



UiO  **University of Oslo Library**
Library of Medicine and Science

How to improve your reports (and why you should care)

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Computational Physics FYS3150/4150, 23. Sept., 2022

Today's agenda

1. Why you should care about writing.
2. Three useful tips.
3. Five concrete ways to improve your sentences.
4. Figures and figure captions.
5. Citations.

The writing process

Writing is a skill

- An important skill, both within and outside academia.
- Actually doing the writing is the only way to improve.
- Clear and precise: Being understood + a look of competence.
- Communication skills go on your CV.
(see random job advertisement)
- Useful for job interviews!



Image by Michael Schwarzenberger from Pixabay

The writing process

Writing is a skill

- Writing takes time. Don't despair!
- Clarifying: Writing can improve your understanding of a topic.
 - Unsent emails :-)
- Write and then rewrite.
- Take the writing seriously, including the feedback you get!



Image by [Michael Schwarzenberger](#) from [Pixabay](#)

Three useful tips



Image by Peter H from [Pixabay](#)



Image by Dariusz Sankowski from [Pixabay](#)



Image by Daniel Kirsch from [Pixabay](#)

1: Tell a story

What you include in your report should tell a story

- Keep the reader in mind: What you include should give a sense of purpose (not a list of random facts).
 - Motivate the reader to keep reading, guide them towards your goal.
- Close the story arc: In the conclusion, answer the expectations that you give in the introduction.
- Refer to *all* plots, figures and tables that you include.
 - The reader should not be left to wonder *why* a figure is included.



2: Read through your own text

Carefully!

- Have you actually written what you think you have?

In this project we will investigate different algorithms for the solving of the one-dimensional Poisson equation with Dirichlet boundary conditions. This is a problem that is used in many different scientific applications.

- Do you really mean what it says on the page?
(Remember: other people are not in your head!)



3. Write academically

...And what is that?

- Academic papers have a strict structure (IMRaD).
- All your claims must be *substantiated*:
 - either by your own calculations or by citing.
 - Contrast to popular science.
- High level of precision - difficult words.
 - BUT don't use ~~sesquipedalian~~ words just for the sake of it!
long

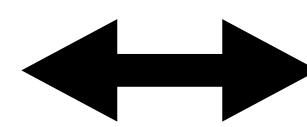


Improve your sentences in five steps



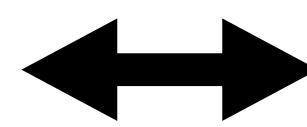
1. Write complete sentences.

Derivation in Appendix A.



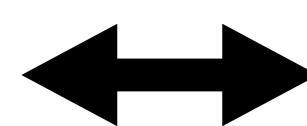
The derivation is found in Appendix A.

Link to GitHub here.



Our code is available on GitHub here.

Simplified equation: ...



The equation can be simplified in the following manner: ...

Sentence fragments

Anders writing code.



Anders is writing code.

(Subject, verb)

(Subject, finite verb)

2. Watch out for grammar.



I	am
You	are
He/she/it	is
We	are
You	are
They	are

2. Watch out for grammar.

- Singular/plural: Simplify your sentences to check!

The algorithm that we developed through many long discussions and arguments WAS finally finished.

- Check your verb tenses (present/past)
 - Be consistent and don't shift tense without a reason

There was a critical error in our code that nobody is able to fix.

- Is it clear which noun your pronouns (e.g. we, they, which...) refer to?

The university made changes to its web pages, which many employees disliked.

- Make an effort!

3. Be active!

Solar spectra were measured in six different frequency bands by our research team.

We measured solar spectra in six frequency bands.

- “We did this...” (active) is often better than “This happened to our data” (passive)
 - But: *My phone was stolen yesterday!*
- 2 in 1: Going from passive to active often simplifies your sentences, which is a good thing!
- However...

4. Love variety

I set up the experiment. Then I performed the experiment. Then I calculated the expected results. I measured the results.

We solve numerically the one dimensional Poisson equation with Dirichlet boundary conditions. The equation is discretized which makes us able to write the problem as a set of linear equations, and then solve the equation by Gaussian elimination. As the matrix we're studying is tridiagonal, we develop an efficient algorithm for solving the system.



Variation in how you formulate your sentences makes it nice to read and leaves a good impression!

5. Take control over the length of your sentences.

- Don't say too much at once. Let the reader breathe.
 - Do you have a sentence with lots of commas? Consider dividing it up!

The paper discusses the first observations of the Sun on different targets and presents an example of the full spectra from the quiet Sun, identifying over 40 spectral lines from neutral hydrogen and ions of carbon, oxygen, nitrogen, neon, sulphur, magnesium, and iron.

