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Ab initio results for intermediate-mass, open-shell nuclei[1]
ROBERT B. BAKER, Louisiana State University, TOMAS DYTRYCH, Louisiana State University and Nuclear Physics Institute, Czech Republic, KRISTINA D. LAUNEY, JERRY P. DRAAYER, Louisiana State University — A theoretical understanding of nuclei in the intermediate-mass region is vital to astrophysical models, especially for nucleosynthesis. Here, we employ the *ab initio* symmetry-adapted no-core shell model (SA-NCSM) in an effort to push first-principle calculations across the *sd*-shell region. The *ab initio* SA-NCSM's advantages come from its ability to control the growth of model spaces by including only physically relevant subspaces, which allows us to explore ultra-large model spaces beyond the reach of other methods. We report on calculations for ^{19}Ne and ^{20}Ne up through 13 harmonic oscillator shells using realistic interactions and discuss the underlying structure as well as implications for various astrophysical reactions.

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Robert Baker
Louisiana State University

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