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Inner-wall Impurity Density Measurements on Alcator C-Mod
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— Recent findings on Alcator C-Mod imply a poloidal impurity density asymmetry in the pedestal region, inferred from boron (B^{5+}) velocity measurements at the inner- and outer-wall combined with neoclassical transport theory. In an effort to confirm these findings, the direct measurement of the boron density was made at the inner-wall pedestal using simultaneous spectroscopic views of boron charge exchange recombination spectroscopy (CXRS) (B^{4+}, $n = 7-6$, $\lambda = 494.467nm$) and Balmer-α (D^{0+}, $n = 3-2$, $\lambda = 656.6nm$). Since the inner-wall CXRS measurement utilizes a deuterium gas puff as the source of neutrals to induce charge exchange, detailed modeling is required in order to calculate the neutral density profile from the Balmer-α measurement. Additionally, due to the low interaction energies the $B^{5+}+D^{0+}(n = 2) \rightarrow B^{*(4+)} + D^{1+}$ is the dominant boron CX process, so a collisional-radiative model is required to calculate the $n = 2$ deuterium density from the $n = 3$ density derived from the Balmer-α measurement. The radial shape of the resulting boron density profile agrees with the profile predicted by the impurity density asymmetry.
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