

Experimental Error: The Case of Allegedly Superluminal Neutrinos

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Abstract

The abstract is a brief summary of all major sections of your thesis document. It should appear on the cover page with the title and be followed by a page break. Content of abstract should include a statement of what was done, the results that you obtained, and their significance. The length of a good abstract should not exceed 150 words, typically.

1 Introduction

The goal of my thesis is to translate theory on fluid flow to computational models. To analytically model fluid flow, one must be able to relate the fluid properties, pressure, density, and temperature, and conserve mass, fluid momentum, and fluid energy. There exists a myriad of different flow types, and my thesis will concentrate on laminar, incompressible flow in particular. Laminar flow is non-turbulent and is therefore easier to solve for. To say that a flow is incompressible is to make the assumption that the fluid is of uniform density. Despite the existence of adequate fluid solvers, the abstraction of the details of the modeling process increases the probability of making poor assumptions when modeling a particular fluid flow.

The introduction section should provide a broader context for your thesis topic that gradually narrows down to a thesis statement. Think of the structure as a funnel: start broad and end narrowly focused. In your presentation, typically you will need to review prior work in the field in setting the stage for your current investigation. Make sure you cite prior work appropriately.[1]

1.1 Interesting Subtopic

Use subsections to break sections down if you wish. This technique can be very helpful if sections become long, especially in more substantial documents. Fig.1 illustrates how to insert and label figures. (Note that LaTeX will keep track of numbering if you do it this way.)

1.2 Second Interesting Subtopic

Subsections are like potato chips: you can't have just one! Maybe you will need to include a formula. Here is an example of some gratuitous physics with a numbered equation on separate line as well as embedded in text.

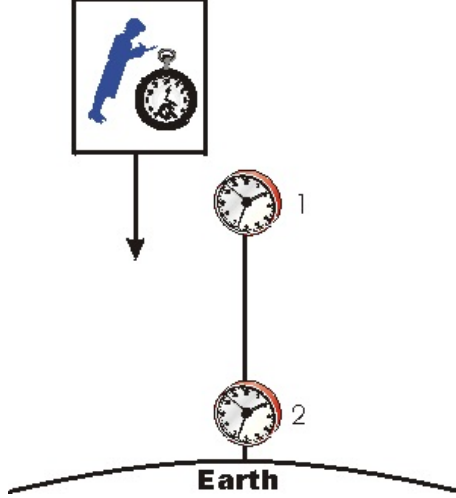


Figure 1: A random relativistic mechanics figure for your entertainment. [2]

A tree-level amplitude in e^+e^- collisions can be expressed in terms of fermion strings of the form

$$\bar{v}(p_2, \sigma_2) P_{-\tau} \hat{a}_1 \hat{a}_2 \cdots \hat{a}_n u(p_1, \sigma_1), \quad (1)$$

where p and σ label the initial e^\pm four-momenta and helicities ($\sigma = \pm 1$), $\hat{a}_i = a_i^\mu \gamma_\mu$ and $P_\tau = \frac{1}{2}(1 + \tau \gamma_5)$ is a chirality projection operator ($\tau = \pm 1$). The a_i^μ may be formed from particle four-momenta, gauge-boson polarization vectors or fermion strings with an uncontracted Lorentz index associated with final-state fermions.

For no particular reason, here is one last equation: $E = mc^2$.

2 Procedures

This section details the actual investigation that you undertook in trying to answer your thesis question. Your description may include description of an experimental set-up or it may involve showing steps of a detailed calculation. Be thorough and specific in documenting what you did but avoid including the trivial (e.g. don't show numbers being plugged into equations). Your goal should be documenting what you did in enough detail that someone else could duplicate the work without having to “reinvent the wheel”.

3 Results

You need to show your results in writing and also in a visual presentation (if appropriate). Visuals may include tables of data, graphs, or images. Be sure to document all columns of the tables and to provide figure captions. Fig. 2 is a graph.

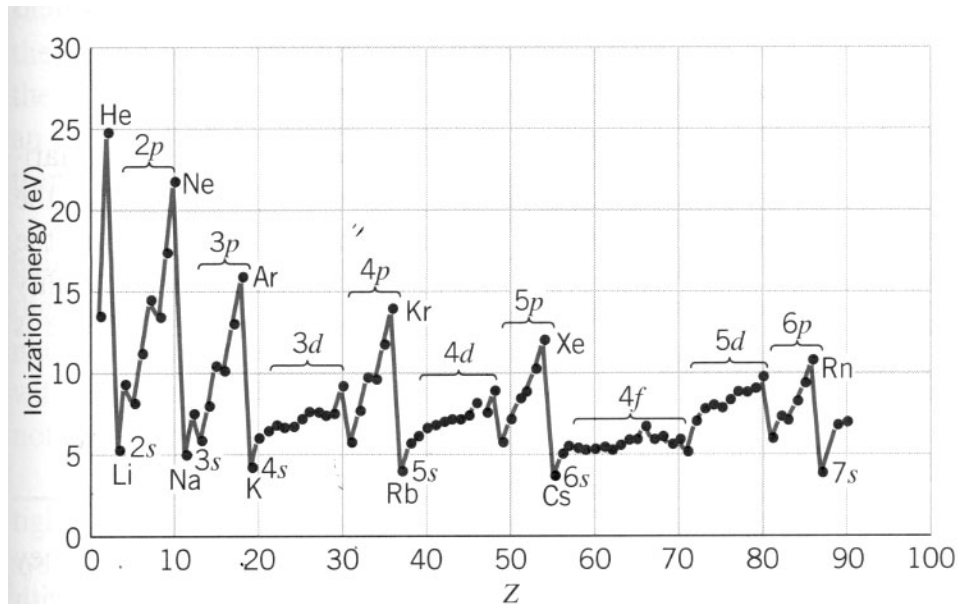


FIGURE 8.4 Ionization energies of neutral atoms of the elements.

Figure 2: A plot of ionization energies for all elements in the periodic table.

4 Discussion

Discuss the significance of your results within the larger context that you developed in the introduction section. Note: don't bother to try writing the discussion section before you have completed the study itself! This is not only bad form, it's just plain a waste of time.

5 Conclusion

Don't forget to close your document with a conclusions section. This is your opportunity to connect your far-reaching discussion section back to the task at hand: answering the question you set for yourself.

References

- [1] Holman, T. (2008). Surround sound, up and running. Focal Press.
- [2] Retrieved from <http://www.upscale.utoronto.ca/GeneralInterest/Harrison/GenRel/Images/TimeDilation5.gif>

6 Appendix

Usually not needed, but just in case...

7 Acknowledgements

It's a nice gesture to thank people who have helped you in the thesis process. If you received grant money to support your work or if you used certain on-line archives or databases, this is the place to put the standard boiler plate acknowledgement language.