Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Black hole binaries: Ergoregions, photon surfaces, wave scattering, and quasinormal modes THIAGO ASSUMPCAO, West Virginia University, Universidade Federal do ABC, VITOR CARDOSO, Instituto Superior Tecnico, Perimeter Institute, CERN, AKIHIRO ISHIBASHI, Kindai University, MAURICIO RICHARTZ, Universidade Federal do ABC, MIGUEL ZILHAO, Instituto Superior Tecnico — In this talk, we address the computationally intense task of numerical modeling of black hole (BH) binaries by focusing on simple geometries that are static and, therefore, never merge. Two different binary models are used to investigate null closed orbits and their response to external perturbations. The first system is the Majumdar-Papapetrou (MP) solution, which describes a static configuration of an arbitrary number of maximally charged black holes. We focus on the special case of two MP black holes and investigate some of its properties, such as the different types of closed photon orbits and the instability scale of unstable circular orbits. The second system comes from Analogue Models of Gravity, which rely on the mathematical relationship between perturbations in fluids and scalar perturbations in curved spacetimes. In this work, we use a double-sink solution of the fluid equations and explore an analogy with the MP geometry. We show that the ergoregion of the double-sink geometry does not coincide with the event horizon, which raises the possibility of superradiant scattering and Penrose-like processes in more realistic astrophysical systems.

Thiago Assumpcao
West Virginia University

Date submitted: 10 Jan 2020 Electronic form version 1.4