We discuss the first observations of the Sun on different targets.

5. Take control over the length of your sentences.

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The paper discusses the first observations of the Sun on different targets and presents an example of the full spectra from the quiet Sun, identifying over 40 spectral lines from neutral hydrogen and ions of carbon, oxygen, nitrogen, neon, sulphur, magnesium, and iron.

We discuss the first observations of the Sun on different targets.

Identifying over 40 spectral lines, we present an example of the full spectra from the quiet Sun.

5. Take control over the length of your sentences.

- Don't say too much at once. Let the reader breathe.
 - Do you have a sentence with lots of commas? Consider dividing it up!
- A mix of long and short sentences makes a text easier to read.
- Be aware of: Who *does things* in your sentences?

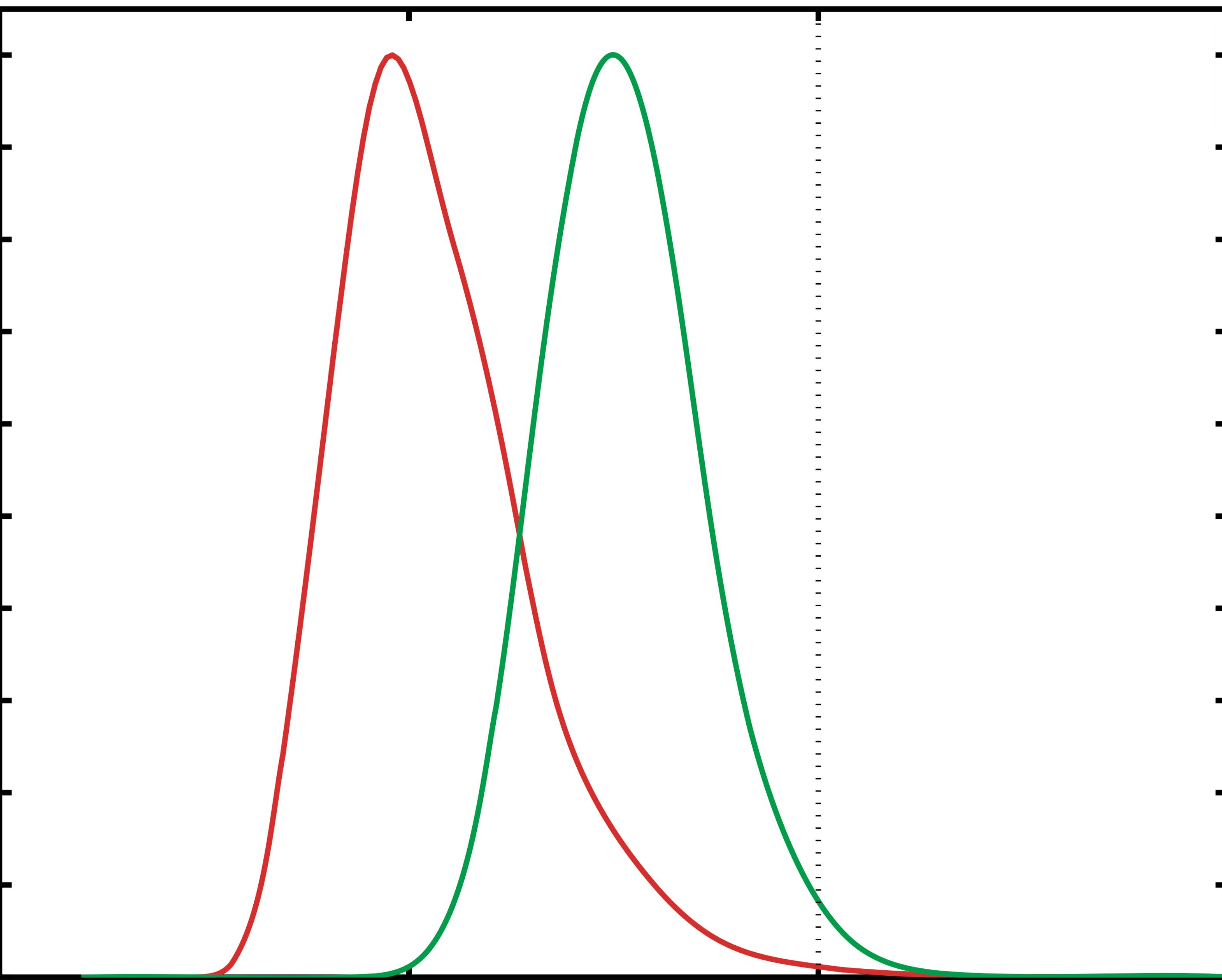
The paper discusses the first observations of the Sun on different targets and presents an example of the full spectra from the quiet Sun, identifying over 40 spectral lines from neutral hydrogen and ions of carbon, oxygen, nitrogen, neon, sulphur, magnesium, and iron.

