

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**Turbulence modification in a turbulent particle laden channel flow with geometric perturbations in one wall**<sup>1</sup> JESUS RAMIREZ-PASTRAN, CARLOS DUQUE-DAZA, Department of Mechanical and Mechatronic Engineering, Universidad Nacional de Colombia — Experiments and numerical simulations of particle-laden flows have shown that wall-roughness level in a turbulent channel flow affects the statistics of both phases. It seems then that induction of geometric perturbations on the channel walls would allow modifying and controlling the particles distribution aiming to enhance processes of heat transfer and particle transport. In this work, Large Eddy Simulations were used to evaluate the effect of two different geometric arrangements (protuberances as well as cavity disturbances) on the particles distribution and the turbulent behavior of a particle laden channel flow. The goal of this work is to evaluate the possibility of controlling the particles distribution and the modification of turbulence by introducing geometric perturbations in one wall. The geometric perturbations are located at the bottom wall of the channel and imposed perpendicularly to the main flow. Measurements of kinetic energy budgets terms, particle concentration profiles, coherent structures, as well as an energetic balance are shown. Results seem to indicate that the geometric perturbations affect considerably the distribution of particles, the turbophoresis effect, as well as the turbulent behavior of the flow.

<sup>1</sup>Acknowledgement to Colciencias for supporting this project

Jesus Ramirez-Pastran  
Universidad Nacional de Colombia

Date submitted: 02 Aug 2017

Electronic form version 1.4