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Nuclear data and rapid neutron capture nucleosynthesis

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In rapid neutron capture, or *r*-process, nucleosynthesis, heavy elements are built up via a sequence of neutron captures and beta decays that involves thousands of nuclei far from stability. Though we understand the basics of how the *r*-process proceeds, its astrophysical site is still not conclusively known. The nuclear network simulations we use to test potential astrophysical scenarios require nuclear physics data (masses, beta decay lifetimes, neutron capture rates, fission probabilities) for all of the nuclei on the neutron-rich side of the nuclear chart, from the valley of stability to the neutron drip line. Here we discuss recent sensitivity studies [1-4] that aim to determine which individual pieces of nuclear data are the most crucial for *r*-process calculations. We will also discuss how, once nuclear physics uncertainties are reduced, we can use an understanding of late-time *r*-process dynamics to constrain the *r*-process astrophysical site [5].

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