Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

**Structure and Dynamics of Disruptive Kink Instabilities Measured by Fast Videography and Magnetics in HBT-EP**[1] M.E. MAUEL, J. BIALEK, J.W. BROOKS, J.P. LEVESQUE, G.A. NAVRATIL, Columbia University — Measurements of kink instabilities, resonant magnetic perturbations (RMPs), and disruptions in the High Beta Tokamak-Extended Pulse (HBT-EP) are studied using toroidal and poloidal arrays of magnetic field sensors[2] and fast videography[3]. The fast camera (Phantom v7.3) is most sensitive to light from the plasma edge and detects the structure of the plasma boundary for all types of MHD activity. Large helical "plumes" and "bubbles" are detected during disruptions (when helical perturbations can exceed 20% of the equilibrium poloidal field) and during kink mode precursors (when the mode amplitude can exceed 5% of the equilibrium field.) We present videos of the distorted plasma boundary and compare high-speed videos with computations of the helical boundary based on magnetic measurements. A variety of disruptions show "plume"/"bubble" structures reach 5 cm (or 30% of the plasma minor radius) from the plasma edge. The distortion and dynamics of the plasma boundary are discussed in relation to on-going investigations of scrape-off layer (SOL) currents during kink instabilities and disruptions.

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

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Date submitted: 14 Jul 2017 Electronic form version 1.4