Contribution ID: **144** Type: **not specified**

Deciphering accretion-driven starquakes in recycled millisecond pulsars using gravitational waves

Wednesday 15 January 2025 10:02 (13 minutes)

Recycled millisecond pulsars are susceptible to starquakes as they are continuously accreting matter from their binary companion. A starquake happens when the rotational frequency of the star crosses its breaking frequency. In this study, we perform a model analysis of an accreting neutron star suffering a starquake. We analyse two models: a spherical star with accreting mountains and a deformed star with accreting mountains. We find that as the star crosses the breaking frequency and suffers a starquake, there is a sudden change in the continuous gravitational wave signal arriving from it. The amplitude of the gravitational wave signal increases suddenly both for the spherical and deformed star. For the spherical star, the accreting matter entirely dictates the amplitude of the gravitational wave. For the deformed star, both the accreting matter and the deformation from spherical symmetry play a significant role in determining the amplitude of the gravitational wave signal. This sudden change in the continuous gravitational wave signal in recycled millisecond pulsars can be a unique signature for such pulsars undergoing a starquake.

Author: NATH, Kamal Krishna (National Institute of Science Education and Research)

Presenter: NATH, Kamal Krishna (National Institute of Science Education and Research)

Session Classification: Parallel C

Track Classification: 5. Baryon rich QCD matter, nuclear astrophysics