

Abstract Submitted  
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**Improved absolute calibration of Thomson scattering diagnostics on the Alcator C-Mod tokamak**<sup>1</sup> Y. MA, J.W. HUGHES, A.E. HUBBARD, MIT PSFC — The Thomson scattering (TS) diagnostics on Alcator C-Mod have been upgraded to provide measurements with improved radial spatial resolution of 1cm in the range of  $r/a \leq 0.6$ . To accurately obtain electron densities ( $n_e$ ), we absolutely calibrate TS using two independent methods. First, we backfill the vessel with deuterium or hydrogen gas at room temperature and measure the anti-Stokes Raman scattering from the TS Nd:YAG lasers. Second, we take advantage of the fact that measurements of second-order harmonic electron cyclotron emission (ECE) from plasma are cut off at certain  $n_e$  and radial locations in a known magnetic geometry. These cutoffs allow us to cross-calibrate simultaneous TS  $n_e$  measurements with ECE diagnostics, in specially designed lower-field ( $B_T \approx 4\text{T}$ ), high-density ( $\bar{n}_e > 2 \times 10^{20} \text{m}^{-3}$ ) discharges. Results from both techniques are analyzed and used to produce reasonable  $n_e$  profiles for plasma discharges. The reliability of each technique is assessed, and discrepancies between the two techniques are discussed. The ultimate goal is to refine the gas calibration technique such that dedicated discharges are not necessary for TS calibration.

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