Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Targeted mixing in an array of alternating vortices XAVIER LEONCINI, CPT-Université de Provence, ROMAIN BACHELARD, CPT-Université de la Méditerranée, TOUSIA BENZEKRI, CPT, CRISTEL CHANDRE, CPT, CNRS, MICHEL VITTOT, CPT-CNRS, NONLINEAR DYNAMICS TEAM AT CPT TEAM — Transport and mixing properties of passive particles advected by an array of vortices are investigated. Starting from the integrable case, it is shown that a special class of perturbations allows one to preserve separatrices which act as effective transport barriers, while triggering chaotic advection. In this setting, mixing within the two dynamical barriers is enhanced while long range transport is prevented. A numerical analysis of mixing properties depending on parameter values is performed; regions for which optimal mixing is achieved are proposed. Robustness of the targeted mixing properties regarding errors in the applied perturbation are considered, as well as slip/no-slip boundary conditions for the flow.

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Date submitted: 09 Aug 2007 Electronic form version 1.4