Abstract Submitted
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Magnetar Formation from the Merger of Binary Neutron Stars
BRUNO GIACOMAZZO, University of Trento — I will discuss the results of recent fully general relativistic magnetohydrodynamic (GRMHD) simulations of binary neutron star (BNS) mergers performed with the Whisky code. I will describe in particular the role of magnetic fields in the post-merger dynamics, their impact on gravitational waves (GWs), and the possible formation of magnetars. The formation of a rapidly spinning magnetar after the merger could in particular generate electromagnetic signals that, if measured together with GWs emitted during the inspiral, could help to constrain the equation of state of NSs. Moreover BNSs are also thought to be behind the central engine of short gamma-ray bursts (SGRBs) and the formation of a magnetar could explain some of the observed SGRBs. While global GRMHD simulations of BNS mergers are currently unable to produce strong magnetic field amplifications during merger, local high-resolution simulations showed that small-scale turbulence can play a very important role in amplifying the magnetic fields. I will show how such small-scale dynamics can be included in global GRMHD BNS simulations via the implementation of a subgrid-scale model and its effect on the formation of magnetars.

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