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**Comparing Plasma Response to Magnetic Perturbations Applied to Limited and Diverted Discharges in HBT-EP**[1] PATRICK BYRNE, J.P. LEVESQUE, C. STOAFER, Q. PENG, M. MAUEL, J. BIALEK, G. NAVRATIL, Columbia University — We report experiments on and ideal MHD models of the multi-mode plasma response to magnetic perturbations applied to stable discharges that are limited with circular cross-section and diverted. We focus on the excitation of both "stiff" non-resonant perturbations with n = 1 and 2 and on the resonant perturbations of marginally stable external kink modes. DCON is used to compute the multi-mode ideal plasma response. We find the "stiff," non-resonant modes have low poloidal wavenumber - $|m| \approx 0$. Consequently, they have a ten-fold higher coupling coefficient to the HBT-EP magnetic control coils. For circular, limited plasmas, the mode is maximum at the high-field side of the plasma; whereas in diverted geometry, the mode creates a highly localized perturbation near the x-point of the plasma. By driving this mode with external coils, it may be possible to actively control the heat deposited by a fusion plasma across a larger surface, relaxing the materials requirements of the strike point. Additionally, the low level of spectral overlap between these modes and the edge-resonant kink in a typical tokamak (2/1 or greater) means that this mode can be strongly driven with minimal excitation of unstable edge modes.

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