Large-scale circulation and Nusselt number in turbulent rotating Rayleigh-Bénard convection.[1] JIN-QIANG ZHONG, UCSB, RICHARD STEVENS, U. Twente, HERMAN CLERCX, Eindhoven U. Tech., DETLEF LOHSE, U. Twente, GUENTER AHLERS, UCSB — We present measurements of the large-scale circulation (LSC) and the Nusselt number Nu of turbulent Rayleigh-Bénard convection in a cylindrical cell of aspect ratio 1 and rotated about a vertical axis at a rate Ω. The side-wall temperatures at eight equally spaced azimuthal positions in the horizontal mid- plane were fit to a cosine function that gave the azimuthal LSC orientation $\theta(t)$ (t is the time), the temperature amplitude $\delta(t)$, and the rms amplitude $\delta T(t)$ of the fluctuations about the fits. The LSC precessed in an azimuthal direction opposite to that of the imposed rotation. The precession rate $\omega = d\theta/dt$ showed a sharp transition at a Rossby number $Ro^* \simeq 2.5$. As Ω increased, $< \delta(t) >_t$ decreased and $< \delta T(t) >_t$ increased beginning at Ro^*. At Ro^* Nu began to increase with increasing Ω. At high Ro $|\omega|$ was proportional to but much smaller than Ω.

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