

Abstract Submitted  
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**Internal/External Magnetic Field Decomposition: Application to Disruption Warning**<sup>1</sup> E.J. STRAIT, S. MUNARETTO, General Atomics, R.M. SWEENEY, MIT — Combined analysis of magnetic field measurements normal and tangential to a closed surface such as a tokamak vacuum vessel wall allows a decomposition of the field into contributions from sources internal and external to the measurement surface [R.M. Sweeney & E.J. Strait, Phys. Plasmas 26, 012509 (2019)]. This technique is a potentially powerful tool for detection of tearing modes and other low-n instabilities, avoiding some of the drawbacks of conventional B-dot and locked-mode detectors. The analysis provides a clean separation of signals from the plasma versus those from external sources such as induced wall currents, and is independent of whether the mode is rotating or locked. The separation of internally and externally sourced fields also enables a straightforward calculation of the electromagnetic torque on the plasma. The accuracy and advance warning time of a disruption predictor based on such analysis of DIII-D data will be discussed.

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E.J. Strait  
General Atomics

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