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Stabilities of black hole solutions in vector-tensor theories

Friday, 27 August 2021 16:00 (40 minutes)

We study static and spherically symmetric black hole solutions in two classes of vector-tensor theories: generalized Proca theory and Einstein-Aether theory.
We formulate the odd-parity black hole perturbations in these theories by expanding the corresponding action up to second order and discuss whether or not black holes with vector hair suffer ghost or Laplacian instabilities.
We apply these results to concrete black hole solutions known in the literature and show that some of those solutions can be excluded by the violation of stability conditions.
Our general formulation of odd-parity perturbations is useful to study the propagation of gravitational waves during the inspiral and ringdown phases of binary BHs.

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