MAX PLANCK INSTITUTE
FOR THE STRUCTURE AND DYNAMICS OF MATTER

ANNOUNCEMENT - TALK

Title: Hydrodynamics without chaos: fluid flow near integrability

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Abstract

The large-scale dynamics of a conventional fluid, whether quantum or classical, is captured by only five equations, one for each local conservation law. For integrable systems, which possess infinitely many conservation laws, this conventional understanding breaks down and must be replaced by an infinite number of hydrodynamic equations. The vast number of slow modes that are predicted by this analysis have dramatic consequences for physical systems near integrability, which have now been observed across platforms spanning ultracold atoms, quasi-one-dimensional materials and intermediate-scale quantum computers. We summarize a decade of intense theoretical work on this topic and connect it to both old and new experiments. We conclude by discussing possible connections to "tomographic dynamics" in 2D Fermi liquids.

Short biography:

Vir B. Bulchandani graduated with distinction from the Mathematical Tripos at the University of Cambridge in 2015 before studying theoretical condensed matter physics at Berkeley with Joel E. Moore. After receiving his PhD in 2020, he was awarded a three-year postdoctoral fellowship at Princeton University. He joined the faculty at Rice in 2024 amid stints at Leibniz Universität Hannover and the National University of Singapore.

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Location:	**MPSD 900.EG.136**
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