

Abstract Submitted
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High-Resolution Multimode MHD Spectroscopy Experiments on HBT-EP D. SHIRAKI, B.A. DEBONO, J.P. LEVESQUE, M.E. MAUEL, D.A. MAURER, N. RATH, G.A. NAVRATIL, Columbia University — The HBT-EP experiment has a unique high-resolution 216 point magnetic diagnostic system, allowing detailed measurements of plasma response to external perturbations. This includes 134 poloidal and 82 radial sensors, allowing measurements of the external field, plasma response, and wall currents. In addition, a high-power modular control coil array allows the application of multimode external field structures. The static and dynamic response of the stable resistive wall mode (RWM) to these perturbations has been measured as a function of perturbation amplitude, phase, and helicity, as well as edge q and mode rotation. The driven response is observed to have the same structure as unstable RWM's. The plasma response is seen to clearly peak with the perturbation helicity and edge q . A large rise in the resonant field amplification is also observed as the natural mode rotation is slowed down with the application of an edge bias and resulting jxB torque. The amplitude of the plasma response as a function of perturbation amplitude appears to have both a linear regime and a nonlinear saturated regime. Details of the measurement techniques are presented for both single-mode and multimode behavior, as well as comparisons to modeling. Supported by U.S. DOE Grant DE-FG02-86ER5322

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