



Contribution ID: 25

Type: **Contributed Talk**

Implications of the quantum nature of the black hole horizon on the gravitational-wave ringdown

Monday, 6 June 2022 17:40 (20 minutes)

Motivated by capturing putative quantum effects at the horizon scale, we model the black hole horizon as a membrane with fluctuations following a Gaussian profile. By extending the membrane paradigm at the semiclassical level, we show that the quantum nature of the black hole horizon implies partially reflective boundary conditions and a frequency-dependent reflectivity. This generically results into a modified quasi-normal mode spectrum and the existence of echoes in the postmerger signal. On a similar note, we derive the horizon boundary condition for a braneworld black hole that could originate from quantum corrections on the brane. This scenario also leads to a modified gravitational-wave ringdown. We discuss general implications of these findings for scenarios predicting quantum corrections at the horizon scale.

Primary authors: MAZUMDAR, Anupam (University of Groningen); MAGGIO, Elisa (University of Rome La Sapienza); PANI, Paolo (Istituto Nazionale di Fisica Nucleare); CHAKRABORTY, Sumanta (Indian Association for the Cultivation of Science)

Presenter: CHAKRABORTY, Sumanta (Indian Association for the Cultivation of Science)

Session Classification: Other challenges for future GW detectors

Track Classification: Other challenges for future GW detectors