

Abstract Submitted  
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**Interaction of the Leading Edge Vortex and Shear Layer Vortices for an Airfoil Undergoing Dynamic Stall**<sup>1</sup> DOUGLAS BOHL, Clarkson University, MELISSA GREEN, Syracuse University — The flow field around a NACA0012 airfoil undergoing large amplitude sinusoidal pitching is investigated using Particle Image Velocimetry (PIV). The airfoil is pitched symmetrically about the quarter chord point with a peak angles of 40, 30, and 20 at reduced frequencies of  $k = 0.2-0.6$  and  $Re_c = 12000$ . In all cases a strong leading edge vortex (LEV) is formed with 2-3 weaker shear layer vortices (SLV) also forming along the airfoil surface. In some cases the LEV and the nearest SLV combine. In other cases SLV's combine. And finally in some cases the vortices remain independent of each other. The data suggest the formation a topological saddle forms between the two vortices that correlates with events in which the two vortices combine. The saddle appears below the center of the weaker vortex and moves relative to the vortices as they interact. The vortices are found to combine when the saddle moves above the center of the weaker vortex. The vortices remain distinct when no saddle appears. The data show that the interaction of the LEV and its nearest SLV occurs only for a limited range of the parameter space investigated.

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