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# Impact of r-Process Heating on Disk Outflows from Neutron Star Mergers

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The detection of the neutron star merger event GW170817 through gravitational wave detectors and electromagnetic observations has provided critical insights into the properties of merger ejecta. In these mergers, the observed light curve, powered by radioactive decay, indicates that rapid neutron capture (r-process) nucleosynthesis generates heavy elements. The final abundances of these elements are shaped by ejecta properties such as velocity, electron fraction, and thermal evolution. These properties, in turn, are influenced by feedback from r-process heating. In this study, we perform viscous hydrodynamic simulations to investigate how nuclear heating affects disk outflows. By implementing a parameterized heating model based on local temperature and electron fraction histories, we find that r-process heating significantly modifies ejecta characteristics. Specifically, our simulations reveal a 10% increase in ejecta mass resulting from nuclear heating, accompanied by enhanced radial velocity and suppressed convective motion. These findings underscore the importance of incorporating r-process heating feedback into neutron star merger models to accurately predict outflow properties.

## Section

High Energy

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