

Title: Jordan-Frame vs Einstein-Frame Neutron Stars in $f(R)$ theories of gravity and their implications for GW observations.

Abstract:

Recent GW observations have involved a huge push for constraining GR and Beyond GR (BGR) theories in the strong field regime, being the scenario a lot more promising when next generation GW detectors come to online. $f(R)$ theories of gravity have been long proposed in cosmology as relevant candidates to successfully describe the dark energy and dark matter problem. However, the recent dawn of the GW astronomy allows us to also study its implications in the merger of compact objects as NSs, which have become natural laboratories to also study matter in dense gravity and density conditions. In this talk I will analyze the possible new prospects and constraints of several $f(R)$ models after the recent GW170817 NS merger and the likely nearly upcoming observations. I will show also the differences that may arise just from the consideration of the Jordan-Frame or Einstein-Frame perspective and how NSs could shed light on which one may represent better the physical properties of these systems.