

Calculation of optical depth based on electron cyclotron emission in the IR-T1 Tokamak plasmas

Mona Ahmadi, Pejman Khorshid

*Department of Physics, Faculty of Science, Mashhad Branch, Islamic Azad University,
Mashhad, Iran*

The electron cyclotron emission (ECE) was investigated in IR-T1 tokamak. According to the electron temperature plasma and its direct relationship with the absorption coefficient, the absorption conditions were discussed for both first and second harmonic ordinary and extraordinary modes and electron cyclotron radiation was calculated. The theory of electron cyclotron emission and absorption coefficient were considered as non-relativistic effects in low plasma temperature. By examining the area of absorption in condition $\omega_p > \omega_c$, the profile of optical depth in perpendicular emission $\theta = \pi/2$ and the equatorial plane torus were calculated and the maximum value of optical depth $\tau = 1.38$ was obtained for IR-T1 tokamak. These results show that the values of optical depth have a direct relationship with electron density and electron temperature plasma mostly in second harmonic extraordinary mode.