0.0178	0.0161
1.0047	1.7140	0.0105	0.0051	0.0051	0.0591	0.0129	0.0179	0.0162
1.0097	1.7277	0.0017	0.0051	0.0051	0.0140	0.0125	0.0180	0.0162
1.0146	1.7357	0.0017	0.0052	0.0052	-0.0321	0.0121	0.0181	0.0163
1.0196	1.7378	0.0017	0.0052	0.0052	-0.0800	0.0121	0.0181	0.0163
1.0345	1.7018	0.0017	0.0053	0.0053	-0.2055	0.0120	0.0184	0.0164
1.0468	1.6560	0.0017	0.0053	0.0053	-0.2764	0.0121	0.0185	0.0166
1.0592	1.6115	0.0016	0.0054	0.0054	-0.3271	0.0123	0.0186	0.0166
1.0716	1.5727	0.0016	0.0055	0.0055	-0.3716	0.0122	0.0188	0.0167
1.0840	1.5256	0.0015	0.0055	0.0055	-0.4160	0.0120	0.0189	0.0169
1.0964	1.4584	0.0015	0.0059	0.0059	-0.4418	0.0120	0.0192	0.0170
1.1088	1.3991	0.0014	0.0060	0.0060	-0.4403	0.0120	0.0195	0.0173
1.1212	1.3543	0.0014	0.0060	0.0060	-0.4247	0.0121	0.0197	0.0175
1.1336	1.3228	0.0013	0.0061	0.0061	-0.4036	0.0121	0.0199	0.0176
1.1584	1.2911	0.0013	0.0062	0.0062	-0.3616	0.0121	0.0203	0.0180
1.1833	1.2784	0.0013	0.0064	0.0064	-0.3279	0.0121	0.0209	0.0184
1.2081	1.2727	0.0013	0.0065	0.0065	-0.2942	0.0121	0.0214	0.0188
1.2329	1.2853	0.0013	0.0066	0.0066	-0.2624	0.0121	0.0220	0.0193
1.2578	1.3043	0.0013	0.0068	0.0068	-0.2394	0.0122	0.0225	0.0197
1.2702	1.3146	0.0013	0.0068	0.0068	-0.2298	0.0122	0.0228	0.0199
1.2826	1.3258	0.0018	0.0069	0.0069	-0.2204	0.0122	0.0231	0.0201
1.2950	1.3392	0.0013	0.0070	0.0070	-0.2120	0.0122	0.0234	0.0204
1.3075	1.3539	0.0014	0.0070	0.0070	-0.2056	0.0122	0.0237	0.0207
1.3323	1.3837	0.0014	0.0072	0.0072	-0.1983	0.0123	0.0244	0.0212
1.3572	1.4122	0.0031	0.0073	0.0073	-0.1961	0.0123	0.0249	0.0216
1.3821	1.4389	0.0015	0.0075	0.0075	-0.1971	0.0123	0.0254	0.0219
1.4069	1.4636	0.0015	0.0076	0.0076	-0.2003	0.0123	0.0259	0.0223
1.4318	1.4866	0.0015	0.0073	0.0073	-0.2048	0.0124	0.0263	0.0226
1.4567	1.5077	0.0021	0.0074	0.0074	-0.2108	0.0126	0.0267	0.0228
1.4816	1.5256	0.0080	0.0076	0.0076	-0.2177	0.0128	0.0270	0.0230
1.5065	1.5396	0.0015	0.0077	0.0077	-0.2237	0.0130	0.0278	0.0236
1.5234	1.5466	0.0016	0.0078	0.0078	-0.2256	0.0130	0.0286	0.0243
1.5413	1.5541	0.0015	0.0079	0.0079	-0.2245	0.0127	0.0293	0.0248
1.5563	1.5617	0.0015	0.0080	0.0080	-0.2224	0.0125	0.0299	0.0253
1.5812	1.5747	0.0016	0.0081	0.0081	-0.2178	0.0125	0.031	0.026
1.6061	1.5878	0.0016	0.0087	0.0087	-0.2101	0.0126	0.032	0.027
1.6310	1.6042	0.0016	0.0088	0.0088	-0.1987	0.0130	0.033	0.027
1.6559	1.6252	0.0016	0.0089	0.0089	-0.1862	0.0136	0.034	0.028
1.6808	1.6501	0.0053	0.0091	0.0091	-0.1742	0.0133	0.035	0.029
1.7057	1.6784	0.0017	0.0097	0.0097	-0.1639	0.0128	0.036	0.030
1.7306	1.7091	0.0017	0.0098	0.0098	-0.1558	0.0127	0.037	0.032
1.7556	1.7413	0.0017	0.0105	0.0105	-0.1501	0.0128	0.039	0.033
1.7805	1.7745	0.0030	0.0111	0.0111	-0.1470	0.0128	0.041	0.034
