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Studying Expansion of Ejecta from Binary Neutron Star Mergers[1] HYUN LIM, OLEG KOROBKIN, JONAH MILLER, RYAN WOLLAEGER, CHRISTOPHER FONTES, Los Alamos National Laboratory, MARK ALEXANDER KALTENBORN, Los Alamos National Laboratory and The George Washington University, WESLEY EVEN, JULIEN LOISEAU, Los Alamos National Laboratory — Neutron star mergers provide an exciting opportunity to study physics at the extreme, such as strong gravity, nuclear equation of state, and r-process nucleosynthesis. One of the signature events associated with such mergers is a kilonova, first unambiguously discovered in the afterglow of the GW170817 merger event. Accurate modeling of kilonova requires an understanding of the ejecta morphology, which can play a significant role in determining its brightness and color. In this work, we explore the expansion of neutron star merger ejecta with the new LANL smoothed particle hydrodynamics code, FleCSPH, which is based on the FleCSI computational infrastructure. We follow simulations of accretion disk outflows [Miller et al. 2019] beyond the outer boundary of the original computational grid, using a Lagrangian particle method. We use a realistic, high density nuclear equation of state and nuclear heating from a nucleosynthesis network. The expanded ejecta morphology is then used as a background for radiative transport calculations with LANL opacities of lanthanides. Resulting spectra and light curves are presented.

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