Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Numerical analysis of rough wall effect on lid-driven cavity flow using Lattice Boltzmann Method ARMAN SAFDARI, Pusan Natl Univ, S. M. REZA ATTARZADEH, Concordia Univ, KYUNG CHUN KIM, Pusan Natl Univ — In this paper, the numerical investigation of two dimensional incompressible flow in a lid-driven cavity with series of squared roughness on the basal wall is carried out. Understanding the dynamic of fluid-particles interaction is of interest in different industrial applications such as sedimentation process. Two numerical methods are applied for validation purpose: Transient modeling based on Finite Volume Method, and Lattice Boltzmann method based on the discrete Boltzmann equation. The flow field is investigated for range of Reynolds number; 100, 700 and 1000 using a fine grid mesh around the roughened wall. The effect of wall-roughness as an influencing parameter on formation of the central vortex inside the cavity is investigated. It is shown that the size of the downstream secondary eddies become smaller with either increasing Reynolds number or increasing the number of roughed features. Dominant effect of secondary eddies were observed by increasing the size of the wall roughness which mimics the influence of sedimented particles inside a cavity. Interesting features of the flow, cavity features and the boundary conditions are discussed in details.

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Date submitted: 31 Jul 2015 Electronic form version 1.4