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Inclusion of Relativistic Broadening for ECE- T_e Mapping in DIII-D,* M.E. Austin, M.W. Brookman, *University of Texas* – Recent increased demands on electron cyclotron emission (ECE)-derived electron temperature (T_e) measurement accuracy in DIII-D have lead to a re-examination of calibration and analysis methods. In particular, a new technique using sawtooth oscillations to assess ECE- T_e overlap in the core shows that the inclusion of relativistic broadening for the ECE channel positions is crucial to obtain accurate gradients in the central region of the plasma, even for $T_e(0)$ values less than 4 keV. A calculation of ECE- T_e position shifts δR for the range of DIII-D operating parameters find that the δR corrections range from 0.5 cm for $T_e \sim 2$ keV to more than 2 cm for $T_e \sim 8$ keV. Two methods for inclusion of the relativistic shifts in DIII-D T_e profiles are compared, a slower full numerical calculation of absorption and emission profiles versus a faster analytical formula.

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