Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Mode suppression in HBT-EP using active feedback and a quadrature bias probe array[1] J.W. BROOKS, J.P. LEVESQUE, R. CHANDRA, M.E. MAUEL, G.A. NAVRATIL, A. SAPERSTEIN, I.G. STEWART, Y. WEI, Columbia University, M.D. BOYER, Princeton Plasma Physics Lab, C. HANSEN, University of Washington — Suppressing MHD instabilities in Tokamaks is one of the largest challenges facing the fusion community, and to address this, one set of solutions uses sourced electrical currents in the plasma. However, the path these currents take through the plasma and how they couple with MHD modes are not well understood. In this work, we set out to understand the currents' paths and coupling behavior by implementing four directional probes in quadrature in HBT-EP and configuring them to source parallel (co-IP or counter-IP), cross, or perpendicular currents as well as measure plasma rotation. HBT-EP's active feedback system, using a parallelized GPU with 21 Âs cycle latency, determines the n=1 mode phase and then sources phase-locked currents at the probes to couple with and ideally suppress the m=2 and m=3 modes. Mirnov coils and scrape-off-layer sensors measure the flow of 14 kHz current driven by the probes and provide insight into the current's path, and a resistive Ohmâ^{TM}s law current model is developed and compared to the experimental results.

[1]Supported by U.S. DOE Grant DE-FG02-86ER53222.

John Brooks
Columbia University

Date submitted: 03 Jul 2019 Electronic form version 1.4