Abstract Submitted
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High-Resolution, High-Accuracy Magnetic Measurements for Multi-Mode MHD Instability Control D. SHIRAKI, P.J. BYRNE, B. DEBONO, J.P. LEVESQUE, B. LI, M.E. MAUEL, D.A. MAURER, G.A. NAVRATIL, N. RATH, Columbia University — Accurate measurements of multi-mode plasma magnetic response are important for quantifying the effects of a variety of MHD phenomena. A new array of 216 poloidal and radial magnetic sensors has been designed, installed, and calibrated on the HBT-EP tokamak to measure multi-mode MHD dynamics. High accuracy of these magnetic measurements on HBT-EP is accomplished using both detailed bench and in-situ "copper plasma" calibration techniques. The in-situ calibration was carried out with current ring sources installed into the vacuum chamber, near the location of the plasma core, as well as the equilibrium poloidal and toroidal field coils, and special in vacuum chamber calibration dipole coils. The calibration procedure is based on a linearized least squares algorithm to verify the location and orientation of each individual sensor based upon magnetic measurements using the various current ring sources along with detailed position measurements using a combination of custom and ROMER coordinate measurement machines. The accuracy of this calibration procedure, the effects of eddy currents, system detection limits, and initial multi-mode plasma response measurements will be presented. Supported by U.S. DOE Grant DE-FG-02-86ER53222

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