Abstract Submitted
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Multimode Structure of Resistive Wall Modes with a Variable Wall Geometry[1] J.P. LEVESQUE, J. BIALEK, P.J. BYRNE, B.A. DEBONO, M.E. MAUEL, G.A. NAVRATIL, N. RATH, D. SHIRAKI, Columbia University — An important instability that limits plasma performance in tokamaks is the resistive wall mode (RWM). When there are two or more unstable modes, or when a mode is near marginal stability, multimode effects may become important [1]. Non-uniformities in the conducting boundary break the toroidal symmetry, and can split the degeneracy of sine and cosine components of rotating modes, introducing multimode effects. We present a systematic study of multimode external kink structure and dynamics in HBT-EP using a high-resolution magnetic sensor set and variable conducting wall geometry [2]. Coherent, non-rigid activity of multiple simultaneous modes is observed using biorthogonal decomposition (BD) with no *a priori* assumptions about mode structure. Modes are stronger when several walls sections are retracted, while spatial shapes of the dominant modes found using BD analysis do not change significantly. Secondary modes are less-significant with respect to the dominant mode for asymmetric wall configurations. Amplitude and rotation modulations are observed with non-uniform wall configurations, and are compared with VALEN predictions.

[1] A.H. Boozer, Phys. Plasmas **10** 1458 (2003)
[2] D.A. Maurer *et al.*, Phys. Plasmas **19** 056123 (2012)

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Jeffrey Levesque
Columbia University

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