

Takashi Abe

No-core Monte Carlo shell model in light nuclei

One of the major challenges in nuclear physics is to describe nuclear structure and reactions from first principles. Such ab initio calculations have recently become feasible for nuclear many-body systems beyond $A = 4$ due to the rapid evolution of computational technologies and also the progress of nuclear many-body approaches. Here, we report recent developments of the Monte Carlo Shell Model (MCSM) and its application to the no-core calculations in light nuclei. The no-core MCSM is one of the promising candidates to go beyond the Full Configuration Interaction (FCI) method which is a different truncation of the basis space used in the No-Core Shell Model (NCSM). It is shown that recent developments enable us to apply the MCSM to the shell-model calculations without a core. We also compare the No-Core Full Configuration (NCFC) results with the ones of MCSM extrapolated to the infinite basis space.