

Probing cosmic censorship and stability in Reissner-Nordström-de-Sitter black holes

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From black hole quasinormal frequencies (QNFs), we can extract characterising information about their perturbed source. In the case of charged black holes, we can interrogate the extendability of the metric past the Cauchy horizon as well as the role of superradiance in black hole evolution. Here, we examine the QNF spectrum corresponding to a massive scalar test field carrying an electric charge, oscillating in the outer region of a Reissner-Nordström-de Sitter black hole. Our analysis provides insight into QNF behaviour, particularly in regions approaching the extremal conditions of the black hole. The implications of our findings extend from safeguarding the principles of cosmic censorship to addressing the structural stability of the black hole's interior. Our semi-classical analysis suggests that Strong Cosmic Censorship may be violated for black holes that are in close proximity to extremality within the context of Reissner-Nordström-de Sitter geometries.

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