

Abstract Submitted
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Applications of 3D Magnetic Diagnostics in DIII-D¹ E.J. STRAIT, S. MUNARETTO, C. PAZ-SOLDAN, General Atomics, J.M. HANSON, Columbia U, N.C. LOGAN, PPPL — Measurements of non-axisymmetric 3D magnetic fields have been successfully employed in DIII-D to validate models of the plasma response to external magnetic perturbations, to validate predictions of the detailed spatial structure of unstable plasma modes, to measure damping rates of stable MHD modes, and to provide input for feedback control of resistive wall modes and of intrinsic error fields. Other possible applications that are ripe for development will be discussed, including the following. External magnetic data allows a direct measurement of the electromagnetic torque exchanged between the plasma and external coils, potentially an indicator of magnetic island onset. 3D magnetic data in the absence of plasma may be used for direct measurement of error fields caused by coil asymmetries. Spatially resolved real-time measurements of non-axisymmetric fields can enable early detection of disruption precursors, independent of whether the instability is rotating or stationary.

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Edward Strait
General Atomics

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