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2D Structures of Toroidicity-induced Alfvén Eigenmodes (TAEs) Measured with Beam Emission Spectroscopy (BES) in the MegaAmp Spherical Tokamak (MAST)[1] HENRY H. WONG, NEAL A. CROCKER, CLIVE MICHAEL, TROY CARTER, University of California, Los Angeles, ANTHONY R. FIELD, NICOLAS FIL, Culham Centre for Fusion Energy, ZHIHONG LIN, University of California, Irvine, HONGYU WANG, Peking University, DANIEL DUNAI, Wigner Research Centre for Physics — Measurements of the 2D poloidal structure of density fluctuations associated with TAEs were obtained for the first time from analysis of with BES data from MAST. TAEs have been observed to reduce the effectiveness of beam heating and current drive in tokamak experiments, including MAST [1]. In this study data from BES and Mirnov coils diagnostics on MAST are used to isolate the contributions of TAEs to the density fluctuations using a cross-correlation analysis. The BES view window spans 6cm vertically and 14cm horizontally, covering 1/3 of the minor radius with 32 channels. The 2D structures at specific times and frequencies obtained from Fourier transforms of short data series indicate a strong radial localization of density fluctuations associated with TAE chirps at the time of peak amplitude. The poloidal phase variations of the structures yield k_θ. Details of these structures are to be compared with the linear and nonlinear eigenmode simulation results from the Gyrokinetic Toroidal Code [2]. The time dependent structures can be used to validate nonlinear physics models for TAE chirping such as energetic particle mode and hole-clump instabilities. [1] Jones, O. M , et al. (2015). PPCF, 57(12), 125009. [2] Z. Lin, et al. (1998) White. Science 281, 1835

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