In this talk, we’ll look at how scientists read journal articles—which generally is not to begin at the beginning and read every word through to the end. We’ll consider why this unconventional reading style is advantageous and how you can use it to identify papers that are worth the time and effort to read thoroughly.
Introduction

- Peer-reviewed papers are the primary means of communication in physics
  - Official record
- Three broad categories
  - High profile (first time) results
  - Results + details
  - Review: synthesis

Scientists are busy, and far more papers are published every year than anyone could reasonably be expected to read.

The first step is to determine whether a paper is worth your time, i.e., determine its importance to your research.

Note that your purpose for reading a paper (and hence your focus) may vary from paper to paper. In some cases, you’ll want to concentrate on the methods or techniques described, to determine if they could be adapted for your project, and you won’t care about the authors’ specific results or conclusions.

Looking to see who wrote the paper is an important data point, but certainly not the only one. If someone whose affiliation is in a department of industrial engineering has written a paper announcing some world-shattering discovery in quantum measurement theory, you would rightly treat that paper with more skepticism than a paper written by Tony Leggett. However, young people and new people make important discoveries all the time, and some very good work is done in what might be considered unexpected places (e.g., Ernst Ising [Ising model] spent his whole career in the United States [after fleeing Nazi Germany] at Bradley University in Peoria, Illinois).
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What to Read

- Learning about developments in your area:
  - Focus on results in PRL or PRA (BCDE) like journals unless:
  - New formalism or methods have been introduced (in this case focus on methods & formalisms)

- Learning something new
  - Focus on broad understanding of paper
  - Need to pickup on details concerning the physics, methods and results!
  - Start with review papers, books and theses
A reading method

The four i’s

Importance
Iteration
Interpretation
Integration
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Second i: iteration

1. Skim the article and identify its structure
   Many (not all) papers:
   IMRD: Introduction, Methods, Results, Discussion
2. Find main points of each section
3. Generate questions: active reading
4. Read to answer questions
5. Iterate!

Take notes as you read!
Second \textit{i: iteration}

Take the paper apart, section by section, and identify the key ideas
Highlight anything you don’t understand
Cross-check the narrative with the figures and tables
Go back and re-read your highlighted sections; refer to the references or supplementary info
Repeat until you thoroughly understand the parts of interest to you
The third i: interpretation

Put the paper aside and write down the key ideas in your own words

Check what you’ve written against the paper; have you correctly represented the information and emphasis of the original paper?

Are there parts that you still don’t understand? (go back to iteration)

Do you agree with what the authors have said? Have they provided sufficient detail and supporting evidence?
The final *i*: integration

Evaluate how the information presented in the paper fits with what you already know
Does it contradict something that you believe?
Does it raise new questions that you should investigate?
Does it describe a method that you could use?
Is it something that you should refer to in the future? (If so, how are you going to keep track of it?)
Conclusions and Next Steps

Evaluate how the information presented in the paper fits with what you already know
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Does it raise new questions that you should investigate?
Does it describe a method that you could use?
Is it something that you should refer to in the future? (If so, how are you going to keep track of it?)