

## Few-body systems and nuclear forces

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Investigations of few-nucleon reactions allow us to study various aspects of nuclear Hamiltonian. Currently many theoretical and experimental efforts in low-energy regime are focused on study details of the nucleon-nucleon and many-nucleon interactions. On theoretical side new sophisticated models of nuclear interaction have been delivered in recent years by various groups. The important contributions to this field come from the Bochum-Bonn [1,2] and the Moscow(Idaho)-Salamanca [3] groups which derived the nucleon-nucleon interaction within the Chiral Effective Field Theory even beyond the fifth order of the chiral expansion (N<sup>4</sup>LO), as well as from the Granada group which updated some semi-phenomenological forces [4].

I will discuss a few chosen applications of these forces to the description of the nucleon-deuteron scattering at energies up to 200 MeV [5,6,7]. This will give me an opportunity to comment which features of on-going and planned experiments are especially wanted from the theoretical studies perspective.

- [1] P.Reinert, H.Krebs, and E.Epelbaum, Eur. Phys. A. A54 (2018) 86.
- [2] E.Epelbaum, H.Krebs, and Ulf-G.Meißner, Phys. Rev. Lett. 115, 122301 (2015).
- [3] D.R.Entem, R.Machleidt, and Y.Nosyk, Phys. Rev. C96, 024004 (2017).
- [4] R.Navarro Perez, J.E.Amaro, and E.Ruiz Arriola, Phys. Rev. C89, 064006 (2014).
- [5] S.Binder, et al., Phys. Rev. C 98, 014002 (2018).
- [6] E.Epelbaum et al., arXiv:1807.02848v1 [nucl-th].
- [7] R.Skibiński, Yu.Volkotrub, J.Golak, K.Topolnicki, H.Wiłała, Phys. Rev. C98, 014001 (2018).

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