

The paper is easy to read - the language is clear, concise, and summarizes the background info well. The photographs of the experimental setup are a good addition that make it clear how your data was collected - I like the use of the beaker holder/tongs to keep the detector in place.

I especially appreciate the drawn figures/schematics that you made to demonstrate the path of the muons as they were deflected - that really helped with my understanding of what the goal of the experiment was.

I think the biggest weakness of the paper is the inconsistency in the formatting - some of the math in your theoretical background was very well done and easy to read:

$$BqV = \frac{mV^2}{r}$$
$$r = \frac{mV}{Bq}$$

Given the velocity of the muon is very high, we have to factor in the effect of relativity and multiply the velocity with  $\gamma$ .

$$\therefore r = \frac{m\gamma V}{Bq}$$

But then your data table appears to just be plain text without any LaTeX, or implementation of the suggestions for data table formatting shown to us in class. Then the sample calculations at the end are handwritten, and the image is quite small and challenging to read. I think it would be advisable to have everything done in LaTeX similar to the theoretical background for the final draft for clarity.

I also have a number smaller, more specific concerns:

- You have only three items in your bibliography, and none of them are academic/peer reviewed sources - not that NASA is an unreliable source, but you are citing a news article that is intended for general audiences. The NIST database is also not a primary source - they do have a searchable bibliography (<https://physics.nist.gov/cuu/Constants/Citations/Search.html>) that could direct you to the source of their data for some more suitable references.
- There are also no in-text citations, which should be present for any time you are referencing one of your sources. "According to NASA" is not quite specific enough -

you need to specify where you got that direct quote from. You should also cite the source you used for the muon mass when you introduce it in your calculations.

- The source for the value of the velocity of the muon that you use in your calculations is not given - you then say later in the paper that you don't know the velocity of the muon, but you used it in your calculations earlier. I found a source that also used scintillation detectors that measured the value you used and had the exact same value for gamma (Liu, L., & Solis, P. (2007). The speed and lifetime of cosmic ray muons. *Physics Department, Massachusetts Institute of Technology, Cambridge, MA, 2139.*) but they specify that this is the average for muons that are travelling normal to the Earth.
- You mentioned that you were able to calculate the strength of the magnetic field using the formula  $B = -0.00092942 + 0.12506632I - 0.0089694I^2$  - where did these numbers come from, and what units are you using for the magnetic field?

I also think that the paper would benefit greatly from some further explanation of what Graph 1 represents - it seems like this graph is the primary result of your paper, but it is unclear exactly what you are showing. This is a plot of the slave counts as a function of master counts - where does the varying magnetic field strength come in? What does a datapoint on this graph represent?

Some discussion of the statistical significance of what was found might also be valuable. It seems from inspection that the fit of the linear trendline to the datapoints is quite poor - adding an  $R^2$  might be beneficial to quantify how well your model fits the data.

Overall the paper is an interesting exploration of a cool concept, and the experimental design seems sound and viable. I would encourage that you have all elements of the paper be formatted consistently for the final draft, and provide a more in-depth discussion of how you came to the conclusion that you measured the count rate decrease by 36.7%, and how confident you are in that value.