DOUBLE POLARIZED DEUTERON-DEUTERON SCATTERING AND TEST OF T-INVARIANCE

Yu. Uzikov[1], M. Platonova[1,2]
[1] *Joint Institute for Nuclear Research;* [2] *Lomonosov Moscow State University*
E-mail: uzikov@jinr.ru

The total cross section of the interaction of deuterons polarized transversely with respect to the beam direction with the polarization P_y and a tensor-polarized deuteron target with the polarization P_{xz} is a null-test signal of the effect of violation of invariance with respect to time reversal (T) while conserving spatial (P) parity. This effect is very similar to that expected in double polarized pd and ^{3}He-d scattering with vector polarized protons and ^{3}He nuclei and tensor polarized deuterons studied in Refs. [1,2]. Here this effect is studied on the basis of the Glauber theory with account of full spin-dependence of nucleon-nucleon scattering amplitudes. Previously such an extension of the Glauber model was done for pd elastic scattering in Ref. [3]. For dd elastic scattering, the corresponding formalism is developed for the first time in the present work. For simplicity we restrict ourselves by single- and double-scattering mechanisms of dd scattering and keep only the S-component of the deuteron wave function. All types of NN interactions nonvanishing on the mass shell [4] are taken into account. Numerical results for the energy dependence of the expected effect of T-violation under P-parity conservation are obtained at the deuteron beam energies of 150-1000 MeV/nucleon.

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