Abstract Submitted for the DFD17 Meeting of The American Physical Society

Wake characteristics of wind turbines in utility-scale wind farms<sup>1</sup> XIAOLEI YANG, Stony Brook University, DANIEL FOTI, University of Minnesota, FOTIS SOTIROPOULOS, Stony Brook University — The dynamics of turbine wakes is affected by turbine operating conditions, ambient atmospheric turbulent flows, and wakes from upwind turbines. Investigations of the wake from a single turbine have been extensively carried out in the literature. Studies on the wake dynamics in utility-scale wind farms are relatively limited. In this work, we employ large-eddy simulation with an actuator surface or actuator line model for turbine blades to investigate the wake dynamics in utility-scale wind farms. Simulations of three wind farms, i.e., the Horns Rev wind farm in Denmark, Pleasant Valley wind farm in Minnesota, and the Vantage wind farm in Washington are carried out. The computed power shows a good agreement with measurements. Analysis of the wake dynamics in the three wind farms is underway and will be presented in the conference.

<sup>1</sup>This work was support by Xcel Energy (RD4-13). The computational resources were provided by National Renewable Energy Laboratory.

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Date submitted: 27 Jul 2017

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