
We quantitatively study the interaction between diffusion and mixing in both the 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 flow of the advecting vector field is assumed to be sufficiently mixing. Our main focus is to explicitly estimate the dissipation time based on the mixing rate. Moreover, in the discrete time setting, we show that the $L^2$ energy decays double exponentially in time, and this double exponential rate is achieved for by a large class of toral automorphisms. (Received August 20, 2018)