Report Checklist

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1 General Points

- Does the writing cater to the **intended audiences**?
  - Will **a physics major who does not know about the lab** understand the scientific goal, the measurement, and the results?
  - Is there adequate detail (measurement parameters, intermediate analysis results) given so that **an advanced lab classmate** can compare his/her results to yours or reproduce your measurement?

  You should read and reread your report from the vantage of these audiences. Does it provide the information needed through a logical narrative?

- Does the abstract, introduction, figures/captions, and conclusion provide a self-contained synopsis of your experiment?

- Are figures and tables used in effective ways to convey complicated ideas from the text? Common uses of figures are a schematic of the experimental apparatus and a plot of data with model fits. A common use of a table is to give numerical values that are too numerous to list cleanly in the writing and not so numerous that they take up lots of space: intermediate analysis results and errors are good candidates for tables.

2 Important Details

- Does your writing make **logical sense**? Sloppy writing often **omits information needed to understand what was done** or is **self-contradictory**. Read your report from a 3rd-party perspective and ask whether it can be understood without insider knowledge that is omitted from or obscured by the text.

- Does the writing have correct grammar and is the text reasonably formatted?

- Are all figures annotated properly?
  - Do all plot axes have labels?
  - Are the labels in figures comparable size to the text (i.e., not too small)?

- Do figure captions provide more than just clarifications of the figure. Do they provide a "take-away" message that is essential to the experiment?
- Do significant figures in numerical results reflect the associated error?
- Are all physical quantities given with units (including in table headers, plot labels etc)?
- Are tables, figures, and sections referenced in the text by their numbers (as opposed to locational references like "above")?

3 Abstract

The abstract is only a few sentences long. It gives a synopsis of the experiment and the final result.

- Is the experiment summarized succinctly?
- Is a numerical result (usually the best-fit value of a physical model parameter) **with error(s)** given?

4 Introduction

The introduction motivates your experiment and places it in the context of previous work.

- Is the relevance of the topic to our understanding of the physical world established?
- What is the history of this topic? Are important works cited?
- Is there any pedagogical/recent work related to your measurement? Is the work cited?
- Is there a concise summary of your experiment and how it fits in the context of previous work?

5 Theory

The theory section describes the physics that you will use to interpret your data. Note this section may not be needed if the phenomenon under study is self-explanatory. For example, when you measure the speed of light there is no explanation needed, but the Brownian motion experiment requires a theoretical description with formulae.

- Is the physical phenomenon under investigation clearly and succinctly described?
- Are all relevant formulas given (to be referenced later in results section)?

6 Experiment Apparatus

The experimental apparatus section describes the **equipment and associated measurement technique** used to make your measurement.

- Is the experimental apparatus clearly and succinctly described?
- Is a diagram of the apparatus given with clear labelling and explanatory caption?
- Are key experimental parameters identified?
- Are all key equations describing the apparatus given?

7 Data

The data section presents the specific measurements that you made along with the data. This section describes any initial analysis to reduce the raw data to an intermediate result (usually the means and standard deviations of sample distributions).

- Are all measurement setups (including specific apparatus parameters) and associated datasets described?
- Are the motivations for the different measurements (e.g., systematics checks) given?
- Is the initial reduction of data, including error estimation, described clearly and succinctly?
- Are the intermediate results (reduced data and errors) provided in both numerical and graphical form?

8 Interpretation

The interpretation section presents what the data tell us about the world in the context of a **physical model**. A **physical model** of the data is given as an equation (or equations) that describe the data and are **derived from the equations describing the experimental apparatus, measurement, and/or theory**. The parameters of this model are variables in the equation (or equations) that are varied to fit the model to the data. The **modeling ("fitting")** method is described with resulting best estimate of and error on model parameters.

- Is the physical model described, referencing appropriate equations in the Theory and/or Experiment Apparatus sections?
- Is the method for fitting the model to the data (and estimating model parameter errors) described? (Was it a linear or non-linear fit? What algorithms were used to find the best fit model parameters?)
- Are the resulting physical model parameters with errors given?
- Are the effects of systematic errors described?

9 Conclusion

- Is the experiment summarized with main "take-away" results emphasized?
- Are any major deficiencies in the experiment addressed?

References

[1] Are all references cleanly/consistently formatted?