

Abstract Submitted  
for the DFD13 Meeting of  
The American Physical Society

**Energy Harvesting from an Oscillating Flat Plate in a Uniform Flow** BENJAMIN STROM, Brown University, JENNIFER FRANCK, KENNETH S. BREUER, Brown University, Providence RI — A flat plate of aspect ratio 4.12 was pitched sinusoidally about the center chord in a uniform flow over a range of frequencies, amplitudes and mean angles of attack with the objective of studying the system's energy harvesting capabilities. Energy transfer from the fluid to plate, calculated from the torque and angular position, was found to be positive over a wide range of pitching parameters with an optimal mean angle of attack of approximately 15 degrees. Energy transfer per cycle was found to correlate linearly with a proposed measure of the total circulation in the leading edge vortex. The characteristic length determining the leading edge vortex strength appeared to differ for angles of attack less than and greater than the optimum. Comparisons with unsteady Large Eddy Simulations give insight into the vortex dynamics and mechanisms of energy transfer.

Benjamin Strom  
Brown University, Providence RI

Date submitted: 25 Jul 2013

Electronic form version 1.4