

Extremal Black Branes from the Near-Horizon

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In this talk, I will present the Kaluza-Klein spectrum of background perturbations to Freund-Rubin compactifications, which are the near-horizon geometry of a class of extremal black branes. The purpose of this is twofold.

The effective masses of fields in the near-horizon geometry determine the scaling exponents of (tidal) deformations to extremal black branes, so the spectrum characterises the horizon of certain extremal black branes which are continuously connected to the undeformed geometry. A large class turns out to be non-smooth or singular, generalising a recent result for extremal black holes.

We also argue that the severity of the Aretakis instability of black branes is determined by the scaling dimensions of the perturbations on the Anti-de Sitter factor in the near-horizon geometry. Our results therefore show that extremal black branes suffer from an Aretakis instability even in the absence of additional fields — in some cases, the dominant mode itself is non-decaying.

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