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Mass and Thermodynamic Relations for Lifshitz Symmetric Black Holes

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The definition of a meaningful thermodynamic mass (appearing in the first law and the Smarr relation, when a cosmological constant is taken into account) is a difficult concept in Lifshitz symmetric spacetimes, due in part to the boundary conditions that need to be satisfied. Knowing such a mass opens up opportunities for examining the critical behaviour of these black holes which is interesting in a gauge/gravity context.

Here we discuss our attempts at formulating a mass for some exact Lifshitz symmetric black hole solutions.

Author: BRENNAN, Wilson (University of Waterloo)

Co-authors: Dr PARK, Miok (Sogang University); Dr MANN, Robert (University of Waterloo)

Presenter: BRENNAN, Wilson (University of Waterloo)

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