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Effect of the Earth's Coriolis force on the large-scale circulation of turbulent Rayleigh-Bénard convection[1] ERIC BROWN, GUENTER AHLERS, Department of Physics and iQCD, University of California, Santa Barbara, CA 93106 — We present measurements of the large-scale circulation (LSC) of turbulent Rayleigh-Bénard convection in water-filled cylindrical samples of heights equal to their diameters. The LSC consists of a single convection cell circulating in a near- vertical plane. Its azimuthal orientation $\theta_0(t)$ had an irregular time dependence, but revealed a net azimuthal rotation with an average period of about 3 days for Rayleigh numbers $R \gtrsim 10^{10}$. On average there was also a tendency for the LSC to be aligned with upflow to the west and downflow to the east, even after physically rotating the apparatus in the laboratory. The rate of azimuthal rotation and the probability distribution $P(\theta_0)$ could be calculated from a model of diffusive azimuthal meandering in a potential due to the Earth's Coriolis force.

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