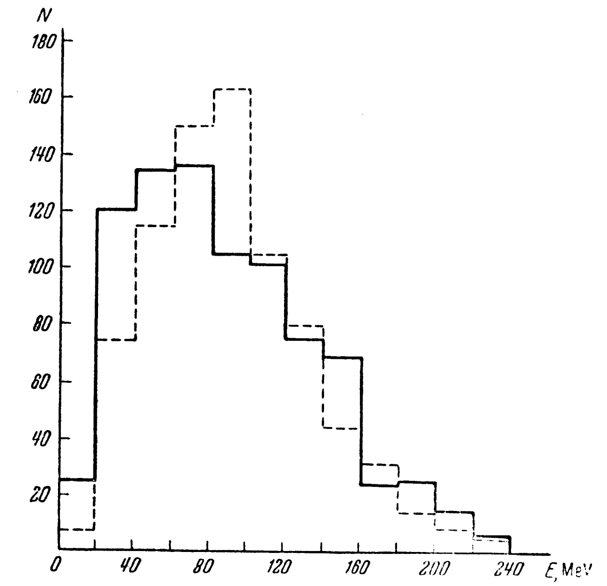
sections of the coil and an inside diameter of 2.5cm. Axial asymmetry in the working part of the coil is 2-3% and radial asymmetry is 5-7%. A test coil was used to measure the field. The field was determined with an accuracy of 5%.

In order to determine the sign of the charge and the energy of the particles, measurements were made of the magnetic curvature and multiple scattering. For analysis of the tracks we used a MBI-8 microscope with a special ocular scale which makes for a great saving of time. Up to the present time we have studied 800 pairs found in an emulsion which was exposed in a magnetic field of 120,000 gauss. The total length of the tracks of these pairs is 221.6 cm. The mean energy per particle as determined by the magnetic method for 1600 components is 43.3 ±2.7 mev; by the multiple scattering method the mean energy is 46.5 ±1.7 mev. The scattering constant per 100 μ for electrons in a type «P» NIKFI (Cine-Photographic Scientific Research Institute) emulsion is 23.4 ±0.7.

Preliminary data on the spectral distribution of the pairs is given in the figure. The results obtained by the multiple scattering method are shown by the dashed line; the solid line gives the results obtained by measuring the magnetic curvature.



It is of interest that in a total of 78 cm (with 39 cm of the distance for positrons) only 2 instances were observed in which the particles disappeared suddenly without leaving a visible trace. In both cases the "disappearing" particles were positrons. Not a single similar instance was detected for negatively charged particles. We also observed a few cases of single scattering of electrons and positrons at angles above 100° and pair creation in the field of an electron.

In conclusion we wish to express our thanks to Prof. V. I. Veksler for his constant interest and assistance.

* This was first suggested by G. M. Strakhovskii in 1951.

** By the single-pulse regime we mean a regime under which the accelerator emits a single pulse at the appropriate "command" from an automatic device.

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Inelastic Scattering of Mesons in the Semi-Phenomenological Theory of the Interaction of π-Mesons with Nucleons

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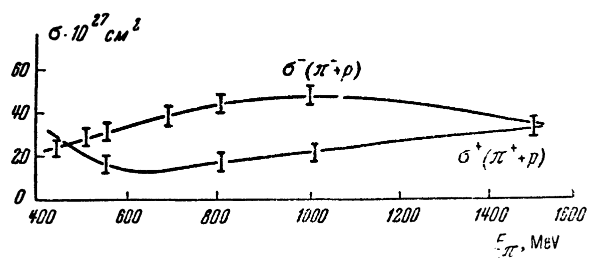
THE problem of inelastic scattering of π-mesons with nucleons (inelastic scattering emanating from the energy of incident mesons higher than 400 mev) has been solved on the basis of the semi-phenomenological theory of the interaction of π-mesons with nucleons[1]. Calculations were carried out according to the first nonvanishing approximation of Heitler's theory of damping[2]. After scattering, the following states were considered: nucleon + meson and "isobar" + meson, but the state of a nucleon + two mesons was



not investigated. The creation of the second meson was regarded as the disintegration of the isobaric state of the nucleon. The present study does not contain new constants in comparison with the work[1].

