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Rotation profile of neutron star merger remnants

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A large number of publications model hyper-massive neutron stars (i.e. neutron stars with total mass exceeding the maximum allowed for a uniformly rotating star) produced in binary neutron star mergers by assuming a rotation profile with a rapidly rotating core. We confront such models with results of general relativistic hydrodynamic simulations which exhibit a slowly rotating core instead. Our simulations apply tabulated nuclear physics equations of states including thermal and composition effects, but do not consider neutrino radiation. We investigate the contribution of thermal effects on the structure and short-term stability of the remnant. Further, we discuss if under-densities caused by hot spots contribute to the gravitational wave signal, as well as the influence of the differential rotation on hot spots.

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