Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Scale-by-scale approach to isotropy in homogeneous turbulent flows JAMISON SZWALEK, WERNER DAHM, University of Michigan — Kolmogorov's local isotropy hypothesis suggests that the increasingly smaller lengths scales in turbulent flows become increasingly independent of the large scales, and at small enough scales the turbulence attains a universal isotropic state. However, within the last 25 years, several researchers have presented evidence for the persistence of anisotropy at scales for which the assumption of local isotropy would be expected to hold. We thus report results from an investigation into the approach to the isotropy on a scale-by-scale basis. We quantify the level of anisotropy at each length scale by analyzing DNS data for homogeneous uniformly-sheared turbulence for several different mean shear rates. Vorticity and strain rate orientations are examined for each wavenumber to provide insight into the physical mechanisms involved in the approach to isotropy.

Jamison Szwalek
University of Michigan

Date submitted: 04 Aug 2005 Electronic form version 1.4