



Contribution ID: 62

Type: **not specified**

Black Holes spontaneous scalarization

Wednesday 22 June 2022 15:20 (20 minutes)

Spontaneous scalarisation of electrically charged, asymptotically flat Reissner–Nordstrom black holes (BHs) has been recently demonstrated to occur in Einstein–Maxwell–Scalar (EMS) models. This phenomenon is allowed by a non-minimal coupling between the scalar and the Maxwell fields and does not require non-minimal couplings of the scalar field to curvature invariants. EMS BH scalarisation presents a technical simplification over the BH scalarisation that has been conjectured to occur in extended scalar-tensor Gauss-Bonnet (eSTGB) models. It is then natural to ask: (1) how universal are the conclusions extracted from the EMS model? And (2) how much do these conclusions depend on the choice of the non-minimal coupling function?

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