Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Structure Function Scaling Exponent and Intermittency in the Wake of a Wind Turbine Array[1] ALEKSANDR ASEYEV, NASEEM ALI, RAUL CAL, Portland State University — Hot-wire measurements obtained in a 3×3 wind turbine array boundary layer are utilized to analyze high order structure functions, intermittency effects as well as the probability density functions of velocity increments at different scales within the energy cascade. The intermittency exponent is found to be greater in the far wake region in comparison to the near wake. At hub height, the intermittency exponent is found to be null. ESS scaling exponents of the second, fourth, and fifth order structure functions remain relatively constant as a function of height in the far-wake whereas in the near-wake these highly affected by the passage of the rotor thus showing a dependence on physical location. When comparing with proposed models, these generally over predict the structure functions in the far wake region. The pdf distributions in the far wake region display wider tails compared to the near wake region, and constant skewness hypothesis based on the local isotropy is verified in the wake.

[1]CBET-1034581

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Date submitted: 01 Aug 2015 Electronic form version 1.4