High Rayleigh Number Convection in a Slender Cylinder for Prandtl Number of 1[1] JANET SCHEEL, Occidental College, KARTIK IYER, New York University, JOERG SCHUMACHER, Technische Universitaet Ilmenau, KATEPALLI SREENIVASAN, New York University — We report results from direct numerical simulations of turbulent Rayleigh-Bénard convection for a Prandtl number of 1 and aspect ratio of 0.1, with Rayleigh numbers varying from 1×10^8 to 1×10^{14}, and possibly higher. We present the dependence of the heat transport (the Nusselt number) and momentum transport (the Reynolds number) on the Rayleigh number for this parameter regime. We will also discuss the global structure of the convection flow and details of the increasingly intermittent boundary layer dynamics. Various strategies for improving the efficiency of statistical convergence will also be presented.

Janet Scheel
Occidental College

Date submitted: 24 Jul 2019   Electronic form version 1.4