报告题目：Mixing, dissipation enhancement, and their application to advective Cahn-Hilliard equation

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报告地点：光华楼东主楼 1801 室

报告摘要： Mixing and dissipation enhancement are two closely related concepts in the study of incompressible fluid flows, with broad applications across disciplines. In this talk, I will first introduce the key ideas and recent developments in these areas. I will then explain how these concepts can be applied to the study of the advective Cahn-Hilliard equation (ACHE), which describes phase separation in a binary alloy under the influence of advection. We establish two main results. First, on two- and three-dimensional torus, we show that if the underlying flow is sufficiently mixing — quantified in terms of dissipation time — then phase separation is completely suppressed, and the solution converges exponentially to its spatial mean in the L^2 sense. Second, we show that in the presence of strong shear flows on the two-dimensional torus, the ACHE exhibits a dimension-reduction phenomenon: its long-time dynamics asymptotically approaches that of a one-dimensional Cahn-Hilliard equation. I will conclude the talk by discussing

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