
flow reversals and intermittency for the (3,4) mode interaction of the spherical Rayleigh Bénard convection

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Abstract

The aim of the paper is to find and analyze intermittent flow reversals in the spherical Rayleigh-Bénard problem. The (3,4) mode interaction near the onset of convection is studied using amplitude equations by the center manifold reduction. We showed the existence of aperiodic flow reversals involving non-axisymmetric state-states, namely with octahedral symmetry.

These dynamics are related to the existence of heteroclinic cycles of steady-states. The spherical symmetry plays a crucial role in their existence. The heteroclinic cycles may be not stable and intermittencies between flow reversals and chaotic dynamics are observed.

Keywords: Reversals, Spherical Rayleigh, Bénard convection, Symmetry, breaking, Equivariant bifurcations, Heteroclinic cycles, Intermittency, chaos

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