

**Date:** November 11, 2004 (Special Seminar)

**Time:** 1:00 PM (Special Time)

**Location:** Olin 305

**Speaker:** Dr. Robert Ecke  
Center for Nonlinear Studies  
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**Title:** "Experiments on 2D Turbulence"

**Abstract**

I will describe experiments on quasi two-dimensional turbulence. One is flowing soap films where turbulence is created by a grid, velocity data is obtained using particle-tracking velocimetry, and ensemble-averaged Eulerian measures of turbulence are obtained. For this system, an analysis of the direct enstrophy cascade using a filter approach yields strong evidence for the vortex stretching mechanism of turbulence enstrophy transfer.

Comparisons are made between traditional spectra/structure-function approaches and the filter approach. The second system is a two-fluid stratified layer experiment where the inverse energy cascade is investigated. Both Eulerian and Lagrangian measurements begin to reveal the complex mechanisms for inverse energy cascade in 2D turbulence predicted by Robert Kraichnan. We use the filter approach to obtain direct spatial correlations between proposed physical mechanisms and strongly negative energy flux.