Five steps to writing better sentences

1. Write complete sentences.
2. Watch out for grammar.
3. Be active!
4. Love variety.
5. Take control over the length of your sentences.

Figures

What is missing?



Example from:
<https://iopscience.iop.org/article/10.1088/0004-637X/695/2/1446#apj300502f4>

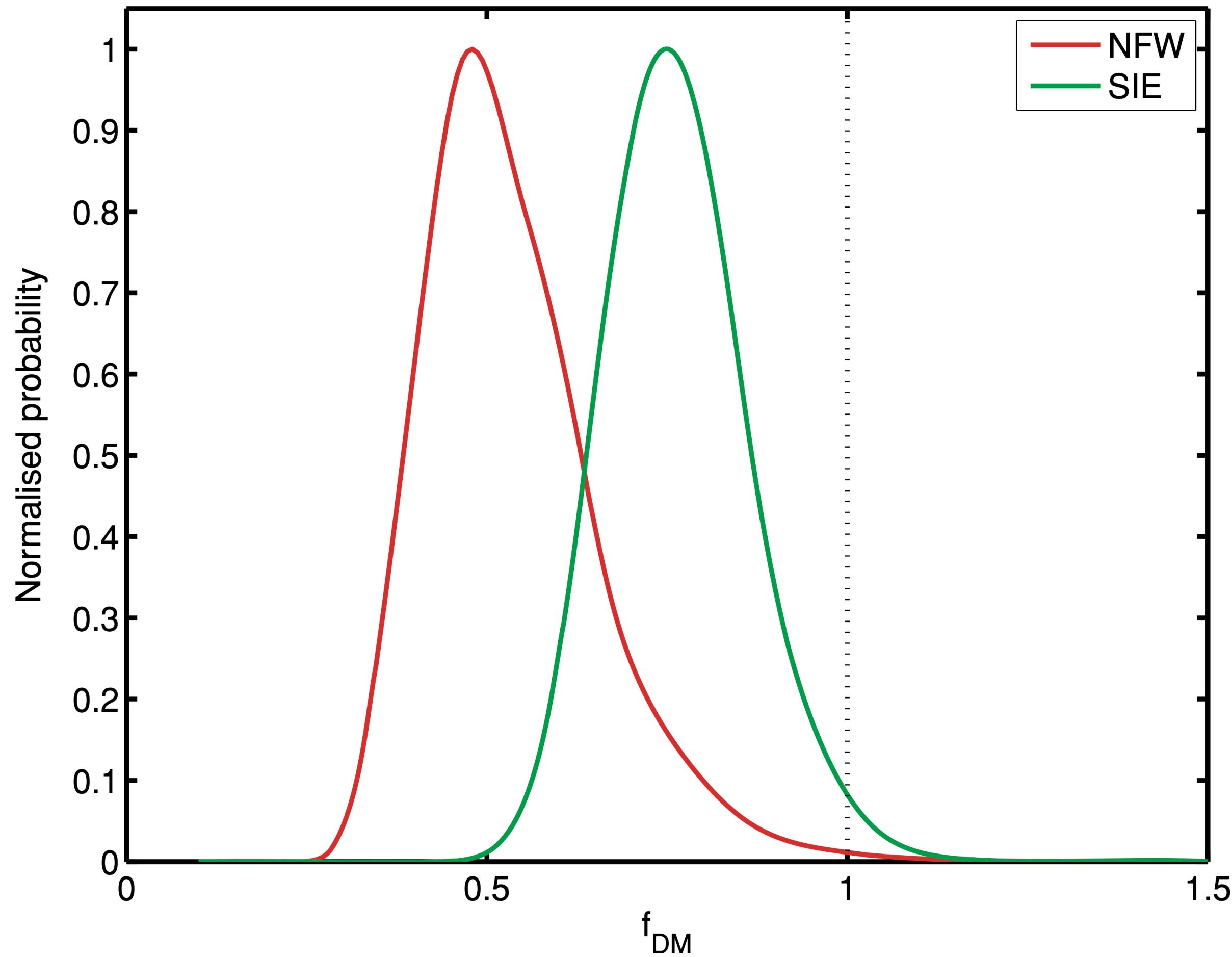


Figure 1. Relative probability distribution for the dark matter axis ratio f_{DM} .

