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Boundary Zonal Flow (BZF) in rotating turbulent convection[1]
EBERHARD BODENSCHATZ, XUAN ZHANG, Max Planck Insitute for Dynamics and Self-Organization, DENNIS VAN GILS, University of Twente, SUSANNE HORN, Coventry University, MARCEL WEDI, LUKAS ZWIRNER, Max Planck Insitute for Dynamics and Self-Organization, GUENTER AHLERS, University of California at Santa Barbara, ROBERT ECKE, Los Alamos National Laboratory, STEPHAN WEISS, OLGA SHISHKINA, Max Planck Insitute for Dynamics and Self-Organization, INTERNATIONAL COLLABORATION FOR TURBULENCE RESEARCH COLLABORATION — We report the discovery and overall properties of a wall-localized mode of turbulent,rotating thermalconvection,denotedas a boundary zonal flow (BZF). We useboth direct numerical simulation and experimental measurements to investigate the BZFmode thatemerges strongly in cylindrical cells with diameter to height ratios $\Gamma < 1$ and thatappears to play a similar role for rotating convection as doesthe large scale circulation (LSC) of non-rotating convection. The coherentprecessing structure of the BZF is manifest in bimodal temperature distributions and in very significant concentration of vertical heat transport near the boundary. The consequences of the BZF for the study of turbulent rotating thermal convection are discussed.

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