

# Senior Laboratory

PHYS 493L, Spring 2024

**Lab Time:** Tuesdays & Thursdays, 8am-10:50am

**Lectures:** most Tuesdays (PAIS 1405)

**Lab Location:** PAIS 1417

**Instructor:** Tara Drake

Email: [drakete@unm.edu](mailto:drakete@unm.edu)

Offices: PAIS 2234 and CHTM 118B

**Teaching Assistant:** Ameen Zerrad

Email: [azerrad151@unm.edu](mailto:azerrad151@unm.edu)

**Office Hours:** arrange meeting with instructor or TA via email

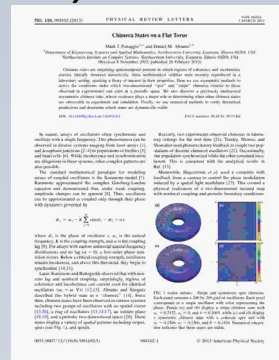
# Lab Reports

Each student produces a **separate** formal report based on experiment.

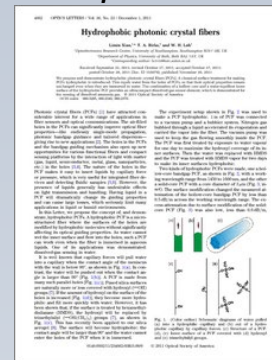
Should follow the style of a scientific journal.

- See Optics Letters or Physical Review Letters
- LaTeX template will be provided.

## Phys. Rev. Lett.



## Opt. Lett.



Next lab report is due **Thursday, Feb 15, before class**. Please submit **by email**. Please also bring a printed copy to class.

# Figures

IMO, the make-or-break of a paper.

1. All axes have labels and units.
2. Figure caption
  - Separated from main text (standard journal format)
  - Enough detail that the main concept is clear without reference to text. A reader should be able to answer, “what measurement is this showing?”
3. Figures have numbers (Fig. 1, Fig. 2) and at least one referral in text.
  - If there is Fig. 1a and Fig 1b, both appear in text separately.
4. Text in figure (labels, etc.) is big enough to read (8 pt or larger).
5. If figure is taken from somewhere, “Reproduced from [ ]” must be in caption.

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# Abstract

How reader decides if your paper is worth their time!

The abstract contains a summary of your manuscript:

- It is short (~250 words).
  1. Briefly state the motivation and give context for the work (~ one-two sentences)
  2. Problem statement/statement of work (~one sentence)
  3. Statement of methodology and results (with errors)
  4. Relevance of results to your field, other disciplines, or general public (depending on the journal's audience)
- Completely encapsulates your paper

# Abstract

Other abstracts you will see:

## Variation 1

1. Problem statement/statement of work (~one sentence)
2. Statement of methodology and results (with errors)
3. Relevance of results to your field, other disciplines, or general public (depending on the journal's audience)

## Variation 2

1. Briefly state the motivation and give context for the work (~ one-two sentences)
2. Problem statement/statement of work (~one sentence)
3. Statement of methodology and results (with errors)

But we practice the long version because:

- It is easily reduced to the other forms.
- It works great for talk/conference abstracts (i.e. independent of a paper).

# Lab Reports

- **Main sections (see guide in class website for specific details)**
  - **Abstract**
  - **Introduction:** motivation, background and summary of experiment
  - **Methods:** description of experimental methods and **calibrations**
  - **Data:** present the data, use plots or/and tables
  - **Results and data analysis:** describe how the data analysis was done and present your results with uncertainty and error analysis
  - **Discussion**
  - **Conclusion**
  - **References:** Pick a consistent format. If you don't know one, use this:

A. Author, B. Coauthor, C. Lastauthor, "Title," *Journal using standard abbreviation such as Nat. Phys.* **Volume**, first page–last page (year published).
  - **Appendix if necessary**



# Writing in LaTeX

- Your lab reports should be written using LaTeX typesetting language.
- There are many LaTeX editors. Overleaf is probably the simplest if you are starting out:
  - Open [overleaf.com](https://overleaf.com)
    - Create an account if you do not have one.
  - Upload the files from “PRL template v2.zip”
  - This document should help with formatting equations, tables, figures, etc.



If you haven't already,  
grab a paper.

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# Homework:

- Create an overleaf account and upload the PRL template and other LaTeX doc. Use the template to create a document for lab report 1.
- In this document, list and describe all the figures you will include in the report.
- Write the abstract for your first lab report. (If you are missing results, just make a note or an “XX” where they will go.)
- PDF due to me next Thursday (2/2).