APR20-2020-000894

Abstract for an Invited Paper
for the APR20 Meeting of
the American Physical Society

Unifying theories for the structure and dynamics of light nuclei.[1]

SOFIA QUAGLIONI, Lawrence Livermore Natl Lab

The study of rare isotopes at radioactive beam facilities has opened new frontiers in nuclear physics. To enable the discovery of model deficiencies and missing physics it is essential that the new insights from these experiments be confronted with predictive theoretical frameworks capable of describing the interplay of many-body correlations and continuum dynamics, characteristic of exotic nuclei as well as of the nuclear reactions used to produce and study them. At the same time, a predictive theory of nuclear structural and reaction properties is also desirable to aid in precisely determining thermonuclear reaction rates that play an important role in fusion-energy experiments, the predictions of stellar-evolution models, and simulations of nucleosynthetic processes. In this talk, I will review the contributions my collaborators and I made to the development of a unified microscopic understanding of the structure and low-energy reactions of light nuclei starting from validated nucleon-nucleon and three-nucleon forces and highlight some of the remaining challenges.

[1]Prepared by LLNL under Contract No. DE-AC52-07NA27344.