Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

High-Speed, High-Power Active Control Coils for HBT-EP BRYAN DEBONO, Columbia University, HBTEP TEAM — We report the performance of a newly installed high-speed, high-power active control system for the application of non-symmetric magnetic fields and the study of rotating MHD and resistive wall modes in the HBTEP tokamak. The new control system consists of an array of 120 modular control coils and 40 solid-state, high-power amplifiers that can apply non-symmetric control fields that are more than 10 times larger than previous studies in HBT-EP and exceed 5% of the equilibrium poloidal field strength. Measurements of the current and field response of the control system are presented as a function of frequency and control coil geometry, and these demonstrate the effectiveness of the system to interact with both growing RWM instabilities and long-wavelength modes rotating with the plasma. We describe a research plan to study the interaction of both kink and tearing mode fluctuations with applied static and rotating magnetic perturbations while systematically changing the plasma rotation with a biased molybdenum electrode inserted into the edge plasma.

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Date submitted: 18 Jul 2010 Electronic form version 1.4