

Simulation of MSE signals, as a diagnostic tool for MHD instabilities

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Mode identification of MHD instabilities is often based on external signals, typically, by Mirnov loops placed at some distance from the plasma. With a sufficient number of coils it is possible to identify the dominant poloidal and toroidal harmonics at the plasma boundary. The internal structure can be determined from the electron cyclotron emission^a. Recently^b, the motional Stark effect, MSE, diagnostic has proved to be a complementary alternative, as it measures the local field perturbation within the discharge. The predicted mode structure for global instabilities is easily obtained from codes, such as PEST, from which, we can simulate the expected MSE signal. We examine a variety of plasma pressure and safety-factor profiles and geometry to determine the expected MSE signal. Comparisons with experiment will be presented.

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^aOkabayashi et al. Nuclear Fusion Vol. 38, (1998) 1149

^bJayakumar et al. BAPS Vol. 48(2003) QP1.045