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**Symmetry-breaking bifurcations of central forced and heated convection in a spherical fluid shell** L.S. TUCKERMAN, PMMH-ESPCI-CNRS, F. FEUDEL, K. BERGEMANN, Universitat Potsdam, Germany, C. EGBERS, B. FUTTERER, BTU Cottbus, Germany, M. GELLERT, Astrophysikalisches Institut Potsdam, Germany, R. HOLLERBACH, University of Leeds — We study convection in a spherical shell under a gravitational force designed to mimic the GeoFlow microgravity experiment, using a combination of time-dependent simulation and path-following methods. With an outer radius which is twice that of the inner radius, the critical modes are spherical harmonics with $\ell = 4$, leading generically to transcritical bifurcations involving axisymmetric and octahedral branches, in agreement with predictions by Michel, Ihrig & Golubitsky, Chossat, Matthews, and Busse & Riahi. A secondary bifurcation involving the $\ell = 5$ mode leads to an additional seven-cell branch. All three steady patterns are simultaneously stable for $7150 < Ra < 17450$. For $Ra > 18710$, simulations lead to time-dependent states, some periodic and some chaotic. The period varies greatly: some of the orbits belong to different branches and a global bifurcation is suspected of delimiting the lower limit of periodic states.

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