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Impact of Neutron Induced Fission on r-process Nucleosynthesis Calculations LAUREN WARD, NICOLE VASSH, TREVOR SPROUSE, University of Notre Dame, MATT MUMPOWER, Los Alamos National Lab, REBECCA SURMAN, University of Notre Dame, FISSION IN R-PROCESS ELEMENTS (FIRE) COLLABORATION, JINA CENTER FOR THE EVOLUTION OF THE ELEMENTS COLLABORATION — Recent evidence indicates that the r process, which is responsible for the creation of the heaviest elements in the universe, occurs at the site of a neutron star merger. Within such merger environments fission has the potential to be greatly influential on abundance yields of nucleosynthesis calculations. We perform sensitivity studies that look at how changing individual neutron induced fission rates and yields affect the abundances of such calculations. We do this for two distinct sets of theoretical nuclear data (based on FRDM 2012 and HFB-17 masses, respectively) and then relate the result to the fission barrier predictions for both models. Additionally, we perform Monte Carlo variations of all of the fission rates to determine the potential uncertainty range in these nucleosynthesis calculations given two distinct fission yield prescriptions (simple symmetric split and GEF). We find that varying the properties of neutron induced fission have a dramatic impact on r-processes nucleosynthesis yields and require further study.

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