Ongoing Ferritic Wall Mode studies on HBT-EP

P.E. HUGHES, M.E. MAUEL, J.P. LEVESQUE, G.A. NAVRATIL, Columbia Univ — Low-activation ferritic steels are leading material candidates for use in next-generation fusion development experiments such as a prospective US component test facility and DEMO [1]. Understanding the interaction of plasmas with a ferromagnetic wall will provide crucial physics for these experiments. Although the ferritic wall mode (FWM) was seen in a linear machine [2], ferritic steel was observed to be compatible with high-performance operation in JFT-2M [3]. Using its high-resolution magnetic diagnostics and adjustable wall segments, HBT-EP now operates successfully with a high-permeability tiled ferritic first wall. Initial measurements showed the ferritic wall enhances the growth rate of the $m/n = 3/1$ kink mode [4]. In this poster, we report results of our study of the evolution of naturally rotating modes, increased plasma response to phase-flip resonant magnetic perturbations (RMPs), and enhanced plasma disruptivity as the walls are adjusted from stainless wall to ferritic wall configuration.


$^1$Supported by U.S. DOE Grant DE-FG02-86ER53222.