Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

The Effects of Neutral Damping on Resistive Wall Mode Physics[1]

R. JAMES, US Coast Guard Academy/Stevens Institute of Tech., K. BECKER, Stevens Institute of Tech., J.M. HANSON, M.E. MAUEL, D.A. MAURER, G.A. NAVRATIL, T.S. PEDERSEN, Columbia University — The physics of the dissipation mechanism responsible for rotational stabilization of the resistive wall mode (RWM) continues to be an object of intense current research. On the High Beta Tokamak – Extended Pulse (HBT-EP), there is experimental evidence that edge neutral damping is a significant dissipation mechanism that affects tearing mode behavior [1]. To quantify the possible effect of neutral damping on RWM physics, we have constructed a 15-channel linear photo-detector array to measure Dα emission and its fluctuations. These measurements will be used in conjunction with a 1D space and 2D velocity kinetic transport model of the atomic and molecular deuterium penetration to quantify neutral profiles within the plasma [2]. Initial quantification of the neutral damping contribution to RWM rotational stabilization utilizing the measured Dα profiles to estimate the edge neutral density will be presented.

[1] E. D. Taylor, *et al.,* Phys. Plasmas **9**, 3938 (2002)
[2] B. LaBombard,MIT PSFC RR-00-9, (2000).

[1]Supported by U.S. DOE Grant DE-FG02-86ER53222.

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Date submitted: 23 Jul 2007 Electronic form version 1.4