

中国科学院数学与系统科学研究院
数学研究所
数学科学全国重点实验室
偏微分方程讨论班

Speaker: In-Jee Jeong (Korea Institute for Advanced Study)

Inviter: 薛志龙

Language: English

Title: Instantaneous and continuous loss of regularity for the 3D Euler equations

Time & Venue: 2026 年 10 月 14 日（星期三）9:00-10:00
思源楼 S817

Abstract: In this talk, I will present a construction of solutions to the three-dimensional incompressible Euler equations whose vorticity loses Sobolev regularity instantaneously and continuously in time. For every $(0 < s < 3/2)$, we construct arbitrarily small initial vorticity in $(H^s(\mathbb{R}^3))$ and a corresponding solution whose exact Sobolev regularity at time (t) is $((s-ct)/(1+ct))$, for some $(c > 0)$, on a short time interval. The solution remains classical locally in space and is unique in a suitable class. I will explain the mechanism behind this loss of regularity:

a nearly steady background flow creates hyperbolic deformation that both stretches and generates finer scales in a high-frequency vorticity perturbation. Combining spatially separated copies of this construction yields the continuous decrease of the Sobolev exponent. This is joint work with Luis Martínez-Zoroa and Wojciech S. Ożański.