You are welcome to nominate speakers to colloquium@nao.cas.cn. The video and slides of previous colloquia and more information can be found at http://colloquium.bao.ac.cn/.

国台学术报告 NAOC COLLOQUIUM

2017 年 第 01 次 / No. 01 2017

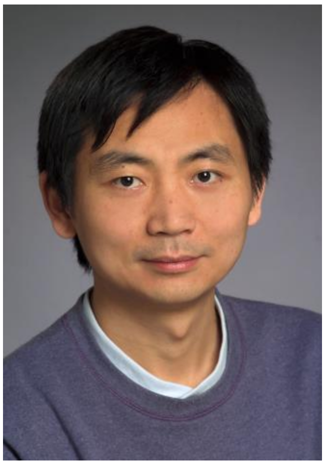
Time: Wednesday 2:30 PM, Jan. 04 Location: A601, NAOC

The Lagrangina View of Fluid Turbulence

Prof. Haitao Xu

Tsinghua University

Center for Combustion Energy and Department of Thermal Engineering



Prof. Haitao Xu received a BE in 1993 from Huazhong University of Science and Technology, Wuhan, China, and a PhD in 2003 from Cornell University, Ithaca, New York, USA. From 2003 to 2006, he was a postdoc in the Department of Physics, Cornell University, where he and colleagues developed a technique to measure the three-dimensional motion of particles in high Reynolds number turbulent flows. In 2006 he joined Max Planck Institute for Dynamics and Self-Organization, Goettingen, Germany, as a research scientist and later a group leader with tenure, where his main interest was the Lagrangian properties of fluid turbulence. He joined the Center for Combustion Energy, Tsinghua University in 2014 as a professor.

Abstract

Fluid flow becomes turbulent when the destabilizing inertial effects overwhelm the damping effects due to viscosity or friction. High Reynolds number turbulence is characterized by a flux of energy from the scale at which the energy is supplied into the flow to the scale at which the energy is dissipated. Understanding this energy flux is at the center of turbulence research. Traditionally, studies of turbulence have been almost exclusively in the Eulerian frame, i.e., in a coordinate system fixed in or at a prescribed motion relative to the laboratory frame. The last 15 years witnessed significant development in the Lagrangian viewpoint, i.e., following "fluid particles (tracer particles)" that move with the fluid in high-Reynolds-number turbulent flow field, in both experiments and numerical simulations. The new perspective revealed many interesting properties of turbulence and advanced our understanding, but also posed intriguing questions. Here we report recent Lagrangian Particle Tracking measurements conducted in a high-Reynolds number von Kármán swirling water flow between two counter-rotating and show how the measurements connect the motion of fluid particles with some fundamental properties of turbulence, such as the energy flux through scales and the time irreversibility.

All are welcome! Tea, coffee, biscuits will be served at 2:15 PM.