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The Dynamics of Spanwise Vorticity on a Rotating Blade in Unsteady Flow CRAIG WOJCIK, JAMES BUCHHOLZ, The University of Iowa — Spanwise flow driven by accelerations on rotating blades is known to influence the aerodynamic forces and moments in flapping flight and wind turbine aerodynamics compared with wings and airfoils that are stationary or oscillated in a planar motion. This difference is largely attributed to the resulting prolonged attachment of the leading edge vortex in the rotating case. In this experimental study, we consider the nature and dynamics of spanwise vorticity shed from the leading- and trailing edges of a spinning propeller that is yawed with respect to the free stream. Phase-averaged Digital Particle Image Velocimetry is used to interrogate the flow. The effects of tip speed ratio and yaw angle on development and strength of the shed structures will be discussed.

James Buchholz
The University of Iowa

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