Resonant chaotic mixing in cellular flows DMITRI VAINCHTEIN, JOHN WIDLOSKI, ROMAN GRIGORIEV, Georgia Tech — We present a quantitative theory of resonant mixing in time-dependent volume-preserving $3D$ flows using a model cellular flow as an example. Specifically, we show that chaotic advection is dramatically enhanced by a time-dependent perturbation for certain resonant frequencies. We compute the fraction of the mixed volume as a function of the frequency of the perturbation and show that essentially complete mixing in $3D$ is achieved at every resonant frequency.

Roman Grigoriev
Georgia Tech

Date submitted: 02 Aug 2007   Electronic form version 1.4