



The University of Texas at Austin
Department of Physics
College of Natural Sciences

Colloquium

Wednesday, February 13, 2019

John Archibald Wheeler Lecture Hall
RLM 4.102, 4:00 pm

Experiments on Quantum Turbulence with trapped ultracold gases

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Abstract

The notion of turbulence in the quantum world was conceived long ago, but the occurrence of turbulence in ultracold gases has been studied in the laboratory only very recently. The topic offers new pathways and perspectives on the problem of turbulence in general. The finite size effects create specific characteristics observed. In this presentation, we review the general properties of quantum gases at ultralow temperatures paying particular attention to vortices, their dynamics, and evolution turbulent regime. Measurement of the energy spectrum using two techniques will be discussed and related to the present understanding of the theory. Identification of turbulence type based on energy spectrum determination will be explained. Applications of the turbulent cloud, when in an expansion, with the creation of a matter wave speckle field will be demonstrated. The appearance of exponential velocity distribution, as indicative of nonthermalization effect, will be interpreted in different views. The presentation will be done in a colloquial language and shall be fully understandable for the general scientific audience.