

Abstract Submitted
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Ab initio calculations of nuclear reactions important for astrophysics¹ PETR NAVRATIL, JEREMY DOHET-ERALY, ANGELO CALCI, TRIUMF, WATARU HORIUCHI, Hokkaido University, GUILLAUME HUPIN, CEA, DAM, SOFIA QUAGLIONI, LLNL — In recent years, significant progress has been made in *ab initio* nuclear structure and reaction calculations based on input from QCD employing Hamiltonians constructed within chiral effective field theory. One of the newly developed approaches is the No-Core Shell Model with Continuum (NCSMC) [1-4], capable of describing both bound and scattering states in light nuclei simultaneously. We will present NCSMC results for reactions important for astrophysics that are difficult to measure at relevant low energies, such as ${}^3\text{He}(\alpha,\gamma){}^7\text{Be}$ and ${}^3\text{H}(\alpha,\gamma){}^7\text{Li}$ [5] and ${}^{11}\text{C}(\text{p},\gamma){}^{12}\text{N}$ radiative capture, as well as the ${}^3\text{H}(\text{d},\text{n}){}^4\text{He}$ fusion. We will also address prospects of calculating the ${}^2\text{H}(\alpha,\gamma){}^6\text{Li}$ capture reaction within the NCSMC formalism. [1] S. Baroni, P. Navratil, and S. Quaglioni, Phys. Rev. Lett. **110**, 022505 (2013). [2] G. Hupin, S. Quaglioni, P. Navratil, Phys. Rev. Lett. **114**, 212502 (2015). [3] J. Langhammer, P. Navratil, S. Quaglioni, G. Hupin, A. Calci, R. Roth, Phys. Rev. C **91**, 021301(R) (2015). [4] P. Navratil, S. Quaglioni, G. Hupin, C. Romero-Redondo, A. Calci, Physica Scripta **91**, 053002 (2016). [5] J. Dohet-Eraly, P. Navratil, S. Quaglioni, W. Horiuchi, G. Hupin, F. Raimondi, Phys. Lett. B **757**, 430 (2016).

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