Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Description of signature scales in a floating wind turbine model wake subjected to varying turbulence intensity. HAWWA KADUM, Portland State University, STANISLAV ROCKEL, MICHAEL HOLLING, JOACHIM PEINKE, University of Oldenburg, RAUL BAYON CAL, Portland State University — The wake behind a floating model horizontal axis wind turbine during pitch motion is investigated and compared to a fixed wind turbine wake. An experiment is conducted in an acoustic wind tunnel where hot-wire data are acquired at five downstream locations. At each downstream location, a rake of 16 hot-wires was used with placement of the probes increasing radially in the vertical, horizontal, and diagonally at 45 deg. In addition, the effect of turbulence intensity on the floating wake is examined by subjecting the wind turbine to different inflow conditions controlled through three settings in the wind tunnel grid, a passive and two active protocols, thus varying in intensity. The wakes are inspected by statistics of the point measurements, where the various length/time scales are considered. The wake characteristics for a floating wind turbine are compared to a fixed turbine, and uncovering its features; relevant as the demand for exploiting deep waters in wind energy is increasing.

Hawwa Kadum
Portland State University

Date submitted: 01 Aug 2017 Electronic form version 1.4