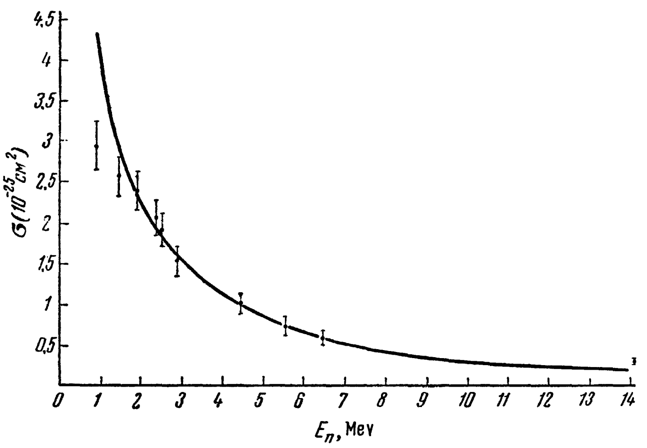
where

$$u_1(x, y) + iv_1(x, y) = e^{-z^2}\int_0^z e^{t^2}dt, \quad z = x + iy,$$

is a tabulated function;[4] $q = k_t - 2k_n/3$ and $K = k_t/3 - k_n$, where k_t and k_n are the wave vectors of the corresponding particle in the center of mass system; Q = 4.56 Mev.

The energy dependence of the total cross section for $E \geq 1$ Mev, obtained from formula (1), is plotted in the figure for the parameter $r_0' = 1.5 \times 10^{-13}$ cm. The experimental results of Ref. 5 are indicated by the segments.



We see that in the energy region $E_n = 1 - 14$ Mev, the agreement of the theory with the experiment is satisfactory. Better results cannot be expected because of the very approximate character of the calculation. In the region of small energies the experimental cross section has a sharp maximum for $E_n = 0.25$ Mev, which is not shown on the figure and which our calculation does not give. This should have been expected, considering that an energy $E_n = 0.25$ Mev of the incident neutron corresponds to the formation of the Li^7 nucleus in one of its excited states (7.46 Mev), and consequently the process exhibits in this energy region a resonance which is not taken into account by us. The disagreement of the theory with the experiment in the region of small energies can also be ascribed to the fact that the use of the Born approximation is not permissible here.

In conclusion I thank Prof. V. I. Mamasakhlisov for his interest in this work and for many comments.

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CONCERNING SUPERPOSITIONS WITH RESPECT TO THE INTERNAL PROPERTIES OF ELEMENTARY PARTICLES

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QUITE recently facts have been found that indicate the presence of an internal structure of elementary particles. One can try making the hypothesis that this internal structure and the internal motions associated with it determine the properties of elementary particles, in analogy with the situation that exists for atoms and nuclei. If also one assumes that the most general features of quantum mechanics are retained, one can expect the occurrence of superpositions with respect to the various internal properties of the elementary particles, i.e., the occurrence of states in which an elementary particle is not characterized by a definite value of one or another internal parameter.

A widely discussed example of superposition is that associated with the charge (or combined) parity and "strangeness" of K^0-mesons.[1] A second example relates to the spatial parity of "strange" particles.[2]* It is interesting to note that particles not having definite parity could in principle have a large electric dipole moment, of the order of 10^{-25} $gm^{-1/2}$ $cm^{5/2}$ sec^{-1}.

Nor can we exclude the possibility of the existence of particles not having a definite value of the spin. In applications to the "strange" particles such an assumption would essentially change the interpretation of many statements relating to this subject. Wide possibilities would be opened up in the discussion of various sorts of angular correlations, etc. As a consequence susceptible of direct experimental test, we suggest a change of the ratio of the numbers of long-lived and short-lived θ^0-mesons (cf. for example, Ref. 1).

If a conservation law holds for some internal property Ω (either absolutely or for strong interactions only), then in collisions of ordinary particles the particles described by superpositions with respect to Ω can be produced only in pairs or larger numbers. Similarly, if before a reaction there is one such particle, then also after the reaction there must remain at least one. For the "strange" particles we thus get conclusions that are usually connected with a law of conservation of "strangeness." This question is considered from a somewhat different point of view in Ref. 5, where the property Ω is that of spatial parity. But in general the property Ω can be of a different nature. Nor is it excluded that similar considerations can be applied not only in connection with the law of conservation of "strangeness" but also with other conservation laws.

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*The parity nonconservation so far observed in β-decays[3,4] may have no bearing on the decays of hyperons and K-mesons into nucleon and π-mesons.

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ON THE PRINCIPLE OF LARMOR INVARIANCE

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In present day field theory relativistic invariance of the basic equations, which includes invariance under four-dimensional displacements, rotations, and reflections, is considered sufficient. The remaining transformations of the conformal group are added if the rest mass of the particle vanishes. We note that electrodynamics includes also the so-called Larmor transformation, which is not contained in the conformal group transformations and which amounts to a simultaneous change of the parities of the field quantities. Huygens' principle cannot be correctly formulated in Maxwell's electrodynamics, which, al-