Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Impact of surface roughness on the turbulent wake flow of a turbine blade KAREN MULLENERS, Leibniz Universitaet Hannover — Roughened aero engine blade surfaces lead to increased friction and reduced efficiency of the individual blades. The surface roughness also affects the wake flow of the blade and thus the inflow conditions for the subsequent compressor or turbine stage. To investigate the impact of surface roughness on a turbulent blade wake, we conducted velocity field measurements by means of stereo Particle Image Velocimetry (PIV) in the wake of a roughened turbine blade in a linear cascade wind tunnel. The turbine blade was roughened at different chord-wise locations. We examined the influence of the chord-wise location of the added surface roughness by comparing their impact on the width and depth of the wake, the positions and distribution of vortical structures and the overall circulation in the wake. The associated variations in the wake's turbulence characteristics including Reynolds stresses were also explored.

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Date submitted: 02 Aug 2013 Electronic form version 1.4