Contribution ID: 112

Effect of the N3LO three-nucleon contact interaction on p-d scattering observables

Tuesday, 20 December 2022 17:55 (20 minutes)

In nuclear physics the so-called *ab initio* methods allow to solve the full Schroedinger equation, for few-body systems, with realistic potentials. From the theoretical point of view, chiral effective field theory provides a solid basis with interactions organized according to the importance of their contribution in powers of Q, the typical nucleon momentum, on the cutoff $\Lambda_{\chi} \sim 1$ GeV.

In this work we analyze the effect of the next-to-next-to-next-to leading order (N3LO) terms of the chiral three-body contact potential on the scattering variables for the p-d system.

Through the use of a unitary transformation five terms of the N4LO three-body contact potential are promoted to N3LO, implying the existence of five LECs for the three-body force at this order. Preliminary investigations carried out in this work suggest that the long standing N-d puzzle can be fixed by these terms.

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Session Classification: Session 8