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Novel Alfvén eigenmode structure measurements in NSTX via reflectometry[1] N.A. CROCKER, W.A. PEEBLES, S. KUBOTA, J. ZHANG, UCLA, R.E. BELL, E.D. FREDRICKSON, N.N. GORELENKOV, B.P. LEBLANC, J.E. MENARD, M. PODESTÀ, PPPL, S.A. SABBAGH, CU, K. TRITZ, JHU, H. YUH, NOVA Photonics — Novel measurements of toroidicity-induced (TAE), global (GAE) and compressional (CAE) Alfvén eigenmode structure have been obtained in NSTX with a recently upgraded 16 channel array of fixed frequency quadrature reflectometers. Measurements of TAE ($\sim$ 50 kHz $<$ f $<$ $\sim$ 150 kHz) phase show significant radial variation in the midplane, indicating radial propagation. This distinctly contrasts with expectation from ideal MHD since the plasma is up-down symmetric. The structure of GAEs and CAEs (f $<$ $\sim$ 400 kHz) have been obtained for the first time in the core of NSTX high power beam-heated H-mode plasmas. The GAEs have core-peaked, broad radial structure, while the CAEs are strongly core-localized, with substantially higher amplitude. GAEs, which are observed to correlate with enhanced thermal electron transport in such plasmas [D Stutman, PRL 102 115002 (2009)], are hypothesized to be the cause due to their core localization and capacity to resonantly modify electron orbits. The observed CAE structures indicate they must also be considered.

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