

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

A lattice Boltzmann code for direct numerical simulation of skin-friction drag reduction by superhydrophobic surfaces in turbulent channel flow AMIRREZA RASTEGARI, RAYHANEH AKHAVAN, University of Michigan — A lattice Boltzmann code for direct numerical simulation of flow over superhydrophobic surfaces has been developed. The code solves the Boltzmann equation for two different sets of particle distribution functions based on the Shan and Chen model [1], to account for the gas-liquid interactions. The immiscibility and inter-phase interactions are controlled through an interaction body force between the distribution functions. The recently proposed model of Hunag et al. [2] is used to set the contact angle in the simulations, in which by tuning the values of the interaction force, one can control the contact angle at the interfaces, simulating hydrophobicity or superhydrophobicity on the solid walls. Test results in channel flow will be presented and discussed.

[1] X.Shan and H.Chen, Phys. Rev. E, **47(3):1815** (1993)

[2] H.Huang, D.T.Throne, M.G.Schaap, and M.C.Sukop, Phys. Rev. E, **76:066701** (2007)

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Date submitted: 04 Aug 2010

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