


How to Read a Physics Paper— The Four I's

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Introduction

- Peer-reviewed papers are the primary means of communication in physics
 - Official record of our work
 - Conference, seminar presentations also contribute; usually related to paper
- Three broad categories
 - 'letter': the results
 - 'long paper': the methods including checks
 - 'review': synthesis—restatement of the questions

Philosophy

- Read to learn about developments in your area
 - Most important use of what follows in this talk
 - Not a straight-line process, it will take a while
- Read to learn about something new or for interest
 - One of my (perennial) New Year's resolutions is to look through the contents of Phys. Rev. Lett. each week and pick an article to read
 - Physics ideas are interconnected

The first *i: importance*

Does the paper contain information (methods, results, conclusions) that has implications for your research? (Is the paper worth reading?)

Read the title and the abstract

Look at the author list and their affiliations

Read the conclusions

Look at the figures and read the captions

Look at the references

A.K.A. getting a sense of the paper

Study or go on?

Second *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?)