Abstract Submitted
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Investigation of Energetic ICRF Minority Protons on Alcator C-Mod[1] V. TANG, P.T. BONOLI, J. LIPTAC, R.R. PARKER, J.C. WRIGHT, MIT PSFC, E.F. JAEGER, ORNL, R.W. HARVEY, CompX — Energetic minority protons with ∼100keV effective temperature are routinely created in C-Mod plasmas with the application of ICRF. A new multi-channel Compact Neutral Particle Analyzer is used to make measurements of these distributions via an active charge-exchange (CX) technique. Using a detailed model that accounts for beam, halo, and impurity CX, core proton temperatures of ∼30-100keV are observed for lower density (n_{e0} ∼1-1.5x10^{20}/m^3) C-Mod plasmas using only ∼0.5MW of ICRF power. The model found that these fast minority protons are peaked spatially away from r/a=0, even for an on-axis resonance. Additionally, noticeable phase-space anisotropy is seen as expected for ICRF heating. The measured effective temperatures scale approximately with the Stix parameter. Preliminary comparisons with results from the AORSA/CQL3D Full-wave/Fokker-Planck code using a new synthetic diagnostic show good agreement and demonstrate that these complex codes are required to simulate C-Mod's energetic minority populations with accuracy.

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