

Abstract Submitted  
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**The Nucleon-Nucleon Interaction in Chiral Effective Field Theory up to 6th Order (N5LO)**<sup>1</sup> YEVGEN NOSYK, RUPRECHT MACHLEIDT, Univ of Idaho — We will discuss the basics of Chiral Effective Field Theory for the nucleon-nucleon interaction and present recent results developed within this framework. While attempts to solve the equations of Quantum Chromodynamics (QCD) numerically in the low energy limit are increasingly successful ("lattice QCD"), Chiral Effective Field Theory (ChEFT) remains a potent alternative method for deriving nuclear forces. We will present the NN potential at N4LO, which shows excellent agreement with experimental data in all partial waves and can be applied further in nuclear structure calculations. Since a modified power counting scheme is used for the N4LO potential, full NN potentials at NLO, NNLO and N3LO are also recalculated using the modified scheme. This allows for systematic estimations of truncation errors when applying potentials to calculations of nuclear structure and reactions. We will also present calculations of dominant pion exchange contributions to nucleon-nucleon scattering at 6th order (N5LO). The latter contributions further improve the agreement with experiment and also turn out to be smaller compared to N4LO, thus showing a trend towards convergence.

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