

APR20-2020-020042

Abstract for an Invited Paper
for the APR20 Meeting of
the American Physical Society

Nucleosynthesis in Binary Neutron Star Mergers

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The origin of the r-process elements remains the biggest unsolved question in our understanding of chemical evolution in the Milky Way, but joint electromagnetic and gravitational wave observations are starting to put significant constraints on their origin. The most likely astrophysical sites for the formation of these nuclei involve dynamic events in the lives of neutron stars: the merger of a neutron star and another compact object or the neutron stars birth. In these environments, nuclear physics plays a paramount role in determining both the evolution of the dense object itself and what nuclei are synthesized in material that is ejected from the system. In this talk, I will discuss nucleosynthesis and matter ejection during neutron star mergers. I will also discuss electromagnetic observables associated with neutron star mergers that give us a direct window into the formation of the r-process elements.