

MATHEMATICS COLLOQUIUM

Thursday, October 26, 2006
3:40-4:30 PM Lockett 285

The Stochastic Geometry of Two Dimensional Turbulence

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Fluid motion is notoriously hard to predict due to the growth of small instabilities (the ‘Butterfly Effect’). Arnold showed that these instabilities can be explained geometrically as due to the negative curvature of the group of diffeomorphisms: ideal fluid flow is the geodesic motion on this group. A detailed understanding of fluid flow is still out of reach in the three dimensional case. I will describe an approach to two dimensional turbulence based on a surprising connection to geodesic motion on unitary groups. Including dissipation and fluctuation leads to a stochastic differential equation for which a steady state solution can be obtained. The eventual goal (not yet realized) is to explain how stable structures such as hurricanes arise from such an unstable chaotic system.

Refreshments will be served in the lounge at 3pm
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