Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Effect of Wall Suction on Cross-Flow Absolute Instability of a Rotating Disk Boundary Layer JOANNA HO, THOMAS CORKE, ERIC MATLIS, University of Notre Dame — The effect of uniform suction on the absolute instability of Type I cross-flow modes on a rotating disk is examined. Specifically it investigates if wall suction transforms the absolute instability into a global mode as postulated in the numerical simulations of Davies and Carpenter (2003). The experiment is designed so that a suction parameter of $a = \bar{W}_0/(\nu\omega)^{1/2} = 0.2$ locates the absolute instability critical Reynolds number, $R_{c_a} = 650$, on the disk. Uniform wall suction is applied from R = 317 to 696. The design for wall suction follows that of Gregory and Walker (1950), where an array of holes through the disk communicate between the measurement side of the disk and the underside of the disk in an enclosure that is maintained at a slight vacuum. The measurement surface is covered by a 20 micron pore size Polyethylene sheet. Temporal disturbances are introduced using the method of Othman and Corke (2006), and the evolution of the resulting wave packets are documented. The present results indicate a rapid transition to turbulence near R_{c_a}.

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Date submitted: 31 Jul 2014 Electronic form version 1.4