

Abstract Submitted  
for the DFD09 Meeting of  
The American Physical Society

**Grid turbulence study using particle image velocimetry** J.I. CARDESA-DUENAS, T.B. NICKELS, University of Cambridge — We analyse grid turbulence using two-dimensional Particle Image Velocimetry (PIV) at moderate Reynolds numbers ( $Re_M = 16000$ ). Measurements on two orthogonal planes are taken at several downstream locations in the mature turbulence region. The resolution is within three times the Kolmogorov length scale. This is made possible by working with solid particles in water, where denser seedings can be achieved than with oil droplets in wind tunnels as previously attempted. We deduce four derivative moments which are sufficient to measure dissipation and mean square vorticity assuming axisymmetric turbulence, a far less restrictive assumption than isotropy. The dissipation estimate is compared with that found from the turbulent kinetic energy balance. The tendency towards isotropy from the axisymmetric state is discussed in the light of four determining parameters (Batchelor 1946). Measurements are also taken immediately after the grid, where the vortical structures shed by the grid can be visualised and tracked as they evolve downstream.

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Date submitted: 21 Jul 2009

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