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Plasma impurity composition in the Alcator C-Mod tokamak[1]
IGOR BESPAMYATNOV, WILLIAM ROWAN, KENNETH LIAO, IFS, The University of Texas at Austin, MATTHEW REINKE, MICHAEL CHURCHILL, PSFC, MIT — Accurate characterization of the impurities in tokamak plasmas is an important task. Impurities can lead to fuel dilution, enhanced radiative losses and can affect main-ion and electron transport through Z_{eff}. The task of quantifying the impurities in Alcator C-Mod tokamak is critical. C-Mod's plasma contains a variety of intrinsic (B, F, Fe, Mo, W), seeded (He, N, Ne, Ar) and purposefully injected (Al, Ca, Ni) impurities during regular operations. Z_{eff} of well-confined C-Mod plasma may reach values greater than 5. In order to properly characterize these impurity effects, density of each impurity should be accurately quantified. C-Mod employs several spectroscopic diagnostics to diagnose impurities. Here we attempt to perform a constrained analysis of the impurity content for a variety of the C-Mod plasma discharges. The goal is to develop a technique to combine results from multiple diagnostics into a joint analysis. Reliable estimates of impurity content and Z_{eff} are sought as the result. The initial focus here is on the measurement of the absolute boron density by means of CXRS. Boron is usually the major low-Z impurity in C-Mod. The accuracy of the boron density measurements and main sources of uncertainties will be discussed in detail.

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