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Neutron star collisions and the gravitational collapse

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With the first detection of gravitational waves from a binary system of neutron stars GW170817, a new window was opened to study the properties of relativistic fluids at and above the nuclear-saturation density. Reaching densities a few times that of nuclear matter and temperatures up to 100 MeV, such mergers also represent potential sites for a phase transition from confined hadronic matter to deconfined quark matter. A hypermassive hybrid star is a metastable remnant of a binary neutron star merger, and in contrast to its purely hadronic counterpart (hypermassive neutron star), it contains deconfined strange quark matter in its inner region. During the last phase, the hypermassive hybrid star collapses into a black hole and the quark matter in the inner region gets macroscopically confined by the formation of the event horizons of the resulting rotating black hole.

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