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Electron Temperature and Density Profiles for Low Recycling Wall Conditions in the Lithium Tokamak Experiment[1] C.M. JACOBSON, R. KAITA, B.P. LEBLANC, R. MAJESKI, Princeton Plasma Physics Laboratory — The Lithium Tokamak Experiment (LTX) is a spherical tokamak designed to study the low-recycling regime through the use of a liquid-lithium coated shell conformal to the last closed flux surface. Li is deposited onto the surface of the shells from internal crucible evaporators or is poured into the lower shell reservoir using a lithium filler system. The recycling rate $R = \Gamma_{\text{wall}\rightarrow\text{plasma}}/\Gamma_{\text{plasma}\rightarrow\text{wall}}$ is varied by the method of Li deposition, shell temperature, and slow passivation of the Li surface over time. A low recycling rate is expected to flatten core electron temperature profiles, raise edge temperatures, and strongly affect electron density profiles. A Thomson scattering diagnostic uses a 15 J, 30 ns FWHM pulsed ruby laser (694.3 nm) to measure T_e and n_e at 9 radial points on the horizontal midplane, spaced from the plasma axis to the outer edge at a single temporal point for each discharge, with two background light channels. Scattered light is imaged though a spectrometer to an intensified CCD. T_e and n_e profiles under various wall conditions are presented. Measurements are used in interpretive modeling of plasmas on LTX.

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