Slow Wave Excitation in the ICRF and HHFW Regimes*

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Theoretical considerations and high spatial resolution numerical simulations of ICRF heating in tokamaks and of high harmonic fast wave heating (HHFW) in spherical toruses (ST) will be presented that indicate that the launched fast waves may excite a short wavelength slow mode via mode conversion inside of the plasma discharge due to the presence of hot electrons that satisfy the condition $\omega < k_{//}v_{te}$, where ω is the launched wave frequency, $k_{//}$ is the local parallel component of the wave vector, and v_{te} is the local electron thermal speed. This excited slow wave may be related to the electrostatic ion cyclotron wave that propagates for frequencies about the fundamental ion cyclotron frequency in warm plasmas. It was first observed by N. D'Angelo and R. W. Motley [1] in a Q-machine in 1962. This slow wave may provide another path for rf power absorption in tokamaks and ST devices.

[1] N. D'Angelo and R.W. Motley, Phys. Fluids **5** (1962) 633.

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