Contribution ID: **47**   Type: **not specified**

A new model of spontaneous scalarization induced by curvature and matter

Friday 20 December 2024 16:45 (15 minutes)

This presentation explores scalarized black hole solutions in Einstein-Maxwell-Scalar (EMS) gravity and a newly developed model of scalarization induced by curvature and matter. Our work introduces novel solutions, with a focus on mixed scalarization phenomena. In EMS gravity, we investigate the coexistence of spontaneous and non-linear scalarization, demonstrating how their interplay is influenced by specific coupling constants, including cases where scalarization is effectively quenched. For the generalized scalarization model, we incorporate both curvature and matter couplings, addressing stability issues and modifying bifurcation thresholds. Utilizing advanced numerical methods, we analyze asymptotically flat scalarized black holes, emphasizing horizon properties, scalar field behavior, and thermodynamic characteristics such as temperature and entropy. These findings provide deeper insights into the scalarization process, its observational implications, and its role in extending our understanding of black hole solutions in modified theories of gravity.

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