

The Penrose Inequality in Spherical Symmetry

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We formulate the stability statement associated with the spacetime version of the Penrose inequality, and establish it under the assumption of spherical symmetry in all dimensions. In particular, we show that spherically symmetric asymptotically flat initial data satisfying the dominant energy condition with ADM masses close to half the area radius of the outermost apparent horizon must arise from an isometric embedding into static spacetime converging to the exterior region of a Schwarzschild spacetime. More precisely, the bases converge in the volume preserving intrinsic flat sense to the corresponding Schwarzschildtime slice, and the static potentials converge in an L^2_{loc} sense. Furthermore, the difference of the second fundamental forms must converge to zero in L^2 .