

1010-35-133

Zoran Grujic* (zg7c@virginia.edu), Department of Mathematics, Kerchof Hall, University of Virginia, Charlottesville, VA 22904, and **Qi S. Zhang**. *Space-time localization of the vorticity in the 3D Navier-Stokes equations.*

It has been observed both in experiments and numerical simulations that the regions of high vorticity magnitude in the 3D viscous incompressible flows exhibit sparse geometry, e.g., intense vorticity tends to accumulate on vortex sheets and/or vortex tubes. Understanding the interplay between these special geometrical properties of the flow and the smoothness (regularity) of the flow paves one of the key roads to our better understanding of fluid dynamics and turbulence. In this talk, a class of local (in the space-time) geometric conditions controlling the evolution of the enstrophy (the L^2 -norm of the vorticity) will be presented. The localization technique developed is quite general, and appears to be more efficient than the standard localization-of-the-pressure techniques in the velocity-pressure formulation of the 3D Navier-Stokes equations. (Received August 23, 2005)