Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Quantifying Kink Mode Dissipation Using Radial Eigenmode Measurements* Y. LIU, G.A. NAVRATIL, D.A. MAURER, M.E. MAUEL, T.S. PEDERSEN, Columbia University — Understanding the magnitude and source of plasma dissipation that governs resistive wall mode rotational stabilization is crucial for the extrapolation of current experimental results to future burning plasma regimes of operation. To date, methods to determine the magnitude of dissipation affecting kink mode dynamics has been through the measurement of the complex damping rate of the mode using MHD spectroscopic techniques [1,2], or by detailed profile measurements of momentum loss as the kink mode evolves in time [3]. Here we present an alternate method to quantify the magnitude of dissipation using measurements of the polodial magnetic field fluctuations associated with the kink's radial eigenfunction. A twenty element, high spatial resolution Hall sensor array was used to measure the kink mode perturbed poloidal fields. Comparison of the relative phase shift of these fluctuations as a function of minor radius with calculations of the expected structure of the kink-RWM eigensystem show a sensitive dependence upon the magnitude of dissipation allowing its quantitative characterization. Estimates of the magnitude of dissipation using these phase shift measurements are in good agreement with previous MHD spectroscopy measurements [1]. *Supported by U.S. DOE Grant DE-FG02-86ER53222 1. M.E.Mauel, *et al.*, Nuc. Fusion, 45, 285 (2005) 2. H. Reimerdes, *et al.*, PRL, 93, 135002 (2004) 3. W. Zhu, *et al.*, PRL, 96, 225002 (2006)

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Date submitted: 22 Jul 2006 Electronic form version 1.4