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Title: Search for Eccentric Binary Black Hole Mergers with Gravitational Waves

Since the first gravitational wave detection in 2015, LIGO-Virgo-KAGRA has detected a total of 90 signals from binary black hole and neutron star mergers. Despite the large number of observations, the astrophysical origin of these binary black hole systems still remains unsolved. Binary black holes primarily originate from two types of environments: when two stars evolve together in isolation to form a binary black hole system that coalesces within the age of the Universe, and when two black holes become bound due to strong gravitational interactions in dense environments like globular clusters and young star clusters. One distinguishing feature between gravitational waves originating from these two environments is the orbital eccentricity of the binary since this leaves a unique imprint on the morphology of the signal. In my talk, I will talk about why the detection of gravitational wave signals from eccentric binary black holes is challenging, and how LIGO mitigates these challenges. I will also briefly discuss the dependence of our search sensitivity on the source parameters of the binary black hole.