ELECTROWEAK STRUCTURE OF LIGHT NUCLEI WITHIN CHIRAL EFFECTIVE FIELD THEORY

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Chiral effective field theory (χEFT) is a powerful theoretical framework which allows to link quantum chromodynamics (QCD) and low-energy nuclear physics. Within this framework, it is possible to derive realistic nuclear potentials and currents, necessary ingredients to describe many processes, as the electromagnetic structure of light nuclei, radiative and weak capture reactions, among which the radiative $p-d$ and $n-d$ captures, the weak muon capture on deuteron and ^{3}He, and the weak proton-proton capture. For some of these processes, there are accurate experimental data to compare with, so as to test the whole theoretical framework. Some other processes, as the weak reactions, are more difficult to be measured, and an accurate theoretical calculation becomes crucial.

In this contribution, I will first give a "historical" summary of the many χEFT calculations of electroweak processes, focusing on the so-called "pionfull" χEFT approach, which includes pions and nucleons as explicit degrees of freedom. Then, I will review the most recent χEFT studies on electroweak processes, among which, in particular, the recent calculations on the electromagnetic structure of light nuclei [1,2,3], on the weak muon capture on deuteron and ^{3}He [4,5] and on the weak proton-proton capture reaction at energies of astrophysical interest [6].

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