

Black Holes: Internal Structures and Holographic Topological Properties

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The interiors of black holes remain worthy of exploration. The dynamic evolution of spacetime from horizon to singularity can exhibit intriguing behaviors. In this talk, I will introduce two works on black hole interiors. In the first work, we extend our analysis to stationary black holes—specifically, 3D hairy rotating black holes. We find that the inner horizons are always destroyed by scalar hairs and the collapse of Einstein-Rosen bridge is always present. The singularities will evolve into Kasner singularities with possible inversion. In the second work, we examine the interiors during the topological phase transition in two holographic semimetal models. The interiors exhibit a “topological invariance” behavior, likely reflecting the topological nature of the semimetals.

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