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Numerical Inside View of Hypermassive Remnant Models for GW170817 WOLFGANG KASTAUN, FRANK OHME, Max Planck Institute for Gravitational Physics — The first multi-messenger observation of a binary neutron star merger has already lead to first constraints on the nuclear matter equation of state. To make the most out of the observational data, however, the theoretical modeling of the merger process needs to be improved further. Among other ingredients, the evolution of the merger remnant within tens of milliseconds after the merger is essential, since it is connected to the kilonova as well as to the short gamma ray burst. Key aspects linking this early phase to the observables of later stages are the fate of the remnant, the mass of the disk, dynamical matter ejection, and disk winds. These in turn are influenced by the interplay with the remnant and hence the delay before black hole formation. Modeling the remnant lifetime and collapse is a difficult challenge for current methods. In this talk, I will present results of numerical simulations that highlight the complexity of the most basic hydrodynamic evolution without magnetic fields, and show novel visualizations of the three-dimensional remnant structure.

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