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[ ] Theory [x] Experiment

Alfven Eigenmodes in Reverse Magnetic Shear Plasmas on DIII-D,* R.~Nazikian, G.J. Kramer, W.M. Solomon, R. White, ,K.L. Wong, *PPPL*, G.R. McKee, U. Wisc., E.J. Doyle, T.L. Rhodes, L. Zang, *UCLA*, K.H. Burrell, R.J. La Haye, E.J. Strait, M.A. VanZeeland, *GA*, W.W. Heidbrink, *UC Irvine* – The excitation of a ``sea'' of Alfvén eigenmodes and its impact on alpha particle confinement is a key scientific issue for a future burning plasmas experiment. A particular class of alpha particle driven instability, the Toroidal Alfvén Eigenmode (TAE), has been extensively studied in plasmas with positive magnetic shear, however our understanding of fast ion driven instabilities in Advanced Tokamak (AT) plasma regimes, with a region of negative shear, is far less developed. Recent experiments in DIII-D reveal new information on the properties of beam ion driven instabilities in QH-mode plasmas from simultaneous measurements using reflectometry, CO_2 and FIR interferometry, BES and MSE. The density fluctuation data reveals the excitation of many core localized (r/a=0.3-0.5) high frequency (50-500 kHz) Cascade-like modes that are poorly observed on magnetic probes. The internal measurements are compared to NOVA-K calculations of Cascade mode stability. ORBIT calculations of beam ion loss will also be shown in the presence of many such modes.

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