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An assessment of methods to compute secondary electron emission for tungsten and molybdenum and implications for plasma potential measurements by Langmuir probes in Alcator C-Mod WILLIAM MCCARTHY, BRIAN LABOMBARD, DAN BRUNNER, ADAM KUANG, Massachusetts Inst of Tech-MIT — Plasma potentials measured by Langmuir probes rely on a method to compute secondary electron emission (SEE) yield. However, significant variations exist among published models for SEE and the datasets used to evaluate them. As a means to critically assess SEE evaluation methods, two of four tungsten electrodes on a Langmuir-Mach probe head were replaced with molybdenum and exposed to high temperature (>50 eV) plasmas. In this situation, plasma potentials computed for either material should be identical, with the SEE evaluation method properly accounting for significant differences in SEE yields. Of the six methods to compute SEE examined, two are found to produce consistent results (Sternglass-Bronstein and Young-Dekker-Bronstein). In contrast, the method previously used for C-Mod data analysis (Sternglass-Kollath) was found to be inconsistent. We have since adopted Young-Dekker-Bronstein. An important consequence is that values for plasma potential, electric field and ExB flow shear near the LCFS in Alcator C-Mod has substantially increased compared to what had been reported previously. This work was supported by DoE Contract DE-FC02-99ER54512 on Alcator C-Mod, a DoE Office of Science user facility.

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