Contribution ID: **141** Type: **not specified**

E. Maggio: Testing general relativity in the nonlinear regime: a parametrized plunge-merger-ringdown waveform model

Tuesday 20 December 2022 15:30 (15 minutes)

Gravitational waves provide a unique opportunity to test gravity in the dynamical and nonlinear regime. Here, we propose a parametrised test of general relativity that introduces generic deviations to the plunge, merger and ringdown stages of binary-black-hole coalescences. The novel feature of the model is that it can capture signatures of beyond-GR physics in the merger phase of black-hole binaries observed by the LIGO-Virgo-KAGRA Collaboration. We find that the deviations from the peak gravitational- wave amplitude and frequency can be constrained to about 20% with GW150914. Alarmingly, we find that GW200129_065458 shows a strong violation of general relativity. We interpret this result as a false violation either due to waveform systematics (mismodeling of spin precession) or data-quality issues. This event demonstrates the importance of systematics and glitch mitigation procedures when interpreting tests of general relativity with present gravitational-wave observatories.

Session Classification: Session 7 A