Astronomy 423 Worksheet #4

Spring 2021

Problem: For synchrotron emission, what is the Lorentz factor that is needed to produce photons with a frequency of 5 GHz in a magnetic field of 10 microGauss?

Step 1: Calculate the gyrofrequency using $\nu_g = (17.6/2\pi)$ MHz B ; where B is in Gauss

Step 2: Calculate the Lorentz factor assuming $\sin(\alpha) = 1$ (basically ignoring the pitch angle which we can assume to be a small factor)

Done!