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P2.057 Tracking of neoclassical tearing modes in TCV using the electron cyclotron emission diagnostics in quasi-in-line configuration

Tuesday, 18 September 2018 11:00 (2 hours)

An important goal of tokamak plasmas is the control of magneto-hydrodynamic (MHD) instabilities with low m, n (poloidal and toroidal mode numbers), which can influence the confinement time of energy and particles and possibly lead to plasma disruption. These instabilities, which appear as rotating magnetic islands, can be reduced or completely suppressed by a current driven by electron cyclotron waves (ECW) accurately located within the island. A fundamental requisite for this control technique is the ability to identify the island parameters (amplitude and radial position) and to vary accordingly the ECW deposition location.
Here we describe a control scheme of the steering mirror of the ECW source based on the real-time tracking of the island radial position realized using only the electron cyclotron emission (ECE) diagnostics in quasi-in-line configuration, i.e. with nearly anti-parallel propagation of the ECW and ECE beams.
The successful experimental proof of principle of this scheme, tested on the TCV tokamak, is here reported.

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