

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Second Harmonics of Reversed Shear TAE in Alcator C-Mod Geometry EUGENE CHEN, HERBERT BERK, BORIS BREIZMAN, LINJIN ZHENG, IFS, UT Austin — Experiments on Alcator C-Mod, operating with reversed magnetic shear, reveal Toroidal Alfvén Eigenmodes (TAE) together with signals at twice the mode frequency. The double frequency signals can be viewed as second harmonic sidebands driven by quadratic non-linear terms in the MHD equations, in analogy with a corresponding theory for Alfvén Cascades [1]. However, these nonlinear sidebands have not yet been quantified by any of the existing codes. In this work, we extend AEGIS code [2] to capture nonlinear effects iteratively by treating the nonlinear terms as a driving source in the linear MHD solver. We first compute the TAE mode structure for realistic geometry and q -profile and then use it to find the spatial structure of the second harmonic density perturbation, which can be directly compared with PCI measurements at Alcator C-Mod. [1] H. Smith, B. N. Breizman, M. Lisak and D. Anderson, *Physics of Plasmas* 13 042504 (2006) [2] L. J. Zheng and M. Kotschenreuther, *Journal of Computational Physics* 211 (2006) 748-766

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Date submitted: 17 Jul 2009

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