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Role of symmetry in inertial wave and mode excitations[1] PALOMA GUTIERREZ-CASTILLO, University of California, Davis, JUAN M. LOPEZ, Arizona State University — The flow in a rapidly rotating cylinder split in half, with the rotation in the two halves modulated harmonically with a small amplitude is studied numerically. We consider modulation frequencies ranging from zero to twice the background rotation frequency, so that the system supports inertial waves. The split in the cylinder at mid-height provides a localized perturbation from which inertial wave beams emanate, but so too do the corners where the thin modulated endwall and sidewall boundary layers meet providing localized perturbations to the rapid background rotation due to the mismatch in their fluxes. Inertial wave beams from the corners are more intense than those from the split at the cylinder mid-height. Due to finite viscosity and nonlinear flow conditions, the wave beams produce intricate patterns formed by constructive and destructive interference as they self intersect and reflect off cylinder boundaries and the axis. A phase difference between the modulations of the two cylinder halves is also imposed. The phase difference impacts the symmetries of the system and its response to the modulations. In particular, some low-order Kelvin modes are driven resonantly, and their selection depends not only on the frequency but also on the phase of the differential modulation.

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