

Departmental Colloquium

Vortex filament dynamics

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Abstract: The evolution of vortex filaments in three dimensions is a question of mathematical hydrodynamics which involves the analysis of nonlinear partial differential equations. On the physical side it is relevant to questions of vortex evolution for the Euler equations as well as to the fine structure of vortex cores in a superfluid. On the mathematical side it is a setting of partial differential equations with a compelling analogy to Hamiltonian dynamical systems. In this lecture I will describe a model for the dynamics of near - parallel vortex filaments and their mutual interactions in a three dimensional fluid. The talk will describe a phase space analysis of solutions, including constructions of periodic and quasi-periodic orbits via a version of KAM theory in an infinite dimensional phase space, and a topological principle to count the multiplicity of solutions. This is ongoing joint work with L. Corsi (Georgia Institute of Technology), C. Garcia (UNAM) and C.-R. Yang (McMaster and Shantou University)

Tea 4:15 PM

Friday, September 22 at 3:00 PM in SEO 636