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**High Harmonic Ion Cyclotron Heating in DIII-D: I. Beam-Ion Absorption**<sup>1</sup> R.I. PINSKER, J.S. DEGRASSIE, C.C. PETTY, General Atomics, F.W. BAITY, ORNL, S. BERNABELI, PPPL, W.W. HEIDBRINK, UC Irvine, T.K. MAU, UC San Diego, M. PORKOLAB, MIT — Damping of fast Alfvén waves (FW) at high ion cyclotron harmonics ( $\omega = n\Omega_i$ ,  $n > 3$ ) is an important competing damping mechanism where direct electron damping is intended. The DIII-D experiments described here have demonstrated strong ion cyclotron damping on energetic deuterons at harmonics as high as  $4\Omega_D$ . Most of the discharges in this study combine deuterium neutral beam injection (NBI;  $P_{\text{NBI}} \geq 2$  MW) with 60 MHz FW ( $P_{\text{FW}} \sim 1\text{--}2$  MW,  $B_T = 2.0$  T). We have also compared  $4\Omega_D$  damping on an injected deuterium beam with  $2\Omega_H$  damping on a hydrogen beam, and studied  $3\Omega_{\text{He}^3}$  damping on an injected  $\text{He}^3$  beam. In all cases, substantial central electron heating is observed. Observations of the D-D reaction rate clearly indicate significant damping at  $4\Omega_D$ . These experiments indicate the importance of high harmonic damping in the presence of an energetic ion species and demonstrate the usefulness of this heating scenario.

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Prefer Oral Session  
 Prefer Poster Session

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Special instructions: DIII-D Poster Session 2, immediately following TE Evans

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