1.8054	1.8075	0.0018	0.0118	0.0118	-0.1461	0.0131	0.043	0.036
1.8303	1.8403	0.0099	0.0130	0.0130	-0.1470	0.0135	0.045	0.038
1.8553	1.8728	0.0018	0.0137	0.0137	-0.1490	0.0132	0.048	0.040
1.8802	1.9049	0.0019	0.0139	0.0139	-0.1516	0.0131	0.050	0.043
1.9211	1.9599	0.0093	0.0137	0.0137	-0.1580	0.0135	0.055	0.047
1.9550	2.0067	0.0020	0.0139	0.0139	-0.1680	0.0134	0.059	0.051
2.0049	2.0730	0.0021	0.0148	0.0148	-0.1920	0.0132	0.067	0.058
2.0547	2.1298	0.0021	0.0175	0.0175	-0.2233	0.0137	0.079	0.069
2.0797	2.1547	0.0047	0.0178	0.0178	-0.2398	0.0149	0.090	0.079
2.1046	2.1774	0.0150	0.0180	0.0180	-0.2561	0.0156	0.110	0.100
2.1545	2.2173	0.0022	0.0178	0.0178	-0.2874	0.0138	0.146	0.135
2.2044	2.2516	0.0023	0.0226	0.0226	-0.3155	0.0135	0.152	0.139
2.2543	2.2823	0.0023	0.0257	0.0257	-0.3409	0.0135	0.159	0.145
2.3042	2.3075	0.0023	0.0262	0.0262	-0.3623	0.0136	0.165	0.149
2.3541	2.3296	0.0023	0.0261	0.0261	-0.3756	0.0138	0.169	0.150
2.4041	2.3570	0.0023	0.0294	0.0294	-0.3832	0.0150	0.174	0.150
2.4540	2.3870	0.0175	0.0328	0.0280	-0.3901	0.0169	0.172	0.145
2.5239	2.4299	0.0187	0.0359	0.0216	-0.3989	0.0170	0.157	0.132
2.6237	2.4937	0.0075	0.0359	0.0179	-0.4075	0.0152	0.150	0.128
2.7236	2.5620	0.0016	0.0349	0.0155	-0.4127	0.0143	0.127	0.110

TABLE 6 (CTD.)

NU (GEV)	A- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D- (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.
2.8235	2.6353	0.0016	0.0362	0.0161	-0.4172	0.0143	0.096	0.081
2.9233	2.7122	0.0020	0.0375	0.0167	-0.4228	0.0144	0.086	0 072
3.0232	2.7923	0.0017	0.0388	0.0172	-0.4306	0.0146	0.079	0 067
3.1231	2.8748	0.0013	0.0401	0.0178	-0.4429	0.0147	0.075	0.063
3.2230	2.9554	0.0014	0.0413	0.0184	-0.4615	0.0149	0.071	0 061
3.3229	3.0282	0.0014	0.0426	0.0189	-0.4810	0.0151	0.068	0.059
3.4228	3.1002	0.0033	0.0439	0.0195	-0.4983	0.0153	0.066	0.057
3.5228	3.1703	0.0015	0.0452	0.0201	-0.5160	0.0155	01063	0.056
3.6227	3.2362	0.0015	0.0465	0.0207	-0.5315	0.0157	0.061	0.054
3.7226	3.3020	0.0033	0.0478	0.0212	-0.5437	0.0159	0.059	0.053
3.8225	3.3681	0.0011	0.0490	0.0218	-0.5538	0.0161	0.058	0 053
3.9325	3.4420	0.0054	0.0505	0.0224	-0.5632	0.0164	0.056	0 052
4.0324	3.5101	0.0011	0.0517	0.0230	-0.5710	0.0166	0.055	O 051
4.1324	3.5795	0.0012	0.0530	0.0236	-0.5789	0.0168	0.055	0.052
4.2323	3.6486	0.0049	0.0543	0.0241	-0.5875	0.0171	0.056	0.054
4.3322	3.7172	0.0012	0.056	0.025	-0.5963	0.0172	0.058	0.056
4.4322	3.7846	0.0013	0.057	0.025	-0.6049	0.0174	0.059	0.059
4.5321	3.8510	0.0013	0.058	0.026	-0.6117	0.0176	0.061	0.061
4.6321	3.9185	0.0013	0.059	0.026	-0.6169	0.0179	01063	O 064
4.7321	3.9872	0.0027	0.061	0.027	-0.6217	0.0182	0.065	0.067
4.8320	4.0566	0.0019	0.062	0.028	-0.6270	0.0185	0.067	0.071
4.9320	4.1263	0.0014	0.063	0.028	-0.6327	0.0187	0.071	0.076
