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Deuteron breakup in collision with proton - measurements at intermediate energies.

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Reactions in three-nucleon systems at intermediate energies, between 50 and 200 MeV/nucleon, attract attention due to theoretically predicted sensitivity of the observables to subtle effects of the dynamics beyond the pairwise nucleon-nucleon force, so-called three nucleon force (3NF). Precise measurements in the sector of elastic nucleon-deuteron scattering show importance of 3NF for correct description of the cross section data, though at energies above 100 MeV/nucleon the currently available models of 3NF do not produce effects sufficiently large to cure discrepancy between the data and calculations [1]. Complementary studies are conducted in the sector of 1H(d,pp)n and 2H(p,pp)n breakup reactions. The 3-body final state is rich in kinematic configurations differing in sensitivity to dynamical effects: Coulomb interaction between protons, 3NF and relativistic effects, while the state-of-the-art theoretical calculations either include 3NF and Coulomb effects [2] or are performed in relativistic regime [3]. Systematic (in beam energy) set of data collected in large phase space regions is necessary to single out the 3NF and relativistic effects and to pin down possible discrepancies.

So far the Coulomb effects have been confirmed in configurations close to FSI of proton-proton pairs at wide range of beam energies, while the 3NF shows its importance starting from energies as low as 65 MeV/nucleon [1,4]. There are also strong hints of discrepancies between data and theory at energies close to the pion production threshold. The results of measurements with SALAD and BINA detectors performed at KVI with beam energy below 100 MeV/nucleon will be presented together with recently analysed data taken with WASA detector at energies roughly two times higher. The prospects of acquiring new experimental data will be also discussed.

[1] N. Kalantar-Nayestanaki, E. Epelbaum, J. Meschendorp, A. Nogga, Rep. Prog. Phys. 75, 016301 (2012).
[2] A. Deltuva, A.C. Fonseca and P.U. Sauer, Phys. Rev. C 72, 054004 (2005);
A. Deltuva, A.C. Fonseca and P.U. Sauer, Phys. Rev. C 73, 057001 (2006);
A. Deltuva, Phys. Rev. C \textbf {80}, 064002 (2009).
[3] R.Skibinski, H. Witala and J. Golak, Eur.Phys.J. A 30, 369 (2006).
[4] St.Kistryn, E.Stephan, J. Phys. G: Nucl. Part. Phys. 40, 063101 (2013).

Selected session

Few body systems

Primary author: Dr STEPHAN, Elzbieta (University of Silesia, Institute of Physics)

Co-authors: Prof. KOZELA, Adam (Institute of Nuclear Physics, PAS, Poland); Dr KLOS, Barbara (Institute of Physics, University of Silesia, Poland); Dr SKWIRA-CHALOT, Izabela (Faculty of Physics, University of Warsaw, Poland); Prof. KALANTAR, Nasser (KVI); Prof. KISTRYN, Stanislaw (Institute of Physics, Jagiellonian University, Poland)

Presenter: Dr STEPHAN, Elzbieta (University of Silesia, Institute of Physics)

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