Contribution ID: **181** Type: **Oral Presentation**

Perturbative Computations of Few-Body Observables in Chiral Effective Field Theory using a Modified Weinberg Power Counting up to N3LO

Chiral effective field theory (χEFT) promises a systematic approach to describe the force between nucleons as arising from the fundamental principles of quantum chromodynamics. A power counting (PC) quantifies the relative importance of different contributions in the χEFT expansion. The PC ensures that the EFT predictions of observables show order-by-order convergence, which in turn enables robust estimates of the theoretical uncertainty. We investigate a PC where sub-leading interactions are treated perturbatively [1]. We fit unknown low-energy constants in the two-nucleon system and find a good description of both neutron-proton scattering cross sections and S-wave low-energy theorems [2,3]. We have taken the first steps in using this PC for $A > 2$ systems beyond first-order perturbation theory. For ^{3}H, we demonstrate reliable computations of the ground-state energy using third-order perturbation theory in the no-core shell model [4].

[1] B. Long, C.J. Yang, Phys. Rev. C 86, 024001 (2012)
[2] O. Thim, A. Ekström, C. Forssén, Phys. Rev. C 109, 064001 (2024)
[3] O. Thim, Few-Body Syst. 65, 69 (2024)
[4] O. Thim, A. Ekström, C. Forssén, in preparation (2025)

Authors: EKSTRÖM, Andreas (Chalmers University of Technology); FORSSÉN, Christian (Chalmers University of Technology); THIM, Oliver (Chalmers University of Technology)

Presenter: THIM, Oliver (Chalmers University of Technology)

Session Classification: Parallel session

Track Classification: Few-Body Systems