Two applications of the shear flow-induced enhanced dissipation. Preliminary report.

In this talk, I will discuss two applications of the enhanced dissipation effect induced by shear-flow mixing. The first application involves the suppression of nonlinear blow-up in the Patlak-Keller-Segel type equations. It is well-known that classical Patlak-Keller-Segel equations form Dirac type singularities when the total mass is above a critical threshold. By introducing external shear flow, it is possible to suppress this potential blow-up scenario. The second application is on reaction enhancement through the shear flow. (Received August 10, 2020)