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Wake modes of rotationally oscillating cylinders PRABU SELLAPPAN, TAIT POTTEBAUM, University of Southern California — Vortex shedding from bluff bodies is a fundamental problem in fluid mechanics and is important in applications such as vortex-induced vibration, heat transfer, and as a test for control strategies. Prior work has focused on vortex shedding from cylinders in cross flow and cylinders undergoing transverse or streamwise oscillations. Vortex shedding from a rotationally oscillating cylinder and the different wake modes that are produced have been investigated in this study. Experiments were carried out in a water tunnel at Re=750 for various amplitudes and frequencies of rotational oscillations. DPIV was used to study and map the different wake modes within the parameter space. Results show the mapping of wake modes to regions of the parameter space ranging from 0.7 to 3 times the natural shedding frequency and peak-to-peak rotational oscillation amplitudes from 5° to 160°. The wake modes and the regions in which they occur are compared with scalar measurements previously reported in the literature. Further utilization of the wake mode map will include understanding heat transfer from rotationally oscillating cylinders.

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