Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

High Spatial Resolution Femtosecond Laser Measurements of Turbulence[1] MATTHEW EDWARDS, ARTHUR DOGARIU, RICHARD MILES, Princeton University — Experimental study of turbulence at length scales smaller than the Taylor microscale can provide unique information about isotropy, homogeneity, and intermittency. We use femtosecond laser electronic excitation tagging (FLEET), an experimentally simple and unseeded molecular tagging method, to probe small-scale turbulent structures in air and nitrogen, measuring velocity with better than 100-micron spatial resolution. At these scales, the density perturbation from the tagging process may influence measured turbulence parameters. Here, we quantify the effect of small perturbations during measurement on the observed statistics of turbulence and explore the spatial limits at which FLEET can be employed.

[1]This research has been supported by AFOSR and an NSF Fellowship

Matthew Edwards
Princeton University

Date submitted: 31 Jul 2014 Electronic form version 1.4