5.0319	4.1956	0.0014	0.065	0.029	-0.6391	0.0191	0.075	0.081
5.1319	4.2636	0.0023	0.066	0.029	-0.6453	0.0193	0.079	0.086
5.2319	4.3313	0.0015	0.067	0.030	-0.6505	0.0197	0.084	O 092
5.3318	4.3990	0.0015	0.068	0.030	-0.6545	0 0200	0.089	0 098
5.4418	4.4744	0.0048	0.070	0.031	-0.6582	0.0206	0.095	0 106
5.5418	4.5436	0.0060	0.071	0.032	-0.6616	0.0210	0.102	0 114
5.6417	4.6128	0.0040	0.072	0.032	-0.6650	0.0216	O 109	0.124
5.7417	4.6820	0.0041	0.074	0.033	-0.6679	0.0222	0.118	0 135
5.8417	4.7520	0.0045	0.075	0.033	-0.6703	0.0229	0.129	0.148
5.9416	4.8226	0.0069	0.073	0.034	-0.6727	0. 0245	0.144	0 166
6.0416	4.8945	0.0078	0.071	0.034	-0.6754	0.0268	0.165	0 189
6.442	5.180	0.017	0.061	0.035	-0.692	0.031	0.207	0.224
7.001	5.576	0.032	0.050	0.036	-0.718	0.038	0.203	0.237
8.001	6.274	0.007	0.034	0. 034	-0.767	0.039	0 190	0.230
9.001	6.963	0.007	0.028	0.028	-0.811	0.041	0 154	0 197
10.001	7.645	0.008	0.023	0.023	-0.848	0.041	0.099	0 145
11.001	8.325	0.009	0.025	0.025	-0.878	0.041	0.095	0 140
12.001	9.002	0.011	0.027	0.027	-0.903	0.042	0.100	0 141
13.001	9.680	0.011	0.029	0.029	-0.924	0.044	0.106	0.141
14.001	10.358	0.010	0.031	0.031	-0.942	0.046	C.112	0 146
15.001	11.035	0.011	0.033	0.033	-0.959	0.049	0.121	0.153
16.001	11.714	0.014	0.035	0.035	-0.975	0.053	O 133	0.165
17.001	12.389	0.012	0.037	0.037	-0.992	0.058	0.149	O 180
18.001	13.060	0.037	0.040	0.040	-1.006	0.064	0 169	O 198
19.001	13.730	0.015	0.042	0.042	-1.016	0.071	0.196	0.225
20.000	14.399	0.045	0.044	0.044	-1.022	0.081	0.241	0.270
22.000	15.744	0.019	0.048	0.048	-1.027	0. 102	0.326	0.354
24.000	17.095	0.017	0.053	0.053	-1.029	0.113	0.360	0.388
26.000	18.448	0.037	0.056	0.056	-1.029	0.123	0.403	0.431
28.000	19.807	0.020	0.063	0.063	-1.032	0.146	0.454	0 482
30.000	21.162	0.086	0 077	0.077	-1.038	0.171	0.490	0.517
35.000	24.538	0.180	0.100	0.100	-1.050	0.216	0.419	0.446
40.000	27.916	0.194	0.114	01 14	-1.052	0.258	0.299	0.326
45.000	31.288	0.154	0.128	0.128	-1.055	0.227	0.265	0 292
50.000	34.658	0.128	0.143	0.143	-1.055	0.207	0.261	0.287
55.000	38.025	0.141	0.157	0.157	-1.060	0.201	0.257	0.283
60.000	41.391	0.154	0.171	0.171	-1.052	0.201	0.255	0 282
65.000	44.755	0.260	0. 185	0. 185	-1.045	0.203	0.255	0.281
70.000	48.117	0.29	0.22	0.22	-1.038	0.206	0.255	0.281
80.000	54.836	0.33	0.29	0.29	-1.022	0.214	0.256	0.284
90.000	61.551	0.38	0.36	0.36	-1.005	0.223	0.261	0.287
100.000	68.263	0.42	0.43	0.43	-0.985	0.235	0.264	0.290
150.000	101.778	0.62	0.62	0.62	-0.875	0.288	0.286	0.311
200.000	135.249	0.82	0.81	0.81	-0.754	0. 338	0.306	0.331
500.000	335.668	2.03	1.90	1.90	-0.113	0.602	0.416	0 441

TABLE 7

COMPLETE AMPLITUDE FOR PI+P SCATTEFING

NU (GEV)	A+ (N.U.)	STAT. ERR.	SYST. POS.	ERRORS NEG.	D+ (N.U.)	STAT. ERR.	SYST. POS.	ERRORS NEG.
