

Mechanisms for Loss of LHCD Efficiency at High Density

Ron Parker

Plasma Science and Fusion Center, Massachusetts Institute of Technology

Since the earliest experiments on lower hybrid current drive, an anomalous loss of efficiency has been observed at high density, i.e., at densities approaching but below the penetration limit. Possible losses include collisional absorption in the plasma scrape-off-layer and effects resulting from parametric decay instabilities. New measurements confirm that, in this regime, power absorption does indeed occur near the edge, most likely just inside the separatrix in diverted configurations. Direct measurement of the launched wave, or pump, suggests that pump depletion is not strong enough to lead to near 100% absorption; consequently, if PDI are the root cause, the loss in efficiency must be a secondary effect, e.g., spectral broadening or development of a supra thermal component in the electron distribution function near the edge.