

Parametrized tests of gravity: from stellar structure to gravitational waves

Hector O. Silva¹ and Nicolás Yunes¹

¹*eXtreme Gravity Institute, Department of Physics,
Montana State University, Bozeman, MT 59717 USA*

The advent of the gravitational wave era is offering us a new arena to test Einstein's theory of general relativity and to confront modifications to it against observations. On the one hand, these tests can place general relativity on a firmer experimental ground, while on the other, any hint of a disagreement would imply a major revision in our understanding of gravity. In this talk, we discuss recent results on a program to connect two parametrized formalism to test General Relativity, one in the strong-field regime of neutrons stars and another in the radiative regime of gravitational waves: the post-Tolman-Oppenheimer-Volkoff and the parametrized-post-Einsteinian formalisms. Our framework sets the stage, for the first time, to do theory-independent tests of gravity both through astronomical observations of neutron stars and gravitational wave observations.