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New ab initio approach for nuclear reactions[1] ALEXIS MERCENNE, KRISTINA LAUNEY, Louisiana State University, TOMAS DYTRYCH, Academy of Sciences of the Czech Republic, JUTTA ESCHER, Lawrence Livermore National Laboratory, JERRY DRAAYER, Louisiana State University — I will discuss a new ab initio approach for nuclear reactions involving nuclei up to the medium-mass region. This approach is based on the *ab initio* symmetry-adapted framework combined with the resonating group method (RGM). It follows the same concept that has been successfully applied to *ab initio* reactions of light nuclei, but now we take advantage of the SU(3) symmetry. This new feature enables a reorganization of the large-scale model space into physically relevant basis states and paves the way to *ab initio* reactions involving heavier and more exotic nuclei of astrophysical interest. In particular, the nuclear structure of the target is described with the *ab initio* symmetry-adapted no-core shell model, and the target-projectile composite system is described within an SU(3) RGM framework. I will discuss the underlying formalism, which involves the expressions of the norm and Hamiltonian kernels in an SU(3) basis, along with the first applications of the model to one-nucleon projectile reactions. The computational efficacy of the reaction model will be illustrated for a ^{20}Ne target.

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