

Study of dark matter scattering off ^2H and ^4He nuclei within chiral effective field theory

mercoledì 11 ottobre 2023 11:20 (20 minuti)

We study dark matter scattering off ^2H and ^4He nuclei, assuming DM to be composed by weak interacting massive particles, WIMPs. In order to parametrize the WIMP-nucleon interaction the chiral effective field theory (χEFT) approach is used. Considering only interactions invariant under parity, charge conjugation and time reversal, we examine five interaction types: scalar, pseudoscalar, vector, axial and tensor. Scattering amplitudes between two nucleons and a WIMP are calculated up to second chiral order, and used to calculate the nuclei responses. We apply this program to calculate the interaction rate as function of the WIMP mass and of the magnitude of the WIMP-quark coupling constants. From our study, we conclude that the scalar nuclear response functions result much greater than the others due to their large combination of low energy constants. We also verify that the leading order contributions are dominant in this low energy process.

Autori principali: FILANDRI, Elena; VIVIANI, Michele (Istituto Nazionale di Fisica Nucleare)

Relatore: FILANDRI, Elena

Classifica Sessioni: Strongly correlated nuclear systems (II)