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The establishment of the noninvariance of weak interactions under space reflection and charge conjigation considerably raised an interest to a more careful study of the symmetry properties of strong interaction. In this note there indicated a possibility of direct experimental check of the invariance of different interactions under time reversal based on the relation between the polarization phenomena in inverse reactions [I,2,3,4,5]. Till recently the relations between the inverse reaction cross sections[6] averaged over spins were used with this aim, while for weak interactions use was made of some consequences due to the reality of interaction constants. Lately a check of the polarization and asymmetry identityin the elastic scattering[9,I0] was suggested for the study of the strong interaction symmetry under time reversal. Basing upon the results of papers I-5 an analogous verification may be performed by means of different nuclear reactions. For instance, the neutron polarization in the reaction

$$d + d \rightarrow n + He^3, \qquad /I/$$

when the deuterons are not polarized coincides up to a usual factor entering into the detailed balance with the asymmetry in the cross section of the inverse reaction

$$n + He^3 \rightarrow d + d \qquad /2/$$

when the neutrons are polarized. The verification of the relation between the polarization and asymmetry and of more complex relations is the verification of the interaction invariance under time reversal since the parity is known to be conserved in strong interactions of usual particles with high accuracy[II]. With this aim the reaction $P + T \rightleftharpoons n + He^3$ may be also used. In general, if a set of nuclear reactions is available a lot of other processes which may be used for this purpose may be indicated.

For the reactions involving γ-quanta we may consider the deuteron photodisintegration and the radiation capture of a neutron by a proton

$$n + p \rightleftharpoons d + \gamma \qquad /3/$$

Here besides the relations, e.g., between the neutron polarization in the deuteron photodisintegration and the asymmetry in the cross section of the radiation capture of the polarized neutrons by protons it is possible to compare the polarization of γ-quanta in the capture and the asymmetry of the photodisintegration cross section when γ-quanta are polarized.

To study the time reversibility of the pion production processes we may point out the reaction

$$p + p \rightarrow d + \pi^+ \qquad /4/$$

considered in /I/ in detail.

The experiments[I2,I3] recently performed may be considered as the first stage of such a check. It follows from the results of Neganov and Parfenov that the relation between the unpolarized cross sections is fulfilled within the accuracy up to 10-15%. This is close to the estimates of Henley and Jacobsohn [6] based on other experimental data.

To study the interaction symmetry involving strange particles one may consider the reaction

$$K^- + d \rightleftharpoons \Sigma^- + p, \qquad /5/$$

suggested at one time by Lee for the determination of particle spins [14] as well as some similar reactions [15]. The polarization Σ^- which one may hope to find by the decay asymmetry must coincide with the K^--asymmetry in the reaction $\Sigma^- + p \longrightarrow d + K^-$ when Σ^- are polarized (for instance, in the process of production). The study of polarization phenomena in reaction (5) may also contribute to the solution of the problem whether the small asymmetry in the Σ^- decay from the reaction $\pi + N \longrightarrow \Sigma^- + K$ is due to the threshold effects or not.

Analogous experiments with weakly interacting particles seem at present to be extremely difficult.

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