

Physics 307L

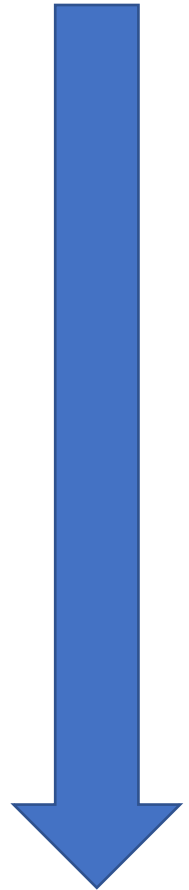
Spring 2020

Prof. Darcy Barron

Lecture 5: Lab Reports and Presentations

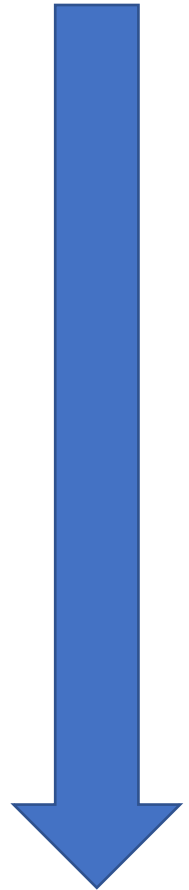
Three ways of reporting results

- **Lab notebook** - *Documenting in detail*
- **Lab reports** - *Organizing and editing*
- **Short conference-style talks** - *Summarizing*



Three ways of reporting results

- Your **lab notebook** is practice for real-world scientific documentation
 - *Documenting in detail* for yourself and close collaborators what you did and how you did it
 - Should be a complete write-up, including completed analysis, where content is ~ in order of time of completion
- **Lab reports** are practice for writing scientific papers, which communicate results to broader audience
 - *Organizing and editing* your work for a broader audience
 - Also should include more background/introduction for context, and typically a section on “what’s next”
 - Should also be used as practice in writing in LaTeX
- **Short conference-style talks** are used to briefly summarize and advertise results to a broader audience
 - *Summarizing* the important context and results
 - Also want to reach a broader audience than a paper (interested/experts will go follow up and read paper)



Due dates

- Going forward, lab notebook is due by Wednesday at noon, the week after you complete the experiment
 - 5% deducted for each day that it is late
 - Extremely late notebooks will be accepted for 50% credit up until Wed. May 13
- First lab report is due by Tuesday, March 10 at 5pm
 - 20% deducted for each week that it is late
- First talks are March 23 and April 6 (must email to sign up for a date in advance)
 - No credit unless re-scheduled due to excused absence
- [https://ghz.unm.edu/juniorlab/index.php?title=Schedule Spring 2020](https://ghz.unm.edu/juniorlab/index.php?title=Schedule_Spring_2020)

Elements of a scientific paper

ABSTRACT: A series of measurements were performed to measure the charge of the electron. An experimental value of $1.6 \pm 0.2 \times 10^{-19}$ C was obtained, in good agreement with the established value.

INTRODUCTION: The charge of the electron is a fundamental constant of physics. It was first measured by R. Millikan and co-workers in 1913 [1]. As experimental techniques improved, the accuracy...

EXPERIMENT: A sketch of the experimental setup is shown in Figure 1. A mist of drops is injected...

RESULTS AND DISCUSSION: Results are summarized in Table I. Experimental errors are attributed to...

CONCLUSIONS: The experiment gives the fundamental electron charge with an accuracy of approximately 12%. This is limited by...

REFERENCES:

[1] R.A. Millikan, "On the Elementary Charge and the Avogadro Constant", Phys. Rev., **2**, 109 (1913).

Elements of a short scientific talk

- **Short** scientific talk – conference style
- Different in style and content from a lecture, seminar, or colloquium
- Typically have 5 – 15 minutes to present, plus short time for questions
- Short enough that you can only communicate ~ 1-2 main points well

Elements of a short scientific talk

- Whom are you speaking to?
- What do you want your audience to learn?
- What is your story?
- How long do you have to speak?
- What visuals will serve to amplify your story?

Elements of a short scientific talk

- Whom are you speaking to?
 - Assume a general undergraduate physics audience
 - Not all students will be familiar with your experiment
- What do you want your audience to learn?
- What is your story?
 - How do you frame it as an engaging story?
- How long do you have to speak?
 - Your talks will be 12-15 minutes plus a few minutes for questions
- What visuals will serve to amplify your story?
 - Graphs, photos of setup, historical photos

Sections of a short talk

- Short enough that an outline isn't always necessary, but can be good to include a ~ 3-4 point outline
 - Intro/Overview of X
 - Experimental Procedure
 - Results
- Variation is expected in focus and content based on which experiment and what outcome was
- Talk should communicate enough information for audience to generate questions

Resources

- <https://journals.aps.org/pr/pdf/10.1103/PhysRev.2.109>
- <http://articles.adsabs.harvard.edu//full/1887SidM..6..306M/000>
- <https://royalsocietypublishing.org/doi/pdf/10.1098/rspa.1920.00350306.000.html>

Resources

- <https://physics.unm.edu/Courses/Becerra/Phys307LSp18/DescriptiveDocuments/GuideforWritingLabReports.pdf>
- <https://www.overleaf.com/learn/latex/Tutorials>

Resources

- <https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing>
- <https://www.planetary.org/blogs/emily-lakdawalla/2013/04040850-better-conference-talks.html>
- <https://colinpurrington.com/tips/lab-notebooks/>