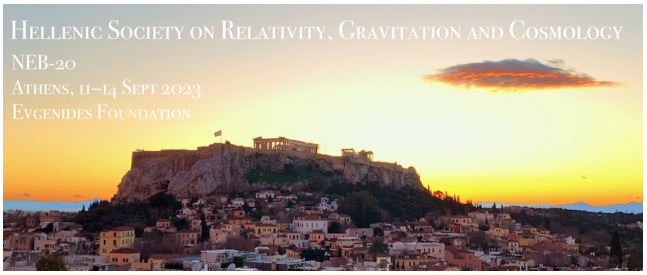

Contribution ID: **55** Type: **not specified**

Rapidly rotating neutron stars: Universal relations and EOS inference

Tuesday, 12 September 2023 12:40 (20 minutes)

We provide accurate universal relations that allow to estimate the moment of inertia I and the ratio of kinetic to gravitational binding energy T/W of uniformly rotating neutron stars from the knowledge of mass, radius, and moment of inertia of some related non-rotating neutron star. Based on these, several other fluid quantities can be estimated as well. Astrophysical neutron stars rotate to varying degrees and although rotational effects may be neglected in some cases, not modeling them will inevitably introduce bias when performing parameter estimation. This is especially important for future, high-precision measurements coming from electromagnetic and gravitational wave observations. The proposed universal relations facilitate computationally cheap EOS inference codes that permit the inclusion of observations of rotating neutron stars. To demonstrate this, we deploy them into a recent Bayesian framework for equation of state parameter estimation that is now valid for arbitrary, uniform rotation. Our inference results are robust up to around percent level precision for the generated neutron star observations, consisting of the mass, equatorial radius, rotation rate, as well as co- and counter-rotating f-mode frequencies, that enter the framework as data.

Primary author: KRUEGER, Christian (University of Tuebingen)

Presenter: KRUEGER, Christian (University of Tuebingen)

Session Classification: Parallel Session A