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Igniting weak interactions in neutron-star post-merger accretion disks SOUMI DE, Los Alamos National Laboratory, DANIEL SIEGEL, Perimeter Institute — The merger of two neutron stars or of a neutron star and a black hole typically results in the formation of a post-merger accretion disk. Outflows from disks may dominate the overall ejecta from mergers and be a major source of r-process nuclei in our universe. We explore the parameter space of such disks, their outflows, and r-process yields by performing three-dimensional general-relativistic magnetohydrodynamic (GRMHD) simulations with weak interactions and approximate neutrino transport. We discuss the mapping between initial binary parameters and the parameter space of resulting disks, chiefly characterized by their initial accretion rate. We demonstrate the existence of an ignition threshold for weak interactions in the parameter space separating a neutrino-cooled regime and an advection dominated regime. While neutrino-cooled disks can produce the entire range of r-process elements in good agreement with the observed solar system abundances, advection heated disks show suppressed production of light r-process elements. With gravitational-wave detectors starting to sample the neutron star merger parameter space, our disk realizations provide a suite of templates that can be matched with future observations via their associated kilonova emission.

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