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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 ~GeV/nucleon [5]. Furthermore, we performed study of the TVPC effect in double polarized deuteron-deuteron scattering and the results obtained, in particular, at SPD NICA energies will be present in the talk. It is found that in dd collisions, in contrast to pd scattering, 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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