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MHD Mode Identification Using Magnetic Probes and Its Application to the Edge Harmonic Oscillation[1] N.C. STONE, Cornell U., H. REIMERDES, Columbia U., E.J. STRAIT, K.H. BURRELL, GA — Magnetohydrodynamic instabilities in tokamak plasmas are usually known for their role in limiting plasma performance. However, the edge harmonic oscillation (EHO) seen in quiescent H-mode plasmas has advantageous effects because it increases edge particle transport, allowing control of the edge pressure. By operating with edge pressures stable to peeling-ballooning modes, edge localized modes (and their intense bursts of heat to the wall) can be avoided. This study aims to improve the understanding of the EHO through the creation of a filament-based toroidal current model capable of simulating both plasma and induced vessel currents. This model predicts the magnetic fields measured by Mirnov probes, serving as a synthetic diagnostic for the presence of MHD instabilities. After tests validate the model against 2/1 and 3/2 tearing modes, it will be used to localize the EHO. This will be accomplished with a least squares fit of simulated m/n modes to experimental observations of the EHO.

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