Abstract Submitted
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Investigation of Multi-Mode MHD Behavior in Shaped HBT-EP Discharges[1] PATRICK BYRNE, J.P. LEVESQUE, M.E. MAUEL, Q. PENG, D.J. RHODES, P.E. HUGHES, G.A. NAVRATIL, Columbia University — We report on investigations into the effect on multimode MHD of a newly installed poloidal field (PF) coil. The coil will allow the circular, limited HBT-EP to follow the main thrust of research towards a fusion reactor, which has been directed toward plasmas that are shaped and diverted. The coil shapes the high field side of the plasma up to and including imposing a PF null, while retaining compatibility with existing diagnostics and control systems. Multimode dynamics have been detected in naturally-rotating kink modes and during the response to 3D resonant magnetic perturbations.[2] Shaping changes both the resonant helical characteristics of MHD instabilities and the plasma response to external excitation and active control. Calculations using the TokaMac and DCON codes[3] have predicted that the coupling between the two least stable MHD kink modes would be reduced when edge q^* is near resonance. The RMP response, mode structure, and multi-mode content of diverted plasmas are compared to limited ones. Preliminary results show shaping changes the relative strengths of the $n = 1$ and $n = 2$ modes.

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[2]Levesque, *et al.*, *Nucl Fusion* **53**, 073037 (2013).
[3]Maurer, et al., *Plasma Phys Contr F* **53**, 074016 (2011).

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