

Topological properties of turbulence in thin films: direct numerical simulations with Ekman friction

Prasad Perlekar^{1, 2} and Rahul Pandit²

¹Technische Universiteit Eindhoven, P.O. Box 513, 5600 MB Eindhoven, The Netherlands

²Centre for Condensed Matter Theory, Department of Physics, Indian Institute Of Science, Bangalore 560012, India

We present a detailed direct numerical simulation (DNS) of the two-dimensional Navier-Stokes equation with the incompressibility constraint and air-drag-induced Ekman friction; our DNS has been designed to investigate the combined effects of walls and such friction on turbulence in forced thin films. We concentrate on the forward-cascade regime and study the probability distribution function of the Weiss parameter, which distinguishes between regions with centers and saddles. Our results are in quantitative agreement with experiments.

Ref: P. Perlekar and R. Pandit, *New J. Phys.*, **11** 073003 (2009).