Contributed Talk

Name: Jorge Rocha **Position:** Staff

Affiliation: ISCTE - Instituto Universitário de Lisboa & CENTRA

Title: Love numbers of black holes in modified gravity

Abstract: Finite-sized bodies deform in the presence of external tidal fields created, for instance, by surrounding objects. This effect is encoded in the so-called Love numbers and this is particularly important in the merging process of black holes or neutron stars. The phase of the gravitational waveform produced is affected by such tidal Love numbers and this idea has been used to constrain the nuclear matter equation of state from the gravitational wave detection of binary neutron star mergers. It is a well known fact that non-rotating black holes in General Relativity (GR) have vanishing Love numbers. Nevertheless, this exact same spacetime is also a solution of a broad class of modified gravity theories, for which the linearized perturbations equations generically differ from those of GR. Consequently, tidal Love numbers can depend not only on the object itself, but also on the gravitational theory supporting it, offering the possibility of ruling out theories with detections of gravitational waves from binary black hole mergers. I will discuss linear perturbations of f(R) gravity on the background of a Schwarzschild-AdS black hole, and its associated tidal Love numbers. While axial sector perturbations remain unaltered with respect to GR --and are therefore universal for this class of theories--, the polar sector is affected. Nevertheless, the non-universality arising in the polar sector is controlled by a single quantity, namely f''(R)/f'(R).