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Soft X-ray Analysis of HBT-EP Kink and Tearing Modes[1] J.P. LEVESQUE, M.E. MAUEL, G.A. NAVRATIL, C.C. STOAFER, Columbia University, L. DELGADO-APARICIO, PPPL, T.B. DOHRN, Newark Academy — Measurement of soft x-ray (SXR) emission from plasmas is a useful diagnostic for studying internal plasma dynamics including MHD mode structures and equilibrium evolution. We present analysis of tearing and kink mode activity in the HBT-EP tokamak using a combination of SXR and external magnetic measurements. Soft x-ray emission is measured using a 16-channel diode array viewing the poloidal cross-section. Emission characteristics of naturally-occurring $m/n = 2/1$ and $3/1$ tearing and kink modes are compared with expectations from a synthetic diagnostic. Core 1/1 modes are observed through localized emission enhancement. The internal plasma response to external magnetic perturbations is investigated, and compared with magnetic response measurements. An upgrade to the HBT-EP SXR diagnostic is proposed, including multiple filters and viewing angles to enable tomographic reconstruction of emissivity and temperature profiles.

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