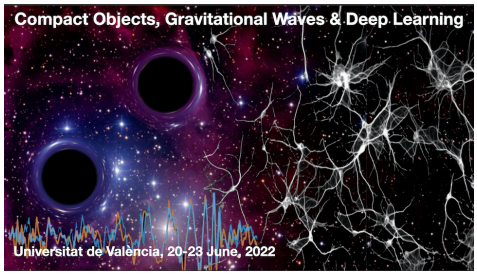

Contribution ID: **61** Type: **not specified**

Equatorial timelike circular orbits around generic ultracompact objects

Wednesday, 22 June 2022 15:00 (20 minutes)

For a stationary, axisymmetric, asymptotically flat, ultra-compact [i.e. containing light-rings (LRs)] object, with a Z2 north-south symmetry fixing an equatorial plane, we establish that the structure of timelike circular orbits (TCOs) in the vicinity of the equatorial LRs, for either rotation direction, depends exclusively on the radial stability of the LRs. Thus, an unstable LR delimits a region of unstable TCOs (no TCOs) radially above (below) it; a stable LR delimits a region of stable TCOs (no TCOs) radially below (above) it. Corollaries are discussed for both horizonless ultra-compact objects and black holes. We illustrate these results with a variety of exotic stars examples and non-Kerr black holes, for which we also compute the efficiency associated with converting gravitational energy into radiation by a material particle falling under an adiabatic sequence of TCOs. For most objects studied, it is possible to obtain efficiencies larger than the maximal efficiency of Kerr black holes, i.e. larger than 42%.

Presenter: DELGADO, Jorge