0.13958	0.0000	0.0000	0.0000	0.0000	-0.1246	0.0140	0.0037	0.0038
0.14458	0.0027	0.0008	0.0004	0.0006	-0.1047	0.0139	0.0040	0.0043
0.14858	0.0035	0.0010	0.0007	0.0011	-0.0878	0.0118	0.0044	0.0046
0.15258	0.0045	0.0013	0.001 1	0.0014	-0.0700	0.0137	0.0050	0.0048
0.15683	0.0060	0.0014	0.0012	0.0013	-0.0501	0.0136	0.0054	0.0050
0.16108	0.0082	0.00 11	0.001 1	0.001 1	-0.0295	0.0125	0.0052	0.0048
0.16438	0.0103	0.0012	0.0012	0.0012	-0.0130	0.0135	0.0050	O 0048
0.17058	0.0154	0.0014	0.0014	0.0014	0.0196	0.0133	0.0054	0.0052
0.17658	0.0222	0.0015	0.0015	0.0015	0.0532	0.0123	0.0057	0.0056
0.18108	0.0287	0.0016	0.0016	0.0016	0.0797	0.0133	0.0061	0.0059
0.18958	0.0452	0.0037	0.0018	0.0018	0.1329	0.0132	0.0077	0.0076
0.19758	0.0667	0.0040	0.0020	0.0020	0.1863	0.0132	0.0133	0.0132
0.20458	0.0903	0.0043	0.0021	0.0021	0.2357	0.0131	0.0163	0.0162
0.21118	0.1182	0.0012	0.0022	0.0022	0.2840	0.0129	0.0158	0.0156
0.21658	0.1429	0.0011	0.0016	0.0016	0.3262	0.0127	0.0140	0.0138
0.22658	0.2061	0.0011	0.0010	0.0010	0.4121	0.0126	0.0102	0.0101
0.23558	0.2849	0.0012	0.0010	0.0010	0.4911	0.0125	0.0105	0.0104
0.24558	0.4002	0.0016	0.0015	0.0015	0.5748	0.0125	0.0110	0.0109
0.25358	0.5159	0.0020	0.0022	0.0022	0.6334	0.0124	0.01 11	0.01 10
0.25858	0.5997	0.0022	0.0025	0.0025	0.6652	0.0135	0.0110	0.0109
0.25998	0.6258	0.0069	0.0027	0.0027	0.6728	0.0137	0.01 10	0.0108
0.26658	0.7577	0.0027	3.0032	0.0032	0.6961	0.0124	0.0107	0.0106
0.27558	0.9576	0.0030	0.0035	0.0035	0.6912	0.0125	0.0104	0.0102
0.27958	1.0519	0.0030	0.0033	0.0033	0.6723	0.0125	0.0103	0.0102
0.28953	1.2853	0.0033	0.0041	0.0041	0.5716	0.0123	0.0111	0.0109
0.29858	1.4702	0.0034	0.0050	0.0050	0.4145	0.0125	0.0108	0.0107
0.30258	1.5354	0.0034	0.0051	0.0051	0.3273	0.0124	0.0104	0.0102
0.30758	1.5972	0.0035	0.0052	0.0052	0.2110	0.0124	0.0100	0.0099
0.31258	1.6417	0.0037	0.0054	0.0054	0.0917	0.0124	0.0099	0.0097
0.31758	1.6693	0.0038	0.0056	0.0056	-0.0290	0.0124	0.0099	O 0098
0.32458	1.6799	0.0039	0.0057	0.0057	-0.1956	0.0123	0.0103	0.0102
0.33458	1.6438	0.0040	0.0055	0.0055	-0.4146	0.0123	0.0115	0.0114
0.34458	1.5631	0.0039	0.0051	0.0051	-0.5955	0.0123	0.0129	0.0127
0.35658	1.4420	0.0035	0.0047	0.0047	-0.7600	0.0122	0.0143	0.0141
0.36858	1.3041	0.0030	0.0043	0.0043	-0.8707	0.0122	0.0156	O 0154
0.38158	1.1709	0.0029	0.0038	0.0038	-0.9428	0.0121	0.0169	O 0167
