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Magnetar formation from the merger of binary neutron stars

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I will present results of recent investigations about the possibility to form long-lived or even stable magnetars after the merger of a binary neutron star (BNS) system. BNSs are among the most powerful sources of gravitational waves (GWs) that will be detected by advanced LIGO and Virgo. While the inspiral GW signal is the main target for the first detections, the formation of a long-lived or even stable NS remnant after the merger can produce a long post-merger GW emission that could also be detected. Moreover magnetic fields can be strongly amplified during the merger and this can lead to the formation of a magnetar. Large magnetic fields can have an impact on the GW emission after merger and also lead to electromagnetic counterparts, such as the X-ray plateaus that are observed in short gamma-ray bursts. I will describe the dynamics that can lead to the formation of stable neutron stars after the merger of some BNS systems, how large magnetic fields can be produced, and their possible effects on the GW signal.

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