报告题目：Asymptotic analysis for harmonic maps with prescribed singularities

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报告摘要：

Motivated by studies of axially symmetric stationary solutions of the Einstein vacuum equations in general relativity, we study singular harmonic maps from the 3-dimensional Euclidean space to the hyperbolic plane, with prescribed singularities. We prove that every such harmonic map has a unique tangent map at the black hole horizon and the harmonic map depends on the location of the black hole smoothly. The harmonic map equation restricted to the unit sphere has a singularity at the north and south poles. The collection of parameters representing the conical singularities in the tangent map determines a flow along which the reduced energy of the harmonic map is decreasing. This leads to an explicit and optimal lower bound for the ADM mass in terms of the total angular momentum, in asymptotically flat, axially symmetric, and maximal initial data sets for the Einstein equations with multiple black holes. The talk is based on joint work with Marcus Khuri, Gilbert Weinstein, and Jingang Xiong.