

ICRF mode conversion flow drive experiments on Alcator C-Mod*

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ICRF mode conversion flow drive (MCFD) may be a candidate for the external control of plasma rotation in large tokamaks like ITER. Recently, we have carried out detailed studies of the dependence of MCFD on plasma parameters and RF parameters [1]. The flow drive efficiency is found to depend strongly on the ^3He concentration in $\text{D}(^3\text{He})$ plasmas, a key parameter separating the ICRF minority heating regime and mode conversion regime. The flow drive efficiency decreases at higher plasma density and higher antenna frequency. At $+90^\circ$ antenna phasing (waves in the co- I_p direction) and dipole phasing, the driven flow is in the co- I_p direction, and the change of the rotation velocity increases with both RF power level and I_p (opposite to the $1/I_p$ intrinsic rotation scaling). When MCFD is applied to I-mode plasmas, the plasma rotation increases until the onset of a possible neo-classical-tearing mode (NTM) triggered by large sawtooth crashes. Very high performance I-mode plasmas with $H_{\text{ITER}98,y2} \sim 1.4$ and $T_{e0} \sim 8$ keV have been obtained in these experiments.

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