0.39458	1.0482	0.0029	0.0034	0.0034	-0.9853	0.0121	0.0184	0.0181
0.40958	0.9273	0.0027	0.0030	0.0030	-1.0071	0.0121	0.0202	0.0199
0.42158	0.8440	0.0026	0.0030	0.0030	-1.0127	0.0122	0.0220	0.0217
0.43458	0.7620	0.0035	0.0043	0.0043	-1.0091	0.0124	0.0289	0.0287
0.44958	0.6805	0.0073	0.0068	0.0068	-0.9931	0.0132	0.0395	O 0392
0.46358	0.6175	0.0076	0.0093	0.0093	-0.9702	0.0136	0.0451	O 0448
0.47958	0.5602	0. 0079	0.0115	0.0115	-0.9385	0.0132	0.0520	0.0517
0.4951	0.5206	0.0005	0.0114	0.0114	-0.9078	0.0125	0.0454	0 0451
0.5191	0.4736	0.0005	0.0096	0.0096	-0.8674	0.01 19	0.0208	O 0204
0.5432	0.4364	O 0004	0.0085	0.0085	-0.8310	0.0118	0.0161	0.0158
0.5674	0.4071	0.0004	0.0078	0.0078	-0.7969	0.01 18	0.0145	0.0141
0.5917	0.3824	0.0004	0.0066	0.0066	-0.7652	0.0118	0.0142	0.0137
0.6160	0.3580	0.0004	0.0062	0.0062	-0.7324	0.01 18	0.0141	0.0136
0.6404	0.3379	0.0003	0.0048	0.0048	-0.6958	0.0118	0.0141	0.0136
0.6648	0.3212	0.0003	0.0045	0.0045	-0.6545	0.01 18	0.0142	0.0136
0.6893	0.3142	0.0003	0.0044	0.0044	-0.6113	0.0119	0.0143	0.0137
0.7015	0.3122	0.0003	0.0043	0.0043	-0.5911	0.01 19	0.0144	0.0137
0.7138	0.3094	0.0003	0.0042	0.0042	-0.5702	0.0123	0.0145	0.0138
0.7236	0.3076	0.0003	0.0043	0.0043	-0.5520	0.0123	0.0146	0.0138
0.7432	0.3082	0.0042	0.0044	0.0044	-0.5133	0.0120	0.0 147	0.0140
0.7629	0.3137	0.0003	0.0043	0.0043	-0.4729	0.0119	0.0149	0.0141
0.7752	0.3197	C.0003	0.0044	0.0044	-0.4472	0.01 19	0.0150	0.0142
0.7875	0.3280	0.0003	0.0042	0.0042	-0.4213	0.01 19	0.0151	0.0143
0.7998	0.3383	0.0003	0.0040	0.0040	-0.3955	0.0122	0.0153	0.0144
0.8121	0.3508	0.0003	0.0041	0.0041	-0.3700	0.0126	0.0154	0.0145
0.8244	0.3655	0.0004	0.0042	0.0042	-0.3449	0.0122	0.0155	0.0146
0.8367	0.3824	0.0004	0.0042	0.0042	-0.3200	0.01 19	0.0156	0.0147
0.8491	0.4029	0.0004	0.0043	0.0043	-0.2963	0.0 119	0.0 158	0.0148
0.8614	0.4253	O 0004	0.0044	0.0044	-0.2750	0.01 19	0.0159	0.0149
0.8737	0.4495	0.0004	0.0044	0.0044	-0.2561	0.01 19	0.0161	0.0150
0.8861	0.4750	0.0005	0.0045	0.0045	-0.2394	0.01 19	0.0162	0.0151
0.8984	0.5013	0.0005	0.0046	0.0046	-0.2256	0.01 19	0.0164	0.0153
0.9108	0.5280	0.0005	0.0046	0.0046	-0.2143	0.01 19	0.0165	0.0154

TABLE 7 (CTD.)

NU (GEV)	A+ (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.	D+ (N.U.)	STAT. ERR.	SYST. ERRORS POS.	NEG.
