

## **Plasma Current Start-up Experiment using Waves in the Lower Hybrid Frequency Range in TST-2**

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Plasma current start-up experiments using RF power in the lower hybrid frequency range are being conducted on the TST-2 spherical tokamak. The lower hybrid wave (LHW) has demonstrated efficient current drive in conventional tokamaks. However, in spherical tokamak (ST) plasmas with very high dielectric constants ( $\epsilon \sim \omega_{pe}^2 / \Omega_e^2 \gg 1$ ), accessibility of the LHW to the plasma core is severely limited. Our approach is to keep the plasma density low ( $\epsilon \sim 1$ ) during plasma current ramp-up. Once the plasma current reaches a level sufficiently high for neutral beam current drive, the plasma can be densified and transformed into an advanced tokamak plasma dominated by the self-driven bootstrap current. Initial plasma start-up experiments are being performed on TST-2 using a comblane antenna which was designed to excite a traveling fast wave. After formation of toroidal flux surfaces the RF power and the vertical field were ramped up to increase the plasma current. Up to 12 kA of plasma current has been achieved. Soft X-ray measurements indicate that the electron temperature increases as the plasma current increases. A build-up of energetic electrons is observed by hard X-ray spectroscopy as the plasma current is ramped up.