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Parametric Finite-Temperature Equation of State in Neutron Star Merger Simulations CAROLYN RAITHEL, Institute for Advanced Study (IAS) — Binary neutron star mergers provide a unique probe of the neutron star equation of state (EoS) across a wide range of parameter space, from the zero-temperature EoS during the inspiral to the finite-temperature EoS following the merger. In this talk, I will present the results of new numerical simulations of binary neutron star mergers, using a parameterized framework for calculating the finite-temperature EoS. I will begin with a summary of the EoS framework, which is based on a two-parameter approximation of the particle effective mass and includes the leading-order effects of degeneracy. I will show that including the effects of degeneracy can significantly impact the outcomes of merger simulations, compared to ideal-fluid (or hybrid) approximations. Using a parameter study to explore this new EoS model, I will discuss how different assumptions about the particle effective mass can affect the post-merger gravitational wave signal and the amount of merger ejecta. Finally, I will comment on the prospects for extracting cold neutron star properties (such as the radius) from the post-merger gravitational wave spectrum, in light of this dependence on finite-temperature effects.

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