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Poloidal variation of high-Z impurity density driven by hydrogen minority heating on Alcator C-Mod[1] MATTHEW REINKE, IAN HUTCHINSON, JOHN RICE, NATHAN HOWARD, AND THE ALCATOR C-MOD TEAM — In the Alcator C-Mod tokamak, strong, steady-state variations of molybdenum density within a flux surface are routinely observed in plasmas using ICRH. In/out asymmetries up to a factor of 2 are observed with inboard and outboard accumulation occurring at different minor radius locations. Scanning the D(H) resonance layer off-axis is shown to alter the magnitude and direction of the asymmetry. These poloidal variations are important in determining the radial impurity transport and can be attributed to the impurity's high charge and large mass in parallel force balance. The large mass enhances the centrifugal force, causing outboard accumulation while the high charge enhances ion-impurity friction and makes impurities sensitive to small poloidal variations in the plasma potential. Ion-impurity friction is shown to not play a role and it is demonstrated that a poloidal potential variation due to trapping of cyclotron heated minority ions is the likely cause of inboard accumulation. Quantitative comparisons between existing parallel impurity transport theories and experimental results are in good agreement when ICRH effects can be ignored and agree to within 50% when attempting to account for the effects of cyclotron heating.

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