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Ab initio **calculations of p-^{7}Be scattering and ^{7}Be(p,γ)^{8}B capture**[1]
PETR NAVRATIL, TRIUMF, SOFIA QUAGLIONI, LLNL, ROBERT ROTH, TU Darmstadt — We build a new *ab initio* many-body approach [1] capable of describing simultaneously both bound and scattering states in light nuclei, by combining the resonating-group method [2] with the *ab initio* no-core shell model [3]. In this way, we complement a microscopic-cluster technique with the use of realistic interactions, and a microscopic and consistent description of the nucleon clusters. We will present results for the proton scattering on ^{7}Be and for the S-factor of the ^{7}Be(p,γ)^{8}B capture reaction important for astrophysics. Our calculations predict low-lying resonances in ^{8}B that have not been clearly identified experimentally so far. Finally, we will also highlight the first results of the d-^{3}H and d-^{3}He fusion calculation obtained within our *ab initio* approach.

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[2] K. Wildermuth and Y. C. Tang, A unified theory of the nucleus, (Vieweg, Braunschweig, 1977).
[3] P. Navratil, J. P. Vary, and B. R. Barrett, Phys. Rev. Lett. 84, 5728 (2000).

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