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Global and local statistics in turbulent convection at low Prandtl numbers JANET SCHEEL, Occidental College, JOERG SCHUMACHER, TU Ilmenau — Very high resolution direct numerical simulations (DNS) of turbulent Rayleigh-Benard Convection (RBC) for low Prandtl numbers which are typical for liquid metals such as mercury/gallium (0.021) or sodium (0.005) will be presented. The scaling of global momentum and heat transport is determined and compared to experimental and theoretical results. We also present mean profiles of root-mean-square velocity and vorticity as well as the thermal and kinetic energy dissipation rates. The velocity boundary layer is found to be much thinner than the thermal boundary layer, and the consequences of this for the heat transport as well as the nature of turbulence in RBC will also be discussed. Finally we investigate the skin friction coefficient and shear Reynolds numbers for these systems. Results will also be compared and contrasted with results from DNS for Prandtl numbers of 0.7 and 6.0 and similar Rayleigh numbers.

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