Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Development of the Dynamic Programming Technique to Analyze BES Fluctuation Data[1] A.J. CREELY, Princeton U., G.R. MCKEE, Z. YAN, U. Wisc.-Madison — Detecting and accurately quantifying turbulence flows is important to understanding turbulent transport dynamics in magnetically confined plasmas. The Dynamic Programming (DP) mathematical technique has been adapted from fluid dynamics to measure rapidly time-varying turbulent flows that arise from radial electric fields and related turbulent processes. The DP technique enables more precise evaluation of the time- and space-resolved velocity of turbulent eddy structures from 2D BES measurements of local long-wavelength density fluctuations than previous Time-Delay-Estimation methods. The method adapts and optimizes a vector-to-vector matching transformation to reveal underlying high-frequency flows. This analysis technique will be tested and applied to the study of interactions between applied magnetic perturbations and Geodesic Acoustic Modes (GAMs), as well as poloidal flow and flow shear dynamics at the L-H transition and during limit cycle oscillations.

[1]This work was supported by the National Undergraduate Fellowship Program in Plasma Physics and Fusion Energy Sciences and the US Department of Energy under DE-FG02-08ER54999 and DE-FC02-04ER54698.

George McKee
U. Wisconsin-Madison

Date submitted: 11 Jul 2013 Electronic form version 1.4