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Magnetic Field and Particle Tracking Simulations for Project 8
DEVYN RYSEWYK, Massachusetts Institute of Technology, PROJECT 8 COLLABORATION — A neutrino is a neutral, weakly interacting particle that was first detected in the 1950s. While first it seemed that the neutrino was massless, there is now solid evidence that says the opposite. Project 8 is a new experiment being developed to measure the neutrino mass. The neutrino mass is measured by using the energy of electrons that are emitted from the beta-decay of tritium, which releases an electron and an antineutrino. A measurement of the beta-decay energy distribution is equivalent to a neutrino mass measurement because it depends on the neutrino mass. Project 8 will detect the electron energy by looking at the cyclotron frequency of the electron while it is moving within a magnetic field. Currently, Project 8 is using a ^{83}Rb source to see if the method for measuring the electron energy will work. ^{83}Rb decays to ^{83m}Kr, and then to ^{83}Kr. Electrons are emitted in the decay of ^{83m}Kr to ^{83}Kr with the energy of about 18 keV and 32 keV. I ran magnetic field simulations to characterize the field that electrons move in. I have also simulated how electrons move through the magnetic field to see if some are trapped and how long they are trapped. I will be presenting field simulations and results from particle tracking simulations.

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