

$$\frac{d^2r}{dz^2} + \left[\frac{(\omega_L^2(z) - \omega_L^2(z=0))}{\beta^2 c^2} \right] r = 0$$

$$e/m = 1.76 * 10^{11} \text{ s}^{-1} T^{-1}$$

$$\gamma = 1.59$$

$$\beta = 0.78$$

$$c = 3 * 10^8 \text{ m s}^{-1}$$

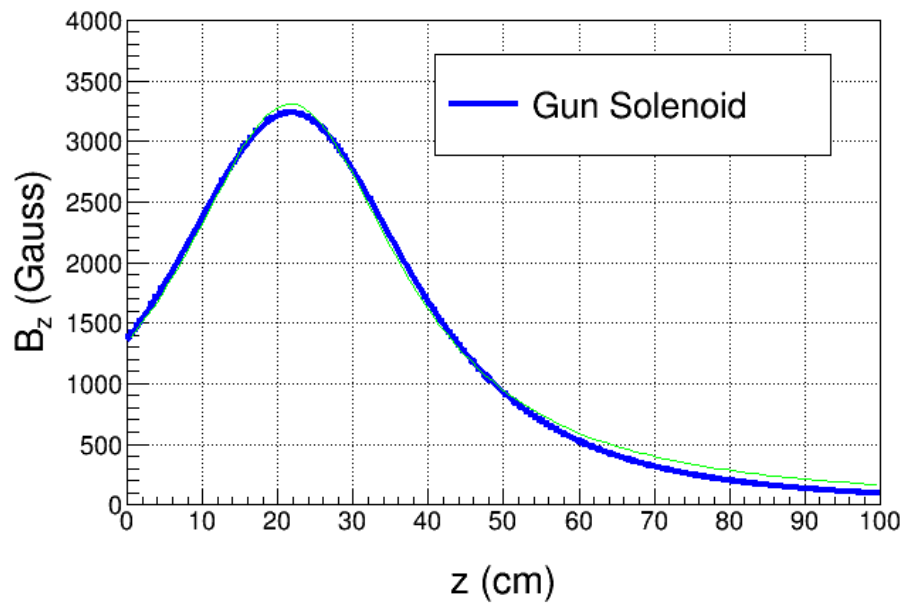
$$B(z=0) = 0.145 \text{ T}$$

$$\omega_L = \frac{eB}{2\gamma m}$$

Therefore

$$\omega_L^2(z=0) = 6.44031 * 10^{19} \text{ s}^{-2}$$

Fit for the magnetic filed map



and the equation is,

$$B = \frac{3310.54}{1 + \left(\frac{z - 21.6284}{17.9171}\right)^2}$$

By substituting these values

$$\frac{d^2r}{dz^2} + 5.59 * 10^4 \left[\frac{0.331054}{1 + \left(\frac{z-0.216284}{0.179171}\right)^2} \right]^2 r - 1.18 * 10^3 r = 0$$