

# Electron-cyclotron absorption in high-temperature plasmas: quasi-exact analytical evaluation and comparative numerical analysis

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On the basis of the electromagnetic energy balance equation, a quasi-exact *analytical* evaluation of the electron cyclotron (EC) absorption coefficient is performed for arbitrary propagation (with respect to the magnetic field) in a high-temperature (Maxwellian) plasma. The calculation makes use of Bateman’s expansion for the product of two Bessel functions, retaining the lowest order contribution. The integration over electron momentum can be carried out analytically, fully accounting for finite Larmor radius effects in this approximation. On the basis of the analytical expressions for the EC absorption coefficients of both the extraordinary and ordinary mode thus obtained, (i) for the case of perpendicular propagation simple formulae are derived for both modes and (ii) a numerical analysis of the angular distribution of EC absorption is carried out, along with an assessment of the accuracy of asymptotic expressions existing in literature.