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Speaker: Dr. Yuchen Wang
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On the concentrated vorticity in the incompressible Euler equation and related models

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Abstract

In this talk, we shall focus on a special class of vortex structures in inviscid fluids called concentrated vorticity, in which the vortical domain is compactly supported on some small regions. Through a perturbative argument, we prove the existence of steady solutions of the 2-D incompressible Euler equation which are highly concentrated near some given points, and obtain a more precise leading term. These solutions are locally uniqueness with prescribed vortex profiles. Moreover, we study the local dynamics on vortex patches and obtain exponential trichotomy on the linearized patch dynamics. Some stability/instability results are given. If time permits, we shall report our recent results concerning concentrated vorticity in the gSQG equation, 2-D capillary-gravity waves and incompressible Euler equation on closed surfaces.