spond to the elements $C_3$, independently of the choice of basis, matrices of the form

$$\begin{vmatrix} -1/2 & \pm\sqrt{3/2} \\ \mp\sqrt{3/2} & -1/2 \end{vmatrix},$$

which follows from the value of the character $\chi^{E_1}(C_3^{\pm}) = -1$ and the unitary nature of the matrices; this means that these elements cannot occur in the cokernel of the representation $E_1$. In the two-dimensional representation $E_2$, with any basis, a unit matrix corresponds to the element $C_2$. This follows from the value of the character $\chi^{E_2}(C_2) = 2$ and the fact that $C_2^2 = E$. Consequently any cokernel corresponding to the representation $E_2$ will contain the element $C_2$, and the subgroup $(E, C_3^{\mp})$ cannot be identical with it.

Thus the subgroup $(E, C_3^{\mp})$ cannot be a cokernel of the group $C_{6V}$, i.e., cannot be a symmetry group of any of the solutions of the Schrödinger equation with a Hamiltonian of that symmetry.

In conclusion we note that solutions of the Schrödinger equation that possess the full symmetry of the system of eigenfunctions (for the case of a finite number of particles see reference 3) have as their symmetry groups all possible cokernels of the symmetry group of the Hamiltonian.

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*Division by the function $\psi$ is possible because the effect of the potential energy operator $\hat{V}$ reduces to multiplication by the potential function V.

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Translated by W. H. Furry
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## *ON THE PROBLEM OF TESTING PARITY CONSERVATION IN THE STRONG INTERACTIONS*

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Submitted to JETP editor October 27, 1959

J. Exptl. Theoret. Phys. (U.S.S.R.) 36, 628-629 (February, 1959)

IN the analysis of the problem of the conservation of parity in individual interactions we shall start from the following postulates: (1) the law of conservation of the combined parity reflects fundamental properties of space-time and is the basic symmetry law in nature; (2) the conservation of spatial parity in individual interactions is a consequence of additional invariance requirements.

In fact, as has been shown in references 1 — 3, in the case of the renormalized quantum electrodynamics, owing to the gauge-invariance condition, the requirement of invariance with respect to the combined-inversion operation PC (or the time reversal T) leads to invariance with respect to the spatial-inversion operation P. In the case of the renormalized pseudoscalar meson theory, owing to the condition of isotopic invariance, the requirement of invariance with respect to the combined-inversion transformation PC also leads to invariance with respect to the spatial-inversion operation P. The requirement of the invariance with respect to the transformation PC of the renormalized and isotopically invariant interaction Lagrangian of the K mesons and baryons does not lead to invariance with respect to the operation P. In this connection it is of interest to examine whether parity is conserved in processes of production of K mesons and hyperons.

It is known that parity is conserved with great precision in nucleon-nucleon collisions and nuclear reactions. If there is no departure from isotopic invariance, then parity nonconservation in these processes can appear both as a consequence of the participation of virtual K mesons and hyperons, and also owing to the nonrenormalizability (nonlocal character) of the interaction. As is shown by a calculation carried out in reference 5, the contribution of the K-meson forces to the nucleon-nucleon potential is small, so that the (very precise) parity conservation in nucleon-nucleon interactions is not in contradiction with violation of parity conservation in interactions involving K mesons and hyperons.*

Let us consider the process $\pi + N \rightarrow K + Y$ with the subsequent decay $Y \rightarrow N + \pi$ (Y can be a $\Lambda$ or a $\Sigma$ hyperon). As has been shown in reference 4, if parity is not conserved in the production of the K meson and hyperon, there is a longitudinal component of the polarization vector of the hyperon, and this leads to the appearance of an asymmetry in the distribution of the $\pi$ mesons from the decay of the hyperons (in the center-of-mass system), both relative to the plane perpendicular to the plane of production and containing the direction of the initial $\pi$ meson, and also relative to the plane perpendicular to the plane of production and perpendicular to the direction of the initial $\pi$ meson. It is found[4,5] that if there is a longitudinal polarization of the hyperon, then there must be asymmetry relative to at least one of these planes. It must be noted that since the properties of the longitudinal polarization (if there is any) are unknown, it may possibly be different (in magnitude and sign) for different angles of production of the hyperon, and the effect may be cancelled out to some extent in integrating over the angles. In this connection it would be interesting to study this process in a narrow range of angles of production of the hyperons.

At high $\pi$-meson energies the most probable processes will be those with three or more particles in the final state. In this case the reaction $\pi^- + p \rightarrow \Sigma^- + K^+ + \pi^0$ is of great interest. If parity is not conserved in the production of hyperons and K mesons, there will be an asymmetry in the distribution of the K mesons relative to the plane (in the center-of-mass system) containing the directions of the incident $\pi$ meson and the $\Sigma$ particle. It must be pointed out that this reaction is a very convenient one from the point of view of the processing of the experimental data. The advantage of this and analogous reactions ($K^- + d \rightarrow \Lambda + p + \pi^-$; $\pi^- + p \rightarrow Y^0 + K^+ + \pi^-$) lies in the fact that the asymmetry does not depend on the properties of the longitudinal polarization, so that one can obtain better statistics by totalling the experimental data for all angles of production of the hyperons.

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*The writer is grateful to Professor Drell for sending a preprint and an account of his work on the problem of PC conservation.

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Translated by W. H. Furry.
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## *ON THE EMISSION MECHANISM OF PROMPT FISSION NEUTRONS*

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Submitted to JETP editor October 30, 1958

J. Exptl. Theoret. Phys. (U.S.S.R.) **36**, 629-630 (February, 1959)

RECENTLY the energy and angular distributions of fission neutrons have been determined with respect to a system in which a fission fragment is at rest.[1] They are in disagreement with the mechanism hitherto usually considered for the emission of prompt fission neutrons, namely the analog of the evaporation of molecules from the surface of hot materials. The measurements show that the neutron angular distributions are strongly anisotropic with respect to the direction of motion of the fission fragment in the system of coordinates in which the fission fragment is at rest, and the energy distribution of the neutrons shows a sharp maximum at an energy of the order 0.1 to 0.2 Mev, with a width of the same order. As is well known the evaporation mechanism leads to an isotropic distribution with a Maxwellian energy spectrum. A possibility of an anisotropic neutron angular distribution can be understood from the point of view of Hill and Wheeler.[2] However, the motion of the nuclear surface can modulate the neutron evaporation spectrum only weakly and essentially cannot explain the sharp peak observed in reference 1.

The foregoing characteristics of the spectra of prompt fission neutrons can be explained by assuming that the surface energy, contained in the outgrowths which remain after the "neck" breaks at the instant of fission, is liberated in the form of a shock wave, which then propagates in the direction of motion of the fragment. Such a shock wave can lead to emission of almost monoenergetic neutrons along the direction of motion of the fission fragment.

To estimate the effect one has to know the form of the deformed fragments at the instant at which the "neck" breaks. At present there does not exist any experimental indications concerning this form. We therefore shall utilize the results of Hill,[3] which were derived within the framework of the liquid drop model. These computations show that right after the instant of fission each fragment has an outgrowth with linear dimensions exceeding the nuclear radius by a factor 1.5 to 2. Utilizing the commonly accepted value for the surface energy one can estimate that each outgrowth contains a deformation energy of the order 20 to 30 Mev. Knowing the number of nucleons in the outgrowth one can easily calculate the velocity of contraction of the outgrowths. This turns out to be of the order