Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Observations of the Moving Plasma Edge during Magnetic Perturbations and Instabilities in HBT-EP[1] M.E. MAUEL, J.W. BROOKS, A. SAPERSTEIN, I.G. STEWART, Y. WEI, J.P. LEVESQUE, G.A. NAVRATIL, Columbia University — Magnetic perturbations move the boundary of toroidally-confined plasma, which can be detected by local probes, optical videography[2], x-ray emmision, and scrape-off-layer currents (SOLC)[3]. This poster summarizes these observations in the HBT-EP device caused by kink and tearing instabilities, resonant magnetic perturbations (RMPs), and disruptions. Particular attention is given to the physical structure of the helical "filaments" and "bubbles" associated with time-varying magnetic perturbations and the relationship of these structures to the strength and orientation of the magnetic perturbation. A linear relationship appears between the plasma's $n = 1$ helical displacement and the current flowing into the surrounding chamber[3], and these currents and plasma edge motion becomes very large during disruptions. As observed elsewhere, the SOLC in HBT-EP are primarily co-aligned with the plasma current and exhibit temporal distortion, consistent with an elevated electron temperature within the "filament." This motivates calculations of the 3D magnetic field-line structure and comparison of this

[1]Supported by U.S. DOE Grant DE-FG02-86ER53222.
[2]Angelini, *et al.*, *Plasma Phys Contr Fusion*, **57**, 045008 (2015).
[3]Levesque, *et al.*, *Nuc Fusion*, **57**, 086035 (2017).

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Date submitted: 02 Jul 2019 Electronic form version 1.4