

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Buoyancy induced modification of the law-of-the-wall in an unstably stratified turbulent channel flow FEDERICO TOSCHI, Eindhoven University of Technology, ANDREA SCAGLIARINI, University of Rome Tor Vergata, HALLDOR EINARSSON, ARMANN GYLFASSON, School of Science and Engineering, Reykjavik University — We present results on the influence of buoyancy on the boundary layer dynamics and on mean quantities, like velocity profiles, in an unstably stratified turbulent channel flow. The study is based on direct numerical simulations where we investigated a broad range of friction Reynolds numbers and Rayleigh numbers. We primarily focused on the modification of the logarithmic law of the wall, due to buoyancy, and we provide a simple phenomenological model that is able to capture the observed deviations, in the log-law region, from the usual neutral case.

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Date submitted: 27 Jul 2015

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