

Abstract Submitted
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The Nucleon-Nucleon interaction in Chiral Effective Field Theory

YEVGEN NOSYK, University of Idaho, PhD student, RUPRECHT MACHLEIDT, University of Idaho, Professor — We will discuss the basics of Chiral Effective Field Theory for the nucleon-nucleon interaction and present recent results developed within this framework, as well as outline the directions for future research. In the past few decades, Quantum Chromodynamics (QCD), the current fundamental theory of the strong interactions, was successfully applied and verified for high-energy processes. However, for the low energies typical for nuclear physics, QCD defies standard methods of analytical solution, which are applicable for Quantum Electrodynamics and high-energy QCD. Recent attempts to numerically solve the equations of QCD in the low energy limit are increasingly successful (“lattice QCD”). However, due to the high complexity, only simple systems consisting of very few quarks can be calculated that way. The alternative approach is Chiral Perturbation Theory, which is based on the symmetries of the original theory (QCD). I will present the current status of this approach up to sixth order.

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