Contribution ID : **95** Type : **poster**

Contribution of three nucleon force investigated in deuteron-proton breakup reaction

Saturday, 4 June 2016 16:00 (1:30)

Collaboration

Few Body Group

Abstract content

Investigation of three-nucleon systems is important for testing nuclear potentials. Quantitatively, it can be done by comparing observables calculated with the use of Faddeev equations with the results of precise measurements. Modern realistic nucleon-nucleon (NN) potentials describe well two nucleon systems. They are successfully applied to predict observables of deuteron-proton breakup reaction only if combined with additional elements of the dynamics like the three nucleon force (3NF). Moreover, the two- and three-nucleon interactions can be modelled within the coupled-channel (CC) framework by an explicite treatment of the Δ-isobar excitation. In Chiral Perturbation Theory, the few-body interactions appear naturally at growing orders (non-vanishing 3NF at next-to-next-to leading order). The modern approaches to calculate observables for 3N system include , besides NN potentials and 3NF contribution, also, Coulomb interactions [1] or relativistic component [2]. All the effects are predicted to influence observables with different magnitude and in various parts of phase space of the breakup reaction, what can be verified by comparison with experimental data.
Experiments devoted to study nuclear dynamics by measurement of the 1H(d,pp)n breakup reaction were carried out at KVI Groningen [3, 4] and FZ-Juelich [4, 5] with the deuteron beam at the wide range of intermediate energies. Poster focuses on measurement done at KVI with unpolarised deuteron beam of 80˜MeV/nucleon energy impinging on liquid hydrogen target. Differential cross-sections for deuteron-proton breakup reaction was determined for a number of kinematic configurations of outgoing particles. Normalization was obtained on the basis of the elastic scattering process. The main steps of the data analysis including geometry cross-check, energy calibration, particles identifications and reconstructed kinematics as well as sample distributions of the normalized differential cross-sections for deuteron breakup.
[1] A. Deltuva A. C. Fonseca, and P. U. Sauer, Phys. Rev. C 73 057001 (2006)
[2] H. Witała R. Skibinski and J. Golak, The European Physical Journal, A30:369 (2006)
[3] St. Kistryn et al., Phys. Lett. B 641, 23 (2006)
[4] B. Kłos et al., Acta Phys. Pol., B 44, 3 (2013)
[5] I. Ciepał et al., Few-Body Syst., 56, 10 (2015)

Primary author(s) : PAROL, Wiktor (Institute of Nuclear Physics Polish Academy of Science, Krakow, Poland)

Presenter(s) : PAROL, Wiktor (Institute of Nuclear Physics Polish Academy of Science, Krakow, Poland)

Session Classification : Poster Session