

# Langmuir Probe Measurements of Scrape-Off Layer Conditions in Lower Hybrid Wave-driven Plasmas in TST-2

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## Abstract

A new Langmuir probe was designed and tested for use in the Scrape-Off Layer (SOL) region of the TST-2 spherical tokamak device. The probe area was increased from the previous design to improve signal clarity. Separate probes were included on both sides of the plasma limiter to identify asymmetry. Measurements of  $1.0 \times 10^{16} \text{ m}^{-3}$  were obtained during LH-driven discharges at the lower limiter. The increased probe area gave better accuracy of electron density  $n_e$  measurements by improving the signal-to-noise ratio of ion saturation current. Bulk electron temperature  $T_e$  was found to be 8-10 eV without LH power, which increased to 20 eV during LH power. Floating potential  $V_{fl}$  was non-negative at the lower limiter, and showed positive correlation with injected LH power. The radial profile of plasma density at the bottom-limiter was estimated, with a decay length of about 60 mm, similar to previous results from the Outboard-antenna limiter. A non-thermal, linear component was observed in a particular discharge, which may correspond to a fast electron plateau caused by Lower-Hybrid Current Drive (LHCD).