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Identification of Key Isotopes in Kilonova Heating KELSEY LUND, YONGLIN ZHU, North Carolina State University, JENNIFER BARNES, Columbia University, TREVOR SPROUSE, Los Alamos National Laboratory, NICOLE VASSH, University of Notre dame, GAIL MCLAUGHLIN, North Carolina State University, MATTHEW MUMPOWER, Los Alamos National Laboratory, REBECCA SURMAN, University of Notre Dame — The rapid neutron capture process (r-process) is one of the main mechanisms whereby elements heavier than iron are synthesized, and is responsible for the creation of the heaviest stable actinides. Observations of the gravitational wave event GW170817, and its optical counterpart, AT2017gfo, support neutron star mergers as an r-process production site. Accurately and reliably modelling yields and observational signatures from these sites requires inputs from nuclear physics, which introduce potentially large uncertainties. We use nucleosynthesis modeling to evaluate the effect of varying these inputs, including different nuclear mass models, fission decay rates, and daughter product distributions in lanthanide and actinide production. I show that applying different nuclear physics inputs generates discrepancies in abundances of key isotopes which contribute significantly to the overall nuclear energy generation in the merger event, which is a necessary component of kilonova light curve modeling.

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