Advanced Accelerator Physics and Accelerator Simulation Homework 1

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January 29, 2007

Exercise 1:
Find the radial dependence of the magnetic field $B_z(r)$ in an isocyclotron with angular frequency ω_z.

Exercise 2:
Consider a microtron with one accelerating cavity ($l = 1\text{m}$, $g = 30\text{MV/m}$) and $\omega_{RF} = 2\pi \cdot 1.3 \times 10^9\text{Hz}$. What is the proper value of the magnetic field B?

Exercise 3:
In a Wideroe linear accelerator, what is the limit of the drift tube's length as the speed of particles $v \to c$?