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Measuring Resistive Wall Mode Stability in Real-time,* J.M. Hanson, M.J. Lanctot, G.A. Navratil, H. Reimerdes, *Columbia U.*, E.J. Strait, *GA* — Measurements of the plasma response to externally applied, low- n magnetic fields can be used to determine the resistive wall mode (RWM) stability of the plasma equilibrium. Such a method, if implemented as a real-time algorithm, can be used to gate error field correction, profile control, and RWM feedback control algorithms, enabling operation close to the no-wall stability limit. In addition, the stability estimate can be used to directly update parameters in an advanced RWM controller as the plasma evolves. We have developed an efficient scheme that uses an external field rotating at a single fixed frequency. Because only one frequency is applied, the plasma response can be calculated from measurements by Fourier-analyzing the measurements at only the applied frequency and subtracting the known vacuum pickup due to the control coils. This single-frequency, Fourier-domain analysis uses a small number of arithmetical operations, which is a requisite for real-time implementation.

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