0.9231	0.5546	0.0005	0.0047	0.0047	-0.2061	0.0119	0.0167	0.0155
0.9355	0.5803	0.0006	0.0047	0.0047	-0.2009	0.0119	0.0169	0.0156
0.9478	0.6034	0.0006	0.0048	0.0048	-0.1980	0.01 19	0.0170	0.0158
0.9602	0.6237	0.0006	0.0049	0.0049	-0.1957	0.01 19	0.0172	0.0159
0.9726	0.6424	0.0006	0.0049	0.0049	-0.1928	0.0120	0.0173	0.0160
0.9849	0.6599	0.0007	0.0050	0.0050	-0.1897	0.0120	0.0175	0.0161
0.9973	0.6763	0.0007	0.0048	0.0048	-0.1862	0.0124	0.0177	0.0162
1.0047	0.6857	0.0007	0.0048	0.0048	-0.1838	0.0129	0.0178	0.0163
1.0097	0.6918	0.0007	0.0048	0.0048	-0.1819	0.0125	0.0179	0.0164
1.0146	0.6977	0.0007	0.0049	0.0049	-0.1799	0.0121	0.0179	0.0164
1.0196	0.7036	0.0007	0.0049	0.0049	-0.1777	0.0121	0.0180	0.0165
1.0345	0.7213	0.0007	0.0050	0.0050	-0.1696	0.0120	0.0182	0.0166
1.0468	0.7365	0.0007	0.0050	0.0050	-0.1619	0.0121	0.0183	0.0167
1.0592	0.7523	0.0060	0.0051	0.0051	-0.1535	0.0123	0.0184	0.0168
1.0716	0.7686	0.0008	0.0055	0.0055	-0.1443	0.0122	0.0186	0.0169
1.0840	0.7858	0.0008	0.0055	0.0055	-0.1344	0.0120	0.0188	0.0170
1.0964	0.8038	0.0008	0.0056	0.0056	-0.1239	0.0120	0.0190	0.0172
1.1088	0.8231	0.0008	0.0056	0.0056	-0.1130	0.0120	0.0193	0.0174
1.1212	0.8435	0.0009	0.0057	0.0057	-0.1020	0.0121	0.0195	0.0176
1.1336	0.8652	0.0009	0.0058	0.0058	-0.0909	0.0121	0.0197	0.0178
1.1584	0.9119	0.0009	0.0062	0.0062	-0.0686	0.0121	0.0202	0.0181
1.1833	0.9649	0.0010	0.0064	0.0064	-0.0467	0.0121	0.0208	0.0186
1.2081	1.0249	0.0010	0.0065	0.0065	-0.0277	0.0121	0.0213	0.0190
1.2329	1.0897	0.0011	0.0066	0.0066	-0.0121	0.0121	0.0218	0.0194
1.2578	1.1633	0.0012	0.0068	0.0068	0.0003	0.0122	0.0223	0.0198
1.2702	1.2046	0.0012	0.0068	0.0068	0.0032	0.0122	0.0227	0.0201
1.2826	1.2487	0.0012	0.0069	0.0069	0.0010	0.0122	0.0229	0.0203
1.2950	1.2908	0.0013	0.0070	0.0070	-0.0058	0.0122	0.0232	0.0205
1.3075	1.3320	0.0013	0.0070	0.0070	-0.0141	0.0122	0.0236	0.0208
1.3323	1.4205	0.0014	0.0068	0.0068	-0.0409	0.0123	0.0243	0.0213
1.3572	1.5000	0.0015	0.0065	0.0065	-0.0864	0.0123	0.0248	0.0217
1.3821	1.5668	0.0016	0.0063	0.0063	-0.1390	0.0123	0.0252	0.0220
1.4069	1.6307	0.0016	0.0064	0.0064	-0.1992	0.0123	0.0257	0.0224
1.4318	1.6818	0.0017	0.0065	0.0065	-0.2723	0.0124	0.0262	0.0227
1.4567	1.7133	0.0017	0.0066	0.0066	-0.3504	0.0126	0.0266	0.0229
1.4816	1.7269	0.0017	0.0067	0.0067	-0.4242	0.0128	0.0270	0.0231
1.5065	1.7301	0.0017	0.0077	0.0077	-0.4913	0.0130	0.0278	0.0237
1.5234	1.7260	0.0087	0.0078	0.0078	-0.5332	0.0130	0.0285	0.0243
1.5413	1.7168	0.0017	0.0079	0.0079	-0.5733	0.0127	0.0292	0.0249
1.5563	1.7060	0.0017	0.0080	0.0080	-0.6032	0.0125	0.0298	0.0253
1.5812	1.6829	0.0017	0.0081	0.0081	-0.6440	0.0125	0.031	0.026
1.6061	1.6562	0.0016	0.0078	0.0078	-0.6716	0.0126	0.032	0.027
1.6310	1.6331	0.0016	0.0083	0.0083	-0.6877	0.0130	0.033	0.027
1.6559	1.6142	0.0118	0.0089	0.0089	-0.6969	0.0136	0.034	0.028
