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Neutron Star Equation of State after the GW170817 event

In this talk I will review the method of estimation of tidal deformabilities of compact stars and present results for pure hadronic as well as hybrid stars that include the mass twins case. Then I will discuss the impact of the nuclear symmetry energy in the determination of the compact star radius. In particular, the recent detection of gravitational radiation from the GW170817 event shed light on the properties of the neutron star equation of state (EoS), thus comprising both the study of the symmetry energy and stellar radius. Furthermore, I shall address the question of the possibility of a universal symmetry energy contribution to the neutron star equation of state under restricted Direct Urca cooling. When these two aspects are combined, powerful predictions for the stiffness of the neutron star EoS are obtained.

Furthermore, I will focus on the case of mass twin compact stars, hybrid compact stars with approximately the same masses but different radii.

To qualify the above, I will show a recent developed EoS that features of a color superconducting chiral quark model with nonlocal, covariant interactions bearing density dependent vector meson coupling and a density-dependent bag pressure. This model allows for a scenario where the compact stars of the GW170817 event are either both hadronic, both hybrid, or simultaneously hadronic and hybrid configurations.

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