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(G*) Proving the Penrose Inequality in (Spherically Symmetric) AdS with Charge

Tuesday 28 May 2024 11:00 (15 minutes)

One of the most important results in mathematical general relativity in the last half century is the inequality, conjectured by Penrose in 1973, that the mass inside a black hole has a lower bound determined by the area of the black hole's event horizon, and that the minimal case is realized by the Schwarzschild black hole. While a fully general proof of the conjecture does not yet exist, it has been proved in the cases of extrinsically flat spatial slices (Riemann-Penrose inequality) and in the general case under the assumption of spherical symmetry. We seek to extend the spherically-symmetric proofs of the conjecture to include electric charge (Einstein-Maxwell theory in $(n + 1)$-dimension) in an anti-deSitter background, where the rigidity case of the inequality is now Reissner–Nordström AdS. In the future, our goal is to extend our proof to Gauss-Bonnet gravity. This is on-going work which is the subject of the author's PhD thesis.

Keyword-1

penrose inequality

Keyword-2

black holes

Keyword-3

general relativity

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