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2.20 Self-Calibration of Electron Cyclotron Emission Imaging with Shape Matching

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Electron Cyclotron Emission Imaging (ECEI) is a diagnostics system which measures 2D electron temperature profiles of high-temperature plasma. Magnetohydrodynamics(MHD) modes in fusion plasma can be quantitatively studied by of ECEI after calibration (finding the proportional coefficients of electron temperature to signal amplitude). Conventional calibrating methods are complicated and difficult to implement. In this paper we propose an self-dependent calibrating method for 24x16 channels high-resolution ECEI on EAST Tokamak based on the properties of data, in which the technique of shape matching is applied to solve for calibration coefficients matrix. The calibrated area is further expanded to a occupation ratio of 88% detecting area by utilizing the features of sawtooth crash. The result is self-consistent and agrees with other experimental data, supporting the validity of this self-calibration approach.

Primary author(s) : XIE, Jinlin (Dept. of Modern Physics, university of science and technology of china)

Presenter(s) : XIE, Jinlin (Dept. of Modern Physics, university of science and technology of china)

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