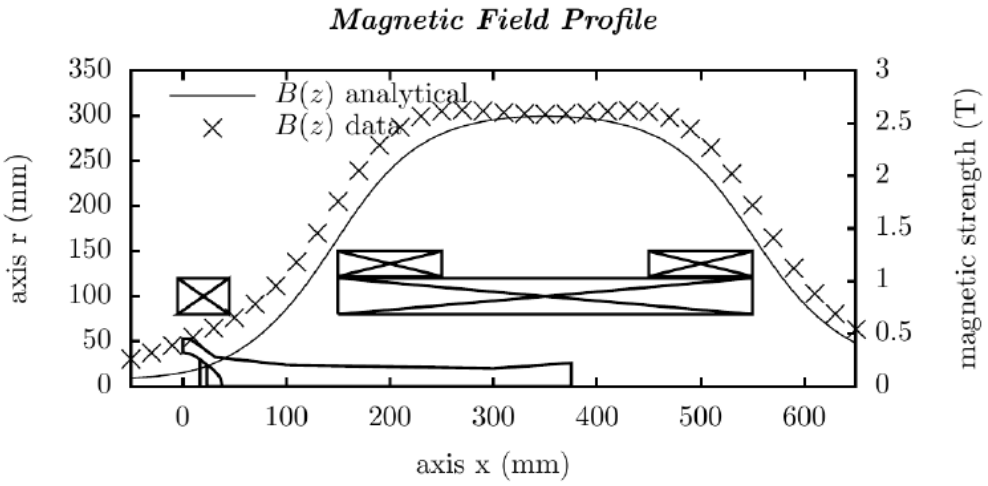
Gyrotron General Design for the Mexican Tokamak

The Fusion Research Group (GIF) at the University State of Nuevo León, México, presents the preliminary advances in the Gyrotron 60 GHz-300 kW design for ECRH systems on Mexican Tokamak "T". Using the well known Trade-off equations, the nominal beam parameters of MIG are presented. Due to need for guiding this beam an array of four copper coils is designed too.



$$B_z = \frac{\mu_0}{4\pi}\iiint \frac{JdV \times e_R}{R^2} = \frac{N\mu_0 I}{2\Delta z \Delta r}\ln\frac{\left\{\frac{r_2+\sqrt{r_2^2+(z-z_1)^2}}{r_1+\sqrt{r_1^2+(z-z_1)^2}}\right\}^{z-z_1}}{\left\{\frac{r_2+\sqrt{r_2^2+(z-z_2)^2}}{r_1+\sqrt{r_1^2+(z-z_2)^2}}\right\}^{z-z_2}}$$

Nominal beam parameters	
Beam voltage	**100 kV**
Beam current	**3 A**
Magnetic field in cavity	**2.56 T**
Average beam radius in cavity	**7.3 mm**
Velocity ratio	**1.5**
Initial normalized energy	**1.195**
Magnetic compresion ratio	**13.68**
Electric field at the emitter	**100e+05 V/m**
Slope angle of the emitter	40 °
Cathode modulating anode gap	11.5 mm
Cathode radius	27 mm
Emitter strip width	8.8 mm
Larmor radius	0.36 mm
Relative cathode loading	0.3 %