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The Importance Truncated No-Core Shell Model applied to the 0p-shell[1] MICHAEL KRUSE, University of Arizona, PETR NAVRATIL, Lawrence Livermore National Laboratory (LLNL), BRUCE BARRETT, University of Arizona
— The No-Core Shell Model (NCSM) is a powerful ab-initio tool, used to calculate observables in light nuclei ($A < 16$), starting from realistic two- and three-body forces. However, most of these calculations become increasingly difficult to perform as the number of nucleons is inreased. Even when soft, unitary transformed interactions (SRG etc) are used, a basis space of several oscillators shells is required ($N_{max} = 14 - 20$), to reach convergence for $A > 7$. Currently, the size of the model space is computationally impossible. Importance truncation selects a-priori, which basis states should be kept in the calculation, and which should be discarded. This procedure reduces the basis dimension considerably, yet captures enough of the physics to accurately describe the low-lying states in detail. In the case of the 0p-shell, several interesting nuclei lie near the neutron-drip lines, for which we will show results. The possibility to study reactions in the IT-NCSM/RGM framework will also be presented.

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