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Charge (in)stability and superradiance of Topological Stars

Topological Stars are smooth horizonless static solutions of Einstein-Maxwell theory in 5-d and they represent possible microstate geometries for non-supersymmetric black holes. This poster explores the possibility of instabilities due to the emission of charged quanta under the electric field sourced by the solution - i. e. strings winding around the compact direction - in analogy with the charge instability already highlighted for other non-BPS geometries like JMaRT. This issue is addressed by calculating quasi-normal mode frequencies with a variety of techniques: WKB approximation, direct integration, Leaver method and by exploiting the recently discovered correspondence between black hole/fuzzball perturbation theory and quantum Seiberg-Witten curves. All mode frequencies we find have negative imaginary parts, implying an exponential decay in time. This suggests a linear stability of Topological Stars also in this new scenario. In addition, this poster analyses the charge superradiance for Black Strings, the horizon-full counterpart of Topological Stars. The amplification factor is computed with the numerical integration method and a quantum Seiberg-Witten motivated definition including instantonic corrections.

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