SCATTERING OF PROTONS AND THE LIGHTEST NUCLEI ON TENSOR-POLARIZED DEUTERONS

AND TEST OF T-INVARIANCE

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Observed baryon asymmetry of the Universe is not explained on the basis of the Standard Model (SM) of fundamental interactions and its explanation requires a source of CP violation beyond the SM. Under CPT symmetry CP violation is equivalent to the time (T) invariance violation. In the interaction of a transversely polarized (Py) nuclear beam with a tensor-polarized (Pxz) deuteron target, a nonzero value of the part of the total cross section corresponding to this combination of polarizations is an unambiguous null-test signal of T -invariance violation while P-parity is conserved (TVPC) [1]. This type of interaction was suggested in [2] to explain CP violation observed in physics of K-mesons and does not appear in the SM. A method for calculating the TVPC null-test signal for double polarized pd scattering based on the spin-dependent Glauber theory was developed in [3,4] and numerical results for energy dependence of this effect were obtained at the beam kinetic energy of 0.1-1 GeV. The method has been generalized by us to the case of 3He-d scattering, and energy dependence of the TVPC effect in this channel has been calculated in the range of energy of 0.1-1 GeV/nucleon [5]. Furthermore, we performed a study of the TVPC effect in double polarized deuteron-deuteron scattering and results obtained, in particular, at SPD NICA energies will be present in the talk. It is found that indd collisions, in contrast to pd-collisions, the contribution of only one type of T-violating nucleon-nucleon forces dominates, which is essential for extraction of the unknown constant of this interaction from the corresponding data.

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