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General Relativistic Magnetohydrodynamic Simulations of Compact Binary Mergers

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In several astrophysical scenarios, compact objects, such as neutron stars (NSs) and black holes (BHs), are often surrounded by magnetic fields. Magnetic fields can play an important role in the dynamics of these objects and in the production of powerful electromagnetic emissions. In the case of NS-NS and NS-BH binaries, for example, magnetic fields can be amplified during the merger, via plasma instabilities, and subsequently produce the relativistic jets that may give rise to short gamma-ray bursts (SGRBs). During the merger of supermassive BHs, magnetized accretion disks surrounding the BHs can instead produce strong electromagnetic emissions that may be used to localize these events. In this talk I will review the current status of general relativistic magnetohydrodynamic simulations of compact binary mergers. I will in particular focus on the role that magnetic fields have in the dynamics of the merger of NS-NS, NS-BH, and BH-BH binaries. I will also discuss how a better understanding of how turbulence may affect magnetic field evolution plays an important role in these simulations.