

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
FRIDAY FEBRUARY 8, 2008
704 THACKERAY HALL
4:00 P.M.

PROFESSOR ZORAN GRUJIC
UNIVERSITY OF VIRGINIA

INTERPLAY BETWEEN GEOMETRY & SMOOTHNESS
IN THE 3D VISCOUS FLUID FLOWS

ABSTRACT: A flow of a 3D viscous fluid is described by the 3D Navier-Stokes equations. A question of whether a singularity can form in finite time is still open and is one of outstanding problems in applied analysis.

It has been observed both in numerical simulations and experiments that the vorticity (curl of the velocity) tends to concentrate on quasi low-dimensional sets – e.g., vortex sheets, vortex tubes. We will discuss interplay between geometry of these coherent vortex structures and smoothness of the flow and show that certain geometric scenarios rule out a finite time blow-up (singularity formation).

Refreshments served at 3:30 p.m.
in the Math Dept. COMMON ROOM, Thackeray 705