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

ROYCE JAMES, U.S. Coast Guard Academy/Stevens Inst. Tech., K. BECKER, Polytechnic University, J. HANSON, M.E. MAUEL, Columbia University, D.A. MAUER, Columia University, G.A. NAVRATIL, T.S. PEDERSEN, Columbia University, COLUMBIA UNIVERSITY COLLABORATION, STEVENS INST. OF TECH. COLLABORATION — 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 D_α emission and its fluctuations. These measurements will be used in conjunction with a 1D space, 2D velocity kinetic transport model of the atomic and molecular deuterium penetration to quantify neutral profiles within the plasma [2]. Updates on efforts to measure the neutral damping contribution to RWM rotational stabilization utilizing the measured D_αg 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).

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