



Contribution ID: 936

Type: Oral

## Listening to the long ringdown: a novel way to pinpoint the equation of state in neutron star cores

Multimessenger signals from binary neutron star (BNS) mergers are promising tools to infer the largely unknown properties of nuclear matter at densities that are presently inaccessible to laboratory experiments. The gravitational waves (GWs) emitted by BNS merger remnants, in particular, have the potential of setting tight constraints on the neutron-star equation of state (EOS).

In this talk I will present a novel and tight correlation between the ratio of the energy and angular momentum losses in the late-time portion of the post-merger signal, i.e., the “long ringdown”, and the properties of the EOS at the highest pressures and densities in neutron-star cores.

By applying this correlation to post-merger GW signals, I will show a significant reduction of the EOS uncertainty at densities several times the nuclear saturation density, where no direct constraints are currently available.

### Category

Theory

### Collaboration (if applicable)

**Primary authors:** ECKER, Christian (Goethe); GORDA, Tyler (Goethe University Frankfurt); KURKELA, Eero Aleks; REZZOLLA, Luciano

**Presenter:** ECKER, Christian (Goethe)

**Track Classification:** QCD matter in astrophysics