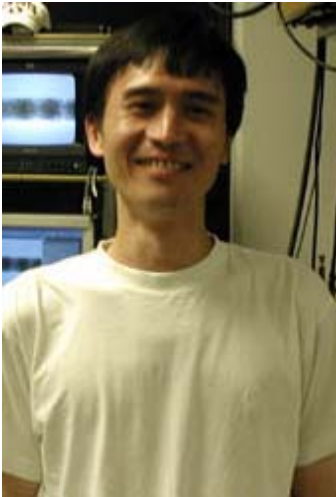


Physics Department Seminar

Friday March 9th, 2007

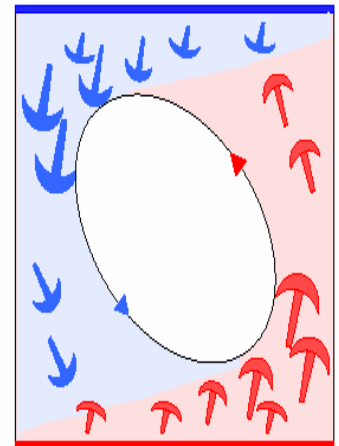
11:00 am in PhSc 105

“Fundamental and Application of Thermal Turbulence”



Dr. Xinliang Qiu

Senior Scientist
United States
Thermoelectric Consortium



Abstract:

Thermal turbulence is ubiquitous in nature: from the atmosphere, oceans, and the earth's mantle to industry. It is also an unsolved physics problem. Thermal turbulence is classified into two categories: free and forced turbulent convection. In this presentation, Rayleigh-Benard (RB) turbulent convection, which describes the fluid motion in a cell that is heated from the bottom and is cooled from the top, is used as a model system of free turbulent convection. We will present experimental results of both temperature and velocity fields in the RB convection cell and give a general picture of the free turbulent convection. The general picture will show you how the large-scale circulation is generated from the thermal plumes, how the order structure reappears from turbulence, and how the heat is transported by the flow. Forced turbulent convection, which exists in industry applications, is the fluid motion driven by external force and has internal heat transfer. We will show how the forced convection is used to solve thermal management problems in industry.