

Abstract Submitted
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Which Neutron Star Mergers Synthesized the *r*-Process Elements? ERIKA HOLMBECK, University of Notre Dame — The astrophysical origin of the heaviest elements made by rapid neutron-capture (the *r*-process) is unknown, though neutron star mergers (NSMs) are strong possible candidates. Metal-poor stars enhanced with these elements provide some basis of comparison with nucleosynthesis model yields, such as that from NSMs. Currently, many theoretical *r*-process studies take this route of comparing individual model results to observed stellar abundances. However, we take the opposite approach in a way that has so far not been accomplished in literature; we use the observed abundances of metal-poor stars themselves to reconstruct properties of the progenitor neutron star binaries that would have merged to produce those elements. We will present the results of this new analysis and comment on whether the predicted binary systems agree with present-day Galactic populations of neutron stars. We also explore the effect that the nuclear Equation of State (EOS) has on our results and if metal-poor stars can provide an additional, indirect EOS constraints.

Erika Holmbeck
University of Notre Dame

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