

Evidence of a GAM like potential structure and frequency impurity response for the Low Frequency Edge Oscillation in I-Mode on Alcator C-Mod

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Recent work has shown that the Low Frequency Edge Oscillation (LFEO) has a zonal potential structure, frequency scaling, and impurity response consistent with that of a Geodesic Acoustic Mode (GAM). A common feature of I-mode on Alcator C-Mod, the LFEO is a fluctuation in the 8-30 kHz frequency range that lives in the pedestal; it is concurrent with, but separate from, the ubiquitous Weakly Coherent Mode (100-300 kHz). Gas Puff Imaging data has been coupled to a scanning mirror Langmuir probe system to investigate the radial structure of the LFEO. Preliminary analysis reveals that it is a radially propagating fluctuation in temperature, density, and potential with a zonal like potential structure within the last closed flux surface. This analysis also shows that the density and potential fluctuation magnitudes are related as expected for a GAM. A database study of many I-modes has shown that the LFEO frequency follows that of a GAM driven near the edge of the confined region when elongation is taken into account. Finally, high time resolution Electron Cyclotron Emission measurements have revealed that the LFEO frequency in the presence of impurities is qualitatively consistent with two gyrokinetic GAM frequency predictions that account for impurity ions developed by Guo et al. and Sasaki et al. Supported by US DoE award SC0014264.

