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Merger of binary neutron stars in numerical relativity

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The merger of binary neutron stars is one of most promising sources of gravitational waves. It is also a promising candidate for the central engine of short-hard gamma-ray bursts and a source of the strong transient electromagnetic signal that could be the counterpart of gravitational-wave signals. Numerical relativity is probably the unique tool for theoretically exploring the merger process, and now, it is powerful enough to provide us a wide variety of aspects of the binary-neutron-star merger. In this talk, I will summarize our current understanding of the entire merger event that is obtained by a large-scale numerical-relativity simulations. In particular, I focus on the relation between the neutron-star equation of state and gravitational waves emitted during the late inspiral and merger phase, and observable electromagnetic signal that is likely to be emitted by the dynamical ejecta through r-process nucleosynthesis.