

R-Process Sensitivities and Measurements

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The origins of the heavy elements have continued to be one of the grand challenges for all of science in the 21st century. The recent observation of gravitational waves from two neutron star mergers simultaneously with the spectroscopy showed that rare earth elements are in fact being made in neutron star mergers. While questions remain about sufficient numbers of mergers to account for the observed abundances of the heavy elements in the universe and whether mergers are the only sources of the heavy elements, measurements of the most exotic nuclei that we can make in our laboratories are the most powerful tools for understanding the astrophysical conditions in which the r-process operates. I will present results of our sensitivity studies and quantifications of nuclear uncertainties to point out the most impactful nuclei to measure and the precision with which they should be measured.

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