Abstract Submitted
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Emergence of Classical Black Hole Thermodynamics using Monodromic Analysis[1] ALEX CHANSON, Utah State University — We exhibit the asymptotic solutions of the Klein-Gordon field in the near-horizon geometry of various Black Holes and show, in the thermodynamic limit, the emergence of the 2nd Law of Black Hole Thermodynamics. We find that the monodromies around the singular points in the Klein-Gordon field are exactly the infinitesimal, classical Bekenstein-Hawking entropy. By utilizing known properties of monodromies, namely the Fuchs relation, we suggest a classical thermodynamic relationship between regular and Cauchy horizons. Indeed, the Fuchs relation between horizon monodromies has been shown to hold in a wide array of known black hole solutions. The only anomalous cases found are the asymptotically flat, d=4 solutions, where the Fuchs relation includes a monodromy at spacial infinity. By analyzing their AdS counterparts, we show how, in the flat-limit, the bifucation-horizon monodromies auto-normalize to the asymptotically flat monodromy at spacial infinity. This method suggests that analyzing the Cauchy horizons may provide insight into the limiting behavior of black hole geometries.

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