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Electromagnetic signatures from the dynamics of compact stars

The merger of a binary system of compact objects (neutron stars or black holes) is expected to be a strong source of gravitational waves, but will also be accompanied by an intense electromagnetic signature. I will show how the dynamics of a binary of magnetized neutron stars leads to a rapidly-spinning black hole surrounded by a hot and highly-magnetized torus. The development of magnetohydrodynamical instabilities in the torus can amplify by several orders of magnitude the initially turbulent magnetic field, yielding an ordered poloidal field of ˜ 10ˆ(15) G along the black-hole spin-axis, within a half-opening angle of 30 deg, which may naturally launch a relativistic jet. I will also discuss the suggestion that the recently discovered fast radio bursts can be explained simply in terms of the collapse of a supramassive neutron star.

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