

Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Probing Alpha Clustering for X-ray Burst Nucleosynthesis in a Symmetry-Adapted Framework¹ ALISON DREYFUSS, Lawrence Livermore Natl Lab, KRISTINA LAUNEY, Louisiana State University, JUTTA ESCHER, Lawrence Livermore Natl Lab, GRIGOR SARGSYAN, Louisiana State University, ROBERT BAKER, Ohio University, TOMAS DYTRYCH, Nuclear Physics Institute, Czech Republic, JERRY DRAAYER, Louisiana State University — I discuss a new framework for studying clustering and determining alpha partial widths, asymptotic normalization coefficients (ANC), and alpha-capture reaction rates for narrow resonances, using symmetry-adapted wave functions. I will demonstrate the method through the well-studied ^{20}Ne system, by calculating the overlap between the ^{16}O +alpha cluster configuration and states in ^{20}Ne calculated in two different symmetry-adapted no core shell model formalisms. I will focus on the 5.79-MeV 1-state in ^{20}Ne and its alpha partial width, and discuss the $^{16}\text{O}(\alpha, \gamma)^{20}\text{Ne}$ reaction rate at astrophysical temperatures. This ultimately is used to explore impacts on simulated X-ray burst abundance patterns.

¹Supported by the U.S. NSF (ACI-1713690, OIA-1738287, PHY-1913728), the Czech SF (16-16772S) and SURA, and performed under the auspices of the DOE by LLNL under Contract No. DE-AC52-07NA27344, with support from LDRD projects 16-ERD-022 and 19-ERD-017, as well as the SCGSR program administered by ORISE for the DOE and managed by ORAU under Contract No. DE-SC0014664. Benefitted from computing resources provided by Blue Waters, NERSC, and LSU HPC, and resources by JINA CEE.

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Date submitted: 25 Jun 2020

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