


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

Celia M. Elliott
Department of Physics
University of Illinois at Urbana-Champaign

*with thanks to Igor Roshchin, Texas A&M,
and Lance Cooper, Laura Greene, and Kevin Pitts, U. Illinois*



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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.

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

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).


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 work being presented: motivation, context, methods, results, and conclusions**

The third *i*: *interpretation*

Put the paper aside and write down the key ideas, results, and conclusions 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 the authors' conclusions?
Have they made their case?**

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?)