

Abstract Submitted
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HBT-EP Program: Active MHD Mode Dynamics & Control¹

G.A. NAVRATIL, S. ANGELINI, J. BIALEK, A.H. BOOZER, P. BYRNE, B. DEBONO, P. HUGHES, J.P. LEVESQUE, L. BI, M.E. MAUEL, D.A. MAURER, Q. PENG, D. RHODES, N. RATH, C. STOAFFER, D. SHIRAKI, Columbia University — The HBT-EP active mode control research program aims to advance understanding of ITER and fusion relevant modular feedback control coil configurations. This poster describes progress with our enhanced active mode control facility (i) to quantify external kink dynamics and multimode response to applied magnetic perturbations, (ii) to understand the relationship between control coil configuration, conducting and ferritic wall effects, and active feedback control effectiveness, and (iii) to explore advanced feedback algorithms and internal feedback control coil configurations. Initial results show the first high-resolution detection of 3D multi-mode magnetic response of wall-stabilized tokamak discharges. Our successful multiple-input/output (MIMO) digital control system has been improved using a GPU. Combined with improved capability from the VALEN 3D feedback modeling code, we aim to optimize the use of modular feedback coils to control instability growth near the ideal wall stabilization limit.

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