

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Temporal dynamics and mode transition in a turbulent Rayleigh-Bnard Convection in a cylindrical domain with a moderate aspect ratio¹

YULIA PEET, Arizona State University, PHILIP SAKIEVICH, Sandia National Laboratory, RONALD ADRIAN, Arizona State University — The current study focuses on dynamics and evolution of large-scale motions in a turbulent Rayleigh-Bnard convection in a cylindrical domain with a moderate aspect ratio of 6.3. We perform Direct Numerical Simulations of the problem with a spectral-element code, and analyze the temporal dynamics of the azimuthal Fourier modes associated with the large-scale motions. Focusing on the first several modes, we document the processes that govern their evolution and interactions, including the in-mode processes, such as fast and slow rotations, as well as inter-mode interactions associated with the mode cessations and transitions. Time scales associated with these processes are analyzed.

¹NSF CBET 1335731, NSF CBET 1707075

Yulia Peet
Arizona State University

Date submitted: 31 Jul 2019

Electronic form version 1.4