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Control of core MHD Instabilities by ECCD in ASDEX Upgrade
M. MARASCHEK [1], G. GANTENBEIN [2], S. GÜNTER [1], F. LEUTERER [1], A. MÜCK [3], H. ZOHM [1], ADEX UPGRADE TEAM — Neoclassical Tearing Modes limiting the achievable β_N, are of great interest for fusion. The control of MHD activity triggering NTMs and the removal or mitigation of NTMs is the main target. Electron Cyclotron Current Drive at the q=1 surface is able to control sawteeth, the main trigger for NTMs and increased β_N values could be achieved by this NTM avoidance. Excited NTMs can be stabilized with moderate ECCD power at the resonant surface. The required power for the different NTMs based on the marginal β_p^{marg} will be discussed. A scan of the ECCD deposition width ($d < W_{marg} ... d > W_{marg}$) in comparison to the marginal island size W_{marg} and the driven current has been done, confirming the theoretical prediction of the current density I/d as the figure of merit. As for ITER $W_{marg} < W < d$ might occur and non-modulated ECCD might be insufficient, a comparison with modulated ECCD, depositing only in the islands O-point, has been performed. The possibility to control the Frequently Interupted Regime (FIR-NTM) with ECCD will be discussed. Typically this regime leads to a confinement recovery at high β_N values. The present status of these schemes at ASDEX Upgrade and the perspectives for ITER will be shown.

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