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Further probing the neutron star equation of state via frequency deviations in universal relations

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In this talk we focus on empirical relations between the gravitational wave frequencies produced by fluid oscillations in neutron stars and macroscopic characteristics like the radius and tidal deformability. Such relations can be employed to constrain the stellar properties, and in turn the underlying equation of state, from gravitational wave observations of neutron star systems. We focus on empirical relations describing two very distinct systems. In particular the quadrupolar mode in isolated, cold, non-rotating neutron stars and the dominant postmerger fluid oscillation in binary neutron star merger remnants. We examine the exact way in which individual models distribute with respect to the corresponding fits to all models and identify a systematic behavior in the way points scatter. We relate the scatter to the underlying equation of state and in particular the tidal Love number. Finally, we discuss how these deviations can lead to stricter equation of state constraints from future gravitational wave observations.

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