

Probing the regularization of spacetime singularities

Friday, 25 October 2024 15:30 (30 minutes)

Spacetime singularities are usually considered the proof of the intrinsic incompleteness of General Relativity (GR). The common belief is that their formation will be prevented in a full, potentially quantum, completion of GR. In this view, it is reasonable to assume that regular metrics can provide an effective description of the outcome of gravitational collapse. We have then two possible regular alternatives to describe the ultracompact objects that we saw in our universe: regular black holes and horizonless compact objects. I will talk about the possible structures of these black hole mimickers and the gravitational waves ringdown signal that we expect from their coalescence. In particular I will focus on the deviations in the spectrum of QNMs with respect to singular BHs, their possible detectability and the structure of echoes when backreaction effects and propagation in the interior of the object are taken into account.

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Session Classification: Fundamental Physics