Abstract Submitted
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Study of Kink Stability during Large Changes of Mode Rotation Induced by a Biased Probe[1] CHRIS STOAFER, Q. PENG, J.P. LEVESQUE, M.E. MAUEL, G.A. NAVRATIL, Columbia University — A bias probe has been installed the High Beta Tokamak - Extended Pulse (HBT-EP) for studying MHD mode rotation and stability. By applying a voltage to the probe inserted into the edge of the plasma, the rotation of long-wavelength kink instabilities can be strongly modified. When the probe is biased to apply a torque in the direction of natural MHD mode rotation (7 - 10 kHz), the mode rotation can double. When the probe is biased in the opposite direction, wall-stabilized kinks can either stop rotating or be forced to counter-rotate in the ion drift direction. A time-varying bias can be applied to the probe with a 5 kW amplifier, which induces a time-varying mode rotation. An active controller can also be used to generate a bias voltage as a function of time. In this case, signals are generated through an active GPU-based digital feedback system, and this allows for MHD stability studies under the highly desirable condition of feedback controlled MHD mode rotation. Plasma rotation is measured with a Mach probe, and MHD mode rotation is measured by analyzing magnetic sensors on HBT-EP. Observations of plasma stability with HBT-EP's adjustable wall are reported for a wide range of mode rotation rates.

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