Contour dynamics for 2D active scalars

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Abstract:
In this talk we discuss two free boundary problems given by fluid domains which are weak solutions of incompressible equations. We consider the contour dynamics Muskat problem and the evolution of a sharp front by the 2D surface Quasi-geostrophic equation. Both systems are described by means of a transport equation for the active scalar $\rho(x,t)$ which takes constant values on complementary domains. The velocity field is determined by $\rho(x,t)$ by singular integral operators. However the solutions of these two physical scenarios have completely different outcomes regarding well-posedness and regularity issues.

References:


