

Abstract Submitted  
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**Recent edge CXRS measurements in I-mode and ELMy H-mode plasmas on C-Mod**<sup>1</sup> C. THEILER, R.M. CHURCHILL, A. HUBBARD, J.W. HUGHES, B. LIPSCHULTZ, E. MARMAR, M.L. REINKE, J.L. TERRY, J.R. WALK, D. WHYTE, MIT PSFC, A. DIALLO, PPPL — A high-resolution charge exchange recombination spectroscopy (CXRS) diagnostic is installed on Alcator C-Mod to measure edge profiles of  $B^{5+}$  density, temperature, and flows and to deduce radial electric field profiles. As donor particles for CX, both hydrogen from a modulated diagnostic neutral beam and deuterium from a local gas puff are employed. While the former technique often suffers from low signal intensities near the LCFS, the latter can be complicated by contamination of the signal by molecular lines and cross-section effects. After discussing how these challenges are overcome in data analysis, we present recent measurements in regimes which have not extensively been investigated previously with edge CXRS on C-Mod. The first one is the I-mode regime, which is characterized by H-mode like energy confinement and L-mode like particle transport. Focusing on I-modes with unfavorable ion  $\mathbf{B} \times \nabla \mathbf{B}$  drift, we study profile scalings with plasma parameters such as density, plasma current and heating power. The second regime is ELMy H-mode, where we explore the capabilities of the CXRS diagnostic to measure profile evolutions during and in between ELMs.

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