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## Using gravitational waves to distinguish between neutron stars and black holes in binaries

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In August 2017, the first detection of a neutron star merger, GW170817, created an opportunity to explore the equation of state of supranuclear matter using gravitational waves. But it is unknown under what circumstances this kind of gravitational wave data could distinguish between different types of mergers. For example, can the data distinguish a merger of black holes from a merger of neutron stars or the merger of a neutron star and a black hole? Here we build on earlier results using chiral effective field theory to explore whether the data from LIGO and Virgo, A+, Voyager, or Cosmic Explorer can lead to such a distinction. The results suggest that LIGO and Virgo will be able to distinguish between a binary neutron star and a binary black hole but not between neutron-star–black-hole binary and a black hole binary.

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