Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Influence of realistic atmospheric forcings on wind turbine wake interactions[1] MITHU DEBNATH, KIRAN BHAGANAGAR, University of Texas, San Antonio — Atmospheric boundary layer structure is dictated by the stratification of the atmosphere; hence stratifications effects are critical in accurate representation of wind turbine wake physics. Large eddy simulation (LES) has been used to resolve atmospheric boundary layer turbulence and the wind turbine (WT) wake turbulence structures. The effect of atmospheric stratification on the evolution of tip and root vortices has been analyzed. For the first time, mutual induction mode of vortex instability leading to vortex merging in the wind turbine wake has been demonstrated under realistic ABL conditions. Vortex merging leads to enhanced Reynolds stresses and increased mixing. Finally, the effect of the turbulent mixing due to the shear layer on power production is analyzed

[1]National Science Foundation, CBET Energy for Sustainability

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Date submitted: 31 Jul 2014 Electronic form version 1.4