

*Department of Mathematics,
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Math 248 - Analysis Seminar

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Vortex filament solutions of the Navier-Stokes equations

Abstract:

From Helmholtz to vaping hipsters, the dynamics of vortex filaments, i.e. fluids with vorticity concentrated along a smooth curve, has been a topic of significant interest in fluid dynamics. The global well-posedness of vortex filaments with small circulation follows from the theory of mild solutions of the 3d Navier-Stokes equations at critical regularity. However, for filaments with large circulation these results no longer apply. In this talk we discuss a proof of well-posedness (in a suitable sense) for vortex filaments of arbitrary circulation. Besides their physical interest, these results are the first to give well-posedness in a neighborhood of large self-similar solutions of the 3d Navier-Stokes without additional symmetry assumptions. This is joint work with Jacob Bedrossian and Pierre Germain.

Host: Tarek Elgindi

Thursday, February 14, 2019

11:00 AM

AP&M 7421
