

TITLE:

Investigation of the Deuteron Breakup on Proton Target in the Forward Angular Region at 130 MeV

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Abstract:

A set of differential cross-section data of the $1\text{H}(d, pp)n$ breakup reaction at 130 MeV deuteron beam energy has been measured in the domain of very forward polar angles with the use of the Germanium Wall detector at the Forschungszentrum Jülich. The data obtained for over 1000 kinematical points (112 geometries) are compared with the theoretical predictions based on various models of the three-nucleon (3N) dynamics. They comprise: the realistic nucleon-nucleon potentials alone or combined with the three-nucleon force (3NF), the coupled-channel calculations with the explicit treatment of the Δ -isobar excitation and finally, the potentials derived from chiral perturbation theory. In the part of the phase space studied, the Coulomb interaction between protons has a strong impact on the differential cross section of the breakup reaction. The strongest Coulomb effects are found in regions where the relative energy of the two protons is the smallest. In these regions the data are well reproduced exclusively by calculations which include the electromagnetic repulsion between protons. In spite of the dominance of the Coulomb force in the phase space studied, the contribution of 3NF effects is also observed.