Abstract Submitted
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Toroidicity-induced Alfvén eigenmode structure measured with multiple diagnostics in MAST[1] H.H. WONG, C A. MICHAEL, N.A. CROCKER, T. CARTER, UCLA, A.R. FIELD, N. FIL, M. FITZGERALD, A. JACOBSEN, K.G. MCCLEMENTS, Culham Centre for Fusion Energy, P. LIU, H. WANG, G.J. CHOI, Z. LIN, UC Irvine, M. CECCONELLO, Uppsala University, D. DUNAI, Wigner Research Centre for Physics — Measurements of plasma fluctuations associated with toroidicity-induced Alfvén eigenmodes (TAE) are obtained using multiple diagnostics in the MegaAmp Spherical Tokamak (MAST). The redistribution and loss of fast-ions caused by the excitation of TAEs would potentially reduce the effectiveness of beam heating and pose a threat to the device. In this study the contribution of TAEs to measured plasma fluctuations is isolated using cross-correlation analysis of measurements from Mirnov coils, beam emission spectroscopy (BES), motional Stark effect (MSE) and tangential soft x-ray (SXR) diagnostics on MAST. The SXR and MSE data allow measurement of the radial structure of TAE across a large spatial range. In contrast, BES offers a 2D view in the poloidal plane that is comparatively narrow in the radial direction, with much finer spatial sampling that can be adjusted from pulse to pulse to view different portions of the radius. The measurements from BES, SXR and MSE are to be compared with simulations carried out with the NOVA and MISHKA ideal MHD linear eigenmode codes, as well as linear simulations carried out with the Gyrokinetic Toroidal Code (GTC)[1]. In future work, details of time-dependent, shorter scale radial and poloidal structures obtained from BES will be compared with nonlinear simulations from GTC, thus providing a basis for validating nonlinear physics models for TAE, e.g. those based on the concept of hole-clump instabilities. [1] Z. Lin el al., Science 281, 1835(1998)

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Henry Hingyin Wong
University of California, Los Angeles

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