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Yuanyuan Feng* (yuanyuaf@andrew.cmu.edu), 6113 Wean Hall, 5000 Forbes Avenue,
Pittsburgh, PA 15213. *Dissipation enhancement by mixing.*

Diffusion and mixing are two fundamental phenomena that arise in a wide variety of applications ranging from micro-fluids to meteorology, and even cosmology. In incompressible fluids, stirring induces mixing by filamentation and facilitates the formation of small scales. Diffusion, on the other hand, efficiently damps small scales and the balance between these two phenomena is the main subject of our investigation. I will talk about the interaction between diffusion and mixing in both continuous, and discrete time setting. In discrete time, we consider a mixing dynamical system interposed with diffusion. In continuous time, we consider the advection diffusion equation where the advecting vector field is assumed to be sufficiently mixing. The main results of this talk is to estimate the dissipation time and energy decay based on assumption quantifying the mixing rate. (Received September 25, 2018)