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Exploring fundamental physics with gravitational wave observations

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Gravitational wave observations provide a plethora of opportunities to explore questions in fundamental physics and physics beyond the standard model. Multimessenger observation of gravitational waves and electromagnetic radiation from distant sources can be used to test modified theories of gravity, measure cosmological parameters, ascertain the nature of dark matter and dark energy. Gravitational waves emitted in the aftermath of neutron star collisions potentially carry the signature of QCD phase transition. Axionic clouds around black holes could lead to continuous gravitational waves with characteristic signature. In this talk I will describe the different aspects of fundamental physics that is accessible to the gravitational-wave window.

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