

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Effect of Surface Roughness on heat transfer in a Turbulent Channel Flow STEFANO LEONARDI, BENJAMIN CRUZ PEREZ, JOHN LUCENA, University of Puerto Rico at Mayaguez — DNSs are carried out for passive heat transport in a turbulent channel flow with surface roughness on the wall. The total heat transfer depends on the pitch to height ratio of the roughness. Several configurations have been studied, square bars, circular cylinders, V-shaped turbulators, segmented V-shaped turbulators, with and without fillets. A parametric study has been performed with the aim of finding the configuration with the largest heat transfer and the minimum drag. The effect of placing the roughness surfaces on both walls or only on one wall is also considered. For transverse square bars, ejections occurring on the leading edge of the roughness elements enhance the heat transfer. On the other hand, when V-shaped turbulators are placed on the wall a secondary motion is induced which is responsible of removing heat from the wall. Applications in turbine engines will be discussed at the conference.

Stefano Leonardi
University of Puerto Rico at Mayaguez

Date submitted: 05 Aug 2010

Electronic form version 1.4