



复旦大学数学科学学院 数学综合报告会

报告题目: **Euler sprays and Wasserstein geometry of the space of shapes**

报告人: Jian-Guo Liu
(Duke University)

报告时间: 2016-05-03 星期二 13:30-14:30

报告地点: 光华东主楼 1801

摘要: We study a distance between shapes defined by minimizing the integral of kinetic energy along transport paths constrained to measures with characteristic-function densities. The formal geodesic equations for this shape distance are Euler equations for incompressible, inviscid potential flow of fluid with zero pressure and surface tension on the free boundary. The minimization problem exhibits an instability associated with microdroplet formation, with the following outcomes: Shape distance is equal to Wasserstein distance. Furthermore, any two shapes of equal volume can be approximately connected by an Euler spray---a countable superposition of ellipsoidal droplet solutions of incompressible Euler equations. Every Wasserstein geodesic between shape densities is a weak limit of Euler sprays. Each Wasserstein geodesic is also the unique minimizer of a relaxed least-action principle for a fluid-vacuum mixture. This is a joint work with Bob Pego and Dejan Slepcev of CMU.

非线性数学模型与方法教育部重点实验室
中法应用数学国际联合实验室
上海市现代应用数学重点实验室
复旦大学数学研究所