Contribution ID: **41** Type: **talk**

Causal nature and dynamics of trapping horizons in black hole collapse

Tuesday, 8 October 2019 12:20 (20 minutes)

In calculations of gravitational collapse to form black holes, trapping horizons (foliated by marginally trapped surfaces) make their first appearance either within the collapsing matter or where it joins on to a vacuum exterior. Those which then move outwards with respect to the matter have been proposed for use in defining black holes, replacing the global concept of an event horizon, which has some serious drawbacks for practical applications. I here present results from a study of the properties of both outgoing and ingoing trapping horizons, assuming strict spherical symmetry throughout. Their causal nature (i.e. whether they are spacelike, timelike or null) is investigated, following two different approaches, one using a geometrical quantity related to expansions of null geodesic congruences, and the other using the horizon velocity measured with respect to the collapsing matter. The models treated are simplified, but do include pressure effects in a meaningful way and we analyze how the horizon evolution depends on the initial conditions of energy density and pressure of the collapse. (NOTE: This work has been published in Classical and Quantum Gravity 34 (2017) no.13, 135012)

Primary author: Dr MUSCO, Ilia (Institut de Ciències del Cosmos, Universitat de Barcelona, Facultat de Física)

Presenter: Dr MUSCO, Ilia (Institut de Ciències del Cosmos, Universitat de Barcelona, Facultat de Física)

Session Classification: Causality preservation and Chronology violation, CTCs