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The role of fission in understanding the astrophysical origin of the heaviest elements[1]

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The heaviest elements are understood to be synthesized by the rapid neutron capture process (r process), but the astrophysical site(s) which host the conditions capable of reaching the heaviest species remains an open question. While there is observational evidence for the synthesis of lanthanides in neutron star mergers, whether heavier elements such as gold, platinum, and the actinides are produced in mergers remains uncertain. Signatures of fission in observables such as abundance patterns and kilonova signals can potentially illuminate the ultimate reach of the r process in candidate astrophysical events. We will review recent work which aims to identify such signatures and discuss their dependence on unknownfission properties of exotic neutron-rich nuclei.

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