Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

2P or not 2P? JASON DAHL, ERDEM AKTOSUN, University of Rhode Island — The characterization of modes in the wake of an oscillating cylinder in a free stream has become a common method for describing the spatial variation of vorticity and coherent vortices in these wakes. Arguably, the most commonly observed wake modes come from the classification of Williamson and Roshko (1988) for a cylinder oscillating in the crossflow direction with definitions such as '2S' to describe two single vortices shed per cycle of motion and '2P' to describe two pairs of opposite rotating vortices shed per cycle. When a cylinder is allowed to move in both the in-line and cross-flow direction, however, these simplified classifications of the wake become muddled, as the phasing and pinch-off of vortices can result in intermediate wakes that might fall in between typically observed wake modes, form new complex combinations of vortices, or form strongly three-dimensional wakes with little coherent vortex structure in a 2-D plane. Through a series of forced motion experiments of a circular cylinder undergoing forced in-line and cross-flow motion in a free stream, this complex wake variability is demonstrated, with focus particularly on formation of the '2P' mode, leading to the question: 2P or not 2P?

Jason Dahl
University of Rhode Island

Date submitted: 24 Jul 2019 Electronic form version 1.4