Rayleigh-Bénard convection with side wall heating  JUN ZHANG, Courant Institute, NYU; NYU Shanghai, JINZI (MAC) HUANG, Courant Institute, NYU — As an important mechanism of heat transfer in fluids, Rayleigh-Bénard convection (RBC) has been thoroughly studied in the past. In this talk, we examine the effect of heating from one vertical sidewall in an otherwise classical RBC in a cubic domain. With side heating introduced, experiment performed at high Rayleigh number shows a decrease of Nusselt number, while the speed of large scale circulation is enhanced due to the upwelling flow generated along the heated wall. Through the measurement of thermal boundary layers, we find that their thickness at both the top and bottom plates stay unaffected as long as the bottom heating power is fixed, while the bulk temperature increases with the side heating. Since we have now a non-isothermal boundary condition on the heated wall, we also discuss a modified definition of Nu that takes into account of the heat injection from the side.

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