

Abstract Submitted  
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**MHD Spectroscopy of External Kink Modes in Diverted Plasmas in HBT-EP<sup>1</sup>** P.J. BYRNE, J. BIALEK, P.E. HUGHES, J.P. LEVESQUE, M.E. MAUEL, G.A. NAVRATIL, Q. PENG, C.C. STOAFER, Columbia University — We report on studies using high-resolution sets of magnetic coils for passive detection and internal saddle coils for active excitation of external kinks in non-circular plasmas. HBT-EP has a zero-net-turns poloidal field coil for local shaping near the inboard midplane, up to and including diverted operation. The shape, amplitude, and mode rotation frequency of the dominant, marginally stable kink mode in shaped plasmas is compared to that of circular plasmas. There also exist stable, low-m, low-n kink modes that in diverted plasmas have high amplitude near the X-point and low amplitude elsewhere, with relevance for magnetic boundary shape in the divertor region of a tokamak. These modes are excited on a feed-forward basis by our control coils, and the effect on mode response of varying RMP amplitude and helicity is studied. VALEN is used to project DCON calculations of the mode structure at the surface of the plasma to both our sensors and control coils, to clarify observations and improve control coupling.

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