

Lower hybrid current drive efficiency at high density on Tore Supra

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High current drive efficiency (CD) for the lower hybrid (LH) waves has been reported for experiments performed at rather low plasma density. Recent results on C-Mod [1], FTU [2] and JET [3] indicate that the current drive efficiency decays for density exceeding $5-7 \times 10^{19} \text{ m}^{-3}$. Interaction of the wave with the edge plasma has been evoked as the cause for reduction of CD efficiency.

LHCD experiments have been carried out on Tore Supra with the density n_{vol} varying between 3.2 and $5.2 \times 10^{19} \text{ m}^{-3}$. For the whole range of density, strong decay of the fast electron bremsstrahlung in the hard X-ray (HXR) range is found with a density dependence very close to n_{vol}^{-3} . Effect of edge plasma parameters on HXR emission is also presented.

These discharges have been modeled with the CRONOS suite of codes. The LH driven current is also found to decay with density with a general trend which is not far from n_e^{-3} dependence but with a large scattering ($\pm 50\%$), indicating a strong reduction of the current drive efficiency with density.

[1]

[2]