Contribution ID: **61** Type: **talk**

What neutron star mergers and their gravitational wave signal can teach us about matter under extreme conditions

Wednesday, 20 February 2019 17:01 (17 minutes)

With the detection of GW170817 we have observed the first multi messenger signal from two merging neutron stars.

This signal carried a multitude of information about the underlying equation of state(EOS) of nuclear matter, which so far is not known for densities above nuclear saturation.
In particular it is not known if exotic states or even a phase transition to quark matter can occur at densities so extreme that they can't be probed by any current experiment.

I will show how the information carried in the gravitational wave signal of GW170817 can be used to constrain the EOS at densities above saturation and what we can learn about the possible existence of phase transitions. I will also comment on how we can use future gravitational wave detections in order to set limits on the existence of neutron stars having a quark matter core.

Finally, I will discuss the detectability of a quark-hadron phase transition taking place in a neutron star merger event.

Summary

Primary author: MOST, Elias Roland (Goethe University Frankfurt)

Co-author: Prof. REZZOLLA, Luciano (ITP, Goethe University Frankfurt)

Presenter: MOST, Elias Roland (Goethe University Frankfurt)

Session Classification: Gravitational Waves

Track Classification: Gravitational Waves