Abstract Submitted
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Study of Kink Modes and Error Fields using Rotation Control with a Biased Probe[1] CHRIS C. STOAFER, J.P. LEVESQUE, Q. PENG, M.E. MAUEL, G.A. NAVRATIL, Columbia University — A bias probe has been installed in the High Beta Tokamak - Extended Pulse (HBT-EP) for studying MHD mode rotation and stability. When the probe is inserted into the edge of the plasma and a voltage applied, the rotation of long-wavelength kink instabilities is strongly modified. A large poloidal plasma flow results, measured with a bi-directional Mach probe, and changes in plasma flow correlate to changes in edge kink mode rotation. An active controller is used to adjust the probe voltage in real time for controlling both the plasma flow and mode rotation. Bias probe voltages are generated through an active GPU-based digital feedback system. Mode rotation control is desirable and allows for MHD stability studies under conditions of varying mode rotation rates. At large positive biases, the probe current induces a torque that opposes the natural direction of mode rotation. We are able to apply sufficiently large torque to induce a transition to a fast rotation state (both mode and plasma rotation). The bias required to induce the transition is shown to depend on an applied error field, establishing a technique to determine the natural error field on HBT-EP.

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