

Abstract Submitted  
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**A Stereo PIV Study on the Wake Characteristics behind Dual-Rotor Wind Turbines**<sup>1</sup> HUI HU, ZHENYU WANG, WEI TIAN, Iowa State university — We report an experimental study to investigate the aeromechanics and wake characteristics of dual-rotor wind turbines (DRWTs) with co- and counter-rotating configurations, in comparison to those of a conventional single-rotor wind turbine (SRWT). The experiments were performed in a large-scale Aerodynamic/Atmospheric Boundary Layer (AABL) wind tunnel under neutral stability conditions. In addition to measuring the power outputs and dynamic wind loads acting on the SRWT and DRWT systems, a stereoscopic PIV was used for detailed wake flow field measurements (free-run and phase-locked) to quantify the characteristics of the turbulent turbine wake flow and to reveal visualize the evolution of the unsteady vortex structures in the wakes of DRWTs, in comparison with those behind a conventional SRWT systems. The detailed flow field measurements are correlated with the dynamic wind loads and power output measurements to elucidate underlying physics for higher total power yield and better durability of the wind turbines.

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