Abstract Submitted
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Results from Active Excitation of Toroidal Alfvén Eigenmodes in Alcator C-Mod[1] J. SEARS, W. BURKE, R. PARKER, J. SNIPES, V. TANG, S. WOLFE, MIT PSFC, A. FASOLI, CRPP - Swiss Federal Institute of Technology, Association Euratom - Swiss Confederation — Toroidal Alfvén Eigenmodes (TAEs) are weakly damped MHD waves in tokamak plasmas. Interaction with fast particles such as fusion-born alphas can overcome the damping and lead to the spontaneous appearance of unstable TAEs. The Active MHD diagnostic on Alcator C-Mod is used to investigate the relationship between the TAE margin to instability and controllable plasma parameters. The diagnostic identifies the frequency response of the plasma in the TAE frequency range, $f_{TAE} = v_A/4\pi qR$. It perturbs the magnetic field with two antennas and detects the plasma response with an array of pick-up coils. The total damping rate and toroidal mode number of the TAE are extracted from a parametric model fitted to the frequency response. Particular attention is paid to signal processing techniques for minimizing uncertainty. The relationship between the TAE damping rate and ICRF heating is investigated with the aid of a neutral particle analyzer to quantify the fast ion population. Other parameters investigated for their effect on damping rate are collisionality, normalized ion gyro-radius, beta, triangularity, and the direction of the ∇B drift with respect to the x-point in diverted plasmas.

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