复旦大学数学科学学院
数学综合报告会

报告题目：A path of understanding fluid equations: from Leray to recent breakthroughs

报告人：Mimi Dai （Princeton University and University of Illinois Chicago）

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报告摘要：

Derived in 1820s, the Navier-Stokes equation (NSE) governs the motion of fluid flows. In 1930s, Leray established the theory of weak solutions for the NSEs and raised some questions, many of which still remain open. One renowned question is regarding the appearance of singularity of solutions to the 3D NSE in finite time, which lies at the heart of the most exiting developments in fluid dynamics. The well-posedness problem, particularly in Leray-Hopf space, is also eminent and unanswered. We will review some major breakthroughs toward resolving the aforementioned problems, sparked by empirical laws in physics and techniques from other fields in mathematics, in particular, the convex integration techniques. We will also discuss some ongoing interest in various problems and new perspectives opened up by these techniques.

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