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Comparison of Moderate to High Ion Cyclotron Absorption on Energetic Ions in NSTX and DIII-D,* J. Burby, *Cornell University*, R.I. Pinsker, M. Choi, *General Atomics* – Strong absorption of fast waves (FWs) on injected deuterons at ion cyclotron harmonic numbers in the 4–10 range is observed on both DIII-D and NSTX. The results from fast ion D_α spectroscopic measurements from the two devices differ significantly: deposition on fast ions peaks near the cyclotron harmonic layer closest to the magnetic axis in the conventional-aspect-ratio DIII-D, while results from the low-aspect-ratio NSTX show a broader deposition profile [1]. One root of the difference stems from the absorbing fast ions sampling more harmonic layers in NSTX than in DIII-D. We investigate cyclotron absorption in cases with multiple harmonic layers within a single ion gyroradius and related phenomena numerically and analytically by examining the response of individual charged particles to rf fields in various field configurations.

[1] M. Podesta *et al.*, in *RF Power in Plasmas (Proc. 18th Top. Conf, Gent, Belgium, 2009)*, to be published.

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