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Applications of the post-Tolman-Oppenheimer-Volkoff formalism HECTOR O. SILVA, University of Mississippi, KOSTAS GLAMPEDAKIS, Universidad de Murcia, GEORGE PAPPAS, Instituto Superior Tcnico, EMANUELE BERTI, University of Mississippi — Besides their astrophysical interest, neutron stars are promising candidates for testing theories of gravity in the strong-field regime. It is known that, generically, modifications to general relativity affect the bulk properties of neutron stars, e.g. their masses and radii, in a way that depends on the specific choice of theory. In this presentation we review a theory-agnostic approach to model relativistic stars, called the post-Tolman-Oppenheimer-Volkoff formalism. Drawing inspiration from the parametrized post-Newtonian formalism, this framework allows us to describe perturbative deviations from general relativity in the structure of neutrons stars in a parametrized manner. We show that a variety of astrophysical observables (namely the surface redshift, the apparent radius, the Eddington luminosity and the orbital frequency of particles in geodesic motion around neutron stars) can be parametrized using only two parameters.

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