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Fast wave experiments in LAPD: RF sheaths, convective cells and density modifications[1] T.A. CARTER, B. VAN COMPERNOLLE, M. MARTIN, W. GEKELMAN, P. PRIBYL, UCLA, D. VAN EESTER, K. CROMBE, Royal Military Academy, Belgium, R. PERKINS, PPPL, C. LAU, E. MARTIN, J. CAUGHMAN, ORNL, S.K.P. TRIPATHI, S. VINCENA, UCLA — An overview is presented of recent work on ICRF physics at the Large Plasma Device (LAPD) at UCLA. The LAPD has typical plasma parameters $n_e \sim 10^{12} - 10^{13}\text{cm}^{-3}$, $T_e \sim 1 - 10\text{eV}$ and $B \sim 1000\text{G}$. A new high-power (∼150 kW) RF system and fast wave antenna have been developed for LAPD. The source runs at a frequency of 2.4 MHz, corresponding to $1 - 7 f_{\text{ci}}$, depending on plasma parameters. Evidence of rectified RF sheaths is seen in large increases ($\sim 10 T_e$) in the plasma potential on field lines connected to the antenna. The rectified potential scales linearly with antenna current. The rectified RF sheaths set up convective cells of local $E \times B$ flows, measured indirectly by potential measurements, and measured directly with Mach probes. At high antenna powers substantial modifications of the density profile were observed. The plasma density profile initially exhibits transient low frequency oscillations (10 kHz). The amplitude of the fast wave fields in the core plasma is modulated at the same low frequency, suggesting fast wave coupling is affected by the density rearrangement.

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