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Multi-Scale Coherent Structure Interactions in Rayleigh-Benard Convection PHILIP SAKIEVICH, YULIA PEET, RONALD ADRIAN, Arizona State Univ — Rayleigh-Benard convection (RBC) is characterized by a rich set of coherent structures. One of the most notable and widely recognized structures in RBC is the large scale circulations, or roll-cells. Roll-cells are identified by large circulatory currents that can span the boundaries of the domain. For domains with aspect ratios (AR) of less than two there is generally only one roll-cell present, but as the AR grows the number of roll-cells increase. Currently little is known about the physical dynamics of multiple roll-cell interactions and their effects on the smaller scale structures such as thermal plumes and waves. In the current presentation we present visualizations from a direct numerical simulation of turbulent RBC in a wide AR cell. We identify multiple roll-cells and track the evolution of smaller scale coherent structures as they develop inside the larger scale roll-cells. In this simulation a cylindrical domain with an AR of 6.3 is used with Prandtl and Rayleigh numbers of 6.3 and $9.6*10^7$ respectively. The spectral element code Nek5000 is used for simulation.

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