# Application of chiral 2N and 3N forces to few–nucleon systems

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May 28, 2003

Chiral effective field theory offers a systematic and controlled method to study the dynamics of few–nucleon systems. It relies on the low–momentum expansion and allows to derive nuclear forces and current operators from the most general effective Lagrangian for nucleon and pion fields and external sources in harmony with gauge invariance and spontaneously broken (approximate) chiral symmetry of Quantum Chromodynamics. The resulting two– and more–nucleon forces are organized according to an increasing power of the low–momentum scale associated with external nucleon momenta and the pion mass and incorporate pion exchanges and contact interactions.

I will show our results for various scattering and bound states observables in the 2N, 3N and 4N systems at next–to–next–to–leading order in the chiral expansion. I will also present new cut–off regularization scheme for pion loop integrals based on spectral function representation, which allows to improve the convergence of the chiral expansion. Our latest results for the 2N system up to next–to–next–to–next–to–leading obtained with the new regularization scheme will be presented.

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