Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Wake structure of an oscillating cylinder in a flowing soap film MARK STREMLER, WENCHAO YANG, Virginia Tech — When a circular cylinder oscillates with respect to a uniform background flow, a variety of wake patterns can be observed in which multiple vortices are generated during each shedding cycle. Thorough investigations of the possible wake patterns behind a cylinder undergoing forced oscillations have been conducted by C.H.K. Williamson using two-dimensional characterization of a three-dimensional flow. Attempts to reproduce the structural bifurcations using two-dimensional computational models have been only moderately successful. A flowing soap film, an experimental system with quasi-two-dimensional flow, provides an alternative method for investigating the role of system dimensionality in the structure and dynamics of complex vortex wakes. Wake patterns are observed directly through interference fringes caused by thickness variations in the soap film. Such systems have been used for decades to visualize wake structure, but they have not previously been used to conduct an analog of Williamson's work. We will discuss the results of an ongoing parametric study of the wake structure produced by a circular cylinder undergoing forced oscillations transverse to the background flow in an inclined soap film system.

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Date submitted: 01 Aug 2016 Electronic form version 1.4