Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Mode control using two electrodes on HBT-EP[1] I.G. STEWART, J.W. BROOKS, J.P. LEVESQUE, M.E. MAUEL, G.A. NAVRATIL , Columbia University — Understanding the effects of plasma rotation on magnetohydrodynamic (MHD) modes and tokamak plasma stability is important for performance enhancement of current magnetic confinement experiments and to future fusion devices such as ITER. In order to control plasma rotation, two molybdenum electrodes have been installed on HBT-EP toroidally separated by 144 degrees. This allows independent biasing of the two probes both spatially and temporally. When the bias probes are inserted into the edge of the plasma and a voltage is applied, the probes drive radial currents and produce plasma flow from the torque induced by the currents. If the bias probe voltage is sufficiently positive, the MHD mode rotation transitions into a state with a rapid mode rotation frequency (in excess of 25 kHz) in the direction opposite to mode rotation without bias. The transition into this reversed rotation state occurs when the torque exceeds a threshold, which can depend upon the phase of an applied n = 1 error field [1]. We present recent studies of the two-electrode system on mode rotation, mode stability, and the toroidal symmetry of the radial current through the scrape-off-layer (SOL) during MHD activity and applied magnetic perturbations. [1] C.C. Stoafer, PhD, Columbia University (2015).

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

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Date submitted: 13 Jul 2017 Electronic form version 1.4