



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PURE MATHEMATICS

Scalar curvature rigidity and flexibility: two problems motivated by general relativity

by

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Abstract

Scalar curvature exhibits a striking interplay between rigidity and flexibility under weak geometric control. In this talk, I will present two related results motivated by general relativity. The first concerns rigidity at spatial infinity inspired by the positive mass theorem: jointly with Jianchun Chu and Man-Chun Lee, we address a conjecture of Gromov asserting that nonnegative scalar curvature, together with purely zeroth-order metric decay faster than the Schwarzschild rate, forces a complete metric on Euclidean space to be flat. The second concerns flexibility under high-frequency limits motivated by Burnett's conjecture for the Einstein equations: we solve and strengthen the Riemannian reverse-Burnett conjecture of Huneau and Luk, establishing that metrics with nonnegative scalar curvature arise as weak limits of scalar-flat metrics within the natural $W^{1,\infty}$ Burnett compactness class. More generally, this identifies scalar-curvature lower bounds as the precise relaxation of the corresponding constant scalar-curvature equations.

Date : 21 August 2026 (Friday)

Time : 3:00p.m. – 4:00p.m.

Venue : Room 1104 (near Lift 19)

All are Welcome!