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Electron Temperature Profile Evolution in MST Improved Confinement Discharges[1] L.A. MORTON, B.E. CHAPMAN, E. PARKE, W.C. YOUNG, D.J. DEN HARTOG, University of Wisconsin - Madison — We investigate the temporal evolution of the electron temperature profile in MST RFP during Pulsed Parallel Current Drive (PPCD), to study profile stiffness and dependence on PPCD programming. PPCD discharges are found to exhibit profile stiffness: the core temperature remains flat, with a gradient region outside r/a = 0.5. The profile shape is fixed even as the core temperature rises by a factor of 3-4 during a discharge. We use the recently-upgraded Thomson Scattering system to accurately measure electron temperatures above 2 keV at a 2 kHz repetition rate. In "crash-heated" PPCD, large magnetic reconnection events (sawtooth crashes) heat the ions to > 1 keV prior to the onset of improved confinement. Crash-heated discharges achieve Te of 2 keV in the core. In "non-crash-heated" PPCD, large crashes are suppressed by lowered toroidal field reversal, preventing strong ion heating. The core electron temperature is 200-400 eV lower at a given density (0.5-1.2 x 10^{13} cm^{-3}) than in crash-heated discharges. We compare the two types of discharges to understand the mechanisms behind this difference.

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