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Investigation of the ^{7}Be and ^{7}Li systems within the No-Core Shell Model with Continuum[1] MATTEO VORABBI, Brookhaven National Laboratory, PETR NAVRATIL, TRIUMF, SOFIA QUAGLIONI, Lawrence Livermore National Laboratory, GUILLAUME HUPIN, Institut de Physique Nucleaire, CNRS/IN2P3, Universite Paris-Sud, Universite Paris-Saclay, F-91406, Orsay, France — The No-Core Shell Model with Continuum (NCSMC) is a recently developed approach capable of describing both bound and scattering states in light nuclei simultaneously. This technique represents a state-of-the-art ab initio method and combines the No-Core Shell Model description of short-range correlations with the clustering and scattering properties of the Resonating Group Method. Recent NCSMC calculations of ^{7}Be and ^{7}Li will be presented. The properties of these nuclei were investigated by analyzing the continuum of all the binary mass partitions involved in the creation of these systems, using chiral interactions as the only input. Our calculations reproduce all the experimentally known states in the correct order and predict new possible resonances with negative and positive parity. A positive-parity S wave resonance is found analyzing the continuum of p + ^{6}He at a very low energy above the threshold, which produces a very pronounced peak in the astrophysical S factor of the ^{6}He(p,γ) ^{7}Li radiative capture. Possible implications for astrophysics have still to be investigated.

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