1.6808	1.5988	0.0016	0.0096	0.0096	-0.7007	0.0133	0.035	0.029
1.7057	1.5873	0.0016	0.0107	0.0107	-0.6999	0.0128	0.036	0.030
1.7306	1.5803	0.0016	0.0113	0.0113	-0.6954	0.0127	0.038	0.031
1.7556	1.5793	0.0016	0.0120	0.0120	-0.6898	0.0128	0.039	0.033
1.7805	1.5809	0.0016	0.0127	0.0127	-0.6854	0.0128	0.041	0.034
1.8054	1.5834	0.0016	0.0128	0.0128	-0.6809	0.0131	0.043	0.036
1.8303	1.5866	0.0016	0.0135	0.0135	-0.6749	0.0135	0.045	0.037
1.8553	1.5919	0.0016	0.0137	0.0137	-0.6670	0.0132	0.048	0.040
1.8802	1.6002	0.0016	0.0139	0.0139	-0.6582	0.0131	0.051	0.042
1.9211	1.6183	0.0016	0.0153	0.0153	-0.6441	0.0135	0.056	0.046
1.9550	1.6365	0.0016	0.0161	0.0161	-0.6324	0.0134	0.061	0.050
2.0049	1.6694	0.0046	0.0171	0.0171	-0.6156	0.0132	0.069	0.056
2.0547	1.7082	0.0047	0.0187	0.0187	-0.6014	0.0137	0.083	0.065
2.0797	1.7290	0.0047	0.0213	0.0184	-0.5954	0.0149	0.094	0.075
2.1046	1.7505	0.0048	0.0240	0.0180	-0.5899	0.0156	0.115	0.094
2.1545	1.7959	0.0021	0.0276	0.0153	-0.5804	0.0138	0.150	0.130
2.2044	1.8444	0.0019	0.0282	0.0126	-0.5727	0.0135	0.154	0.137
2.2543	1.8964	0.0016	0.0289	0.0128	-0.5671	0.0135	0.159	0.146
2.3042	1.9520	0.0013	0.0295	0.0131	-0.5639	0.0136	0.163	0.151
2.3541	2.0134	0.0013	0.0302	0.0134	-0.5659	0.0138	0.165	0.154
2.4041	2.0767	0.0014	0.0308	0.0137	-0.5770	0.0150	0.166	0.158
2.4540	2.1362	0.0014	0.0315	0.0140	-0.5961	0.0169	0.163	0.154
2.5239	2.2115	0.0014	0.0324	0.0144	-0.6303	0.0170	0.150	0.140
2.6237	2.3038	0.0015	0.0336	0.0149	-0.6876	0.0152	0.141	0.136
2.7236	2.3758	0.0016	0.0349	0.0155	-0.7485	0.0143	0.121	0.116

TABLE 7 (CTD.)

NU (GEV)	A+ (N.U.)	STAT. ERR.	SYST. POS.	ERRORS NEG.	D+ (N.U.)	STAT. ERR.	SYST. POS.	ERRORS NEG.
2.8235	2.4255	0.0016	0.0362	0.0161	-0.7991	0.0143	0.091	0.086
2.9233	2.4707	0.0017	0.0375	0.0167	-0.8337	0.0144	0 081	O 077
3.0232	2.5128	0.0017	0.0388	0.0172	-0.8531	0.0146.	0.075	0.071
3.1231	2.5661	0.0013	0.0401	0.0178	-0.8619	0.0147	0.071	0 067
3.2230	2.6266	0.0014	0.0413	0.0184	-0.8690	0.0149	0.068	0 064
3.3229	2.6927	0.0029	0.0426	0.0189	-0.8766	0.0151	0.065	0 062
3.4228	2.7627	0.0015	0.0439	0.0195	-0.8865	0.0153	0.062	0.060
3.5228	2.8344	0.0015	0.0452	0.0201	-0.8987	0.0155	0.060	0.059
3.6227	2.9078	0.0035	0.0465	0.0207	-0.9137	0.0157	0.058	0.057
3.7226	2.9808	0.0023	0.0478	0.0212	-0.9324	0.01 59	0.057	0.056
3.8225	3.0515	0.0011	0.0490	0.0218	-0.9545	0.0161	0.055	0.055
3.9325	3.1234	0.0011	0.0505	0.0224	-0.9787	0.0164	0.053	O 054
4.0324	3.1881	0.0011	0.0517	0.0230	-0.9999	0.0166	0.052	0.053
4.1324	3.2484	0.0012	0.0530	0.0236	-1.0202	0.0168	0.052	0 054
4.2323	3.3072	0.0012	0.0543	0.0241	-1.0364	0.0171	0.054	0.056
4.3322	3.3675	0.0012	0.056	0.025	-1.0504	0.0172	0.055	0.059
4.4322	3.4268	0.0013	0.057	0.025	-1.0620	0.0174	0.057	0.061
4.5321	3.4894	0.0013	0.058	0.026	-1.0717	0.0176	0.059	0.064
4.6321	3.5537	0.0013	0.059	0.026	-1.0822	0.0179	0.061	0 066
