Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Single-point Velocity Statistics YONGGUN JUN, X.L. WU, University of Pittsburgh — The single-point (SP) velocity statistics is investigated in forced and decaying two-dimensional turbulence in a flowing soap film. It is shown that the probability distributin functions (PDF) in both cases deviate from a Gaussian distribution, which is normally anticipated in turbulent fluid flows. In the forced turbulence case, the tail of the SP velcoty PDF decays faster than Gaussian and can be correlated with the forcing statistics on small sclaes. In the decaying turbulence case, the SP velocity PDF evolves from a sub-Gaussion to a super- Gaussian behavior as a function of decaying time. In all times, however, the locally averaged vorticity distribution remains approximately Gaussian. While our forcing data may be explained by the instanton model put forward by Falkovich et al., the decaying turbulence data remain unexplained by theory.

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Date submitted: 15 Jan 2006 Electronic form version 1.4