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# Ab initio calculations of nuclear structure and reactions

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The description of nuclei starting from the constituent nucleons and the realistic interactions among them has been a long-standing goal in nuclear physics. In recent years, a significant progress has been made in developing ab initio many-body approaches capable of describing both bound and scattering states in light and medium mass nuclei based on input from QCD employing Hamiltonians constructed within chiral effective field theory. We will discuss recent breakthroughs that allow for ab initio calculations for ground states, spectroscopy and reactions of nuclei and even hypernuclei throughout the p- and sd-shell and beyond with two- and three-nucleon interactions. We will also present results for nuclear reactions important for astrophysics, such as 7Be(p,γ)8B and 3He(α,γ)7Be radiative capture, and for 3H(d,n)4He fusion.

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