4.7321	3.6179	0.0016	0.061	0.027	-1.0932	0.0182	0.063	0.069
4.8320	3.6821	0.0014	0.062	0.028	-1.1042	0.0185	0.065	0.073
4.9320	3.7464	0.0030	0.063	0.028	-1.1150	0.0187	0.069	0.077
5.0319	3.8107	0.0014	0.065	0.029	-1.1257	0.0191	0.073	0.082
5.1319	3.8751	0.0038	0.066	0.029	-1.1363	0.0193	0.077	0.088
5.2319	3.9393	0.0015	0.067	0.030	-1.1466	0.0197	0.082	O 094
5.3318	4.0035	0.0024	0.068	0.030	-1.1567	0.0200	0.087	0 100
5.4418	4.0742	0.0028	0.070	0.031	-1.1673	0.0206	0.094	0.108
5.5418	4.1385	0.0016	0.071	0.032	-1.1768	0.0210	0.100	0 116
5.6417	4.2027	0.0040	0.072	0.032	-1.1863	0.0216	0.108	0.125
5.7417	4.2656	0.0077	0.074	0.033	-1.1947	0.0222	O 117	0.136
5.8417	4.3298	0.0047	0.075	0.033	-1.2014	0.0229	0.128	0.150
5.9416	4.3954	0.0064	0.076	0.034	-1.2075	0.0245	0.143	0 167
6.0416	4.4629	0.0098	0.078	0.034	-1.2142	0.0268	0.164	0 190
6.442	4.732	0.024	0.081	0.037	-1.248	0.031	0.204	0 226
7.001	5.105	0.038	0.086	0.038	-1.298	0.038	0.203	O 237
8.001	5.765	0.057	0.084	0.039	-1.387	0.039	0.192	0.229
9.001	6.419	0.049	0.074	0.039	-1.470	0.041	0.157	0.194
10.001	7.069	0.037	0.057	0.034	-1.544	0.041	0.103	0 141
11.001	7.717	0.031	0.041	0.028	-1.611	0.041	0.099	0.136
12.001	8.365	0.024	0.025	0.025	-1.672	0.042	0 103	O 137
13.001	9.013	0.017	0.028	0.028	-1.727	0.044	O 108	0.139
14.001	9.663	0.010	0.031	0.031	-1.778	0.046	O 114	0 144
15.001	10.313	0.010	0.032	0.032	-1.826	0.049	0 123	0.152
16.001	10.965	0.011	0.033	0.033	-1.874	0.053	0 135	0 163
17.001	11.612	0.023	0.036	0.036	-1.921	0.058	0.150	0 178
18.001	12.259	0.036	0.040	0 040	-1.964	0.064	0.170	0.198
19.001	12.904	0.025	0.041	0.041	-2.002	0.071	0.197	0.224
20.000	13.548	0.013	0.043	0.043	-2.036	0.081	0.242	0.269
22.000	14.847	0.151	0.050	0.050	-2.093	0 102	0.327	0.353
24.000	16.154	0.123	0.062	0.062	-2.144	0.113	0.361	0 388
26.000	17.468	0.148	0.074	0.074	-2.192	0 123	0.404	0.430
28.000	18.787	0.160	0.088	0.088	-2.242	0.146	0.455	0.481
30.000	20.109	0.180	0.103	0.103	-2.295	0.171	0.490	0 517
35.000	23.395	0.389	0.120	0.120	-2.427	0.216	0.420	0.445
40.000	26.681	0.365	0 137	0.137	-2.542	0.258	O 300	0.325
45.000	29.970	0.308	0 154	0.154	-2.645	0.227	0.266	O 291
50.000	33.260	0.342	0.171	0.171	-2.743	0.	0.261	0.287
55.000	36.550	0.314	0.188	0.188	-2.839	0.201	0.257	0.283
60.000	39.842	0.359	0.205	0.205	-2.922	0.201	0.256	0.281
65.000	43.136	0.630	0.223	0.223	-3.000	0.203	0.256	0.280
70.000	46.428	0.29	0.25	0.25	-3.076	0.206	0.255	0.281
80.000	53.017	0.33	0.31	0.31	-3.219	0.214	0.258	0.282
90.000	59.609	0.38	0.37	0.37	-3.351	0.223	0.261	0 287
100.000	66.201	0.42	0.43	0.43	-3.474	0.235	0.264	0.290
150.000	99.192	0.62	0.62	0.62	-4.000	0.288	0.286	0.311
200.000	132.209	0.82	0.81	0.81	-4.425	0.338	0.306	0.331
500.000	330.596	2.03	1.90	1.90	-6.243	0.602	0.416	0.441

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