Total cross sections were obtained for the scattering of π^+- and π^-- mesons on protons with calculation of the contribution of $S_{1/2}$, $P_{1/2}$ and $P_{3/3}$ waves. The evaluation of the D wave showed that its contribution to the total cross section was less than 10%.

Comparison was made with experiment for energies of incident mesons greater than 400 mev (up to 400 mev results of the present study agree with the results of reference 1). Experimental data are shown on the graph[3]. The results obtained theoretically are given in the Table below. As is evident from comparison, the theoretical values of σ^+ $(\pi^+ + p)$ agree favorably with the experimental data, but the values of $\sigma^-(\pi^- + p)$ were noticeably smaller than those obtained experimentally.

Theoretical Values of Cross Sections

E_π, mev	$\sigma^+(\pi^+ + p)_3 \cdot 10^{27}$ cm^3	$\sigma^-(\pi^- + p)_3 \cdot 10^{27}$ cm^3
600	18.5	22.2
800	22.2	24
1000	23	25.5
1200	22.7	25

It is possible that the experimental values for σ^- $(\pi^- + p)$ are diminished as the result of their being made more precise[4]. But even in this instance agreement with the experiment is to be expected only in the calculation of the state nucleon + two mesons. This state should significantly increase the cross section $\sigma^-(\pi^- + p)$ with an insignificant increase in $\sigma^+(\pi^+ + p)$.

In conclusion the authors express their thanks to I. E. Tamm, Iu. A. Gol'fand and V. Ia. Fainberg for their continuous interest in the work as well as to L. V. Pariski, N. E. Nikulkina and L. I. Grachev, who performed a great computational task.

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The Relation Between our Criterion of Stability for a Homogenious Phase and that of S. V. Tiablikov

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BOGOLIUBOV and S. V. Tiablikov have noted that the criterion for the stability of a homogeneous distribution of particles, given in reference 1, coincides with the similar criterion, given earlier and and in different form by Tiablikov[2] in the case of limit points of the second kind. Equation (9) of reference 2 and the first of Eq. (34) of reference 3 can be put in the same form

$$-\frac{4\pi}{vkT}\int_0^\infty \frac{\sin\beta r}{\beta}\left\{\int_\infty^r \Phi'(t)\,g(t)\,dt\right\} r\,dr = 1, \qquad (1)$$

where $\Phi(r)$ is the intermolecular potential, $g(r)$ is the radial distribution function. This equation must be satisfied by the equation for the determination of β. The second of Eq. (34) in reference 2, which serves for this purpose, similarly to Eq. (1), is written in the expanded form

$$\int_0^\infty (\sin\beta r - \beta r\cos\beta r)\left\{\int_\infty^r \Phi'(t)\,g(t)\,dt\right\} r\,dr = 0. \qquad (2)$$

This condition is absent in reference 2, but a graphical method is applied there to the determination of β, which, as can be shown, is approximately equivalent to the requirement of Eq. (2). The approximation of the graphical method of Tiablikov consists of this, that the temperature on the left side of Eq. (9) in reference 2 is considered as an unknown and variable, while the term on the right is considered given and constant. A general and precise condition for determining β in reference 2 is not given.

The different approach to the problem in references 1 and 2, and, in part, the differences in notation account for the fact that the equivalence of the two stability criteria remained unknown to us. An attempt to determine the sign of the derivative (dv/dt) along the fusion curve by the theory of Tiablikov led us, as a consequence of an admitted error, to the physically inadmissible result of which mention was made in reference 3. Actually, as is clear from the above, the sign of the derivative must be the same in the two cases. It was shown in reference 4 that $(dv/dT)_{\lim} < 0$ for systems of the argon type, in accord with the experimental facts. Therefore the author acknowledges the error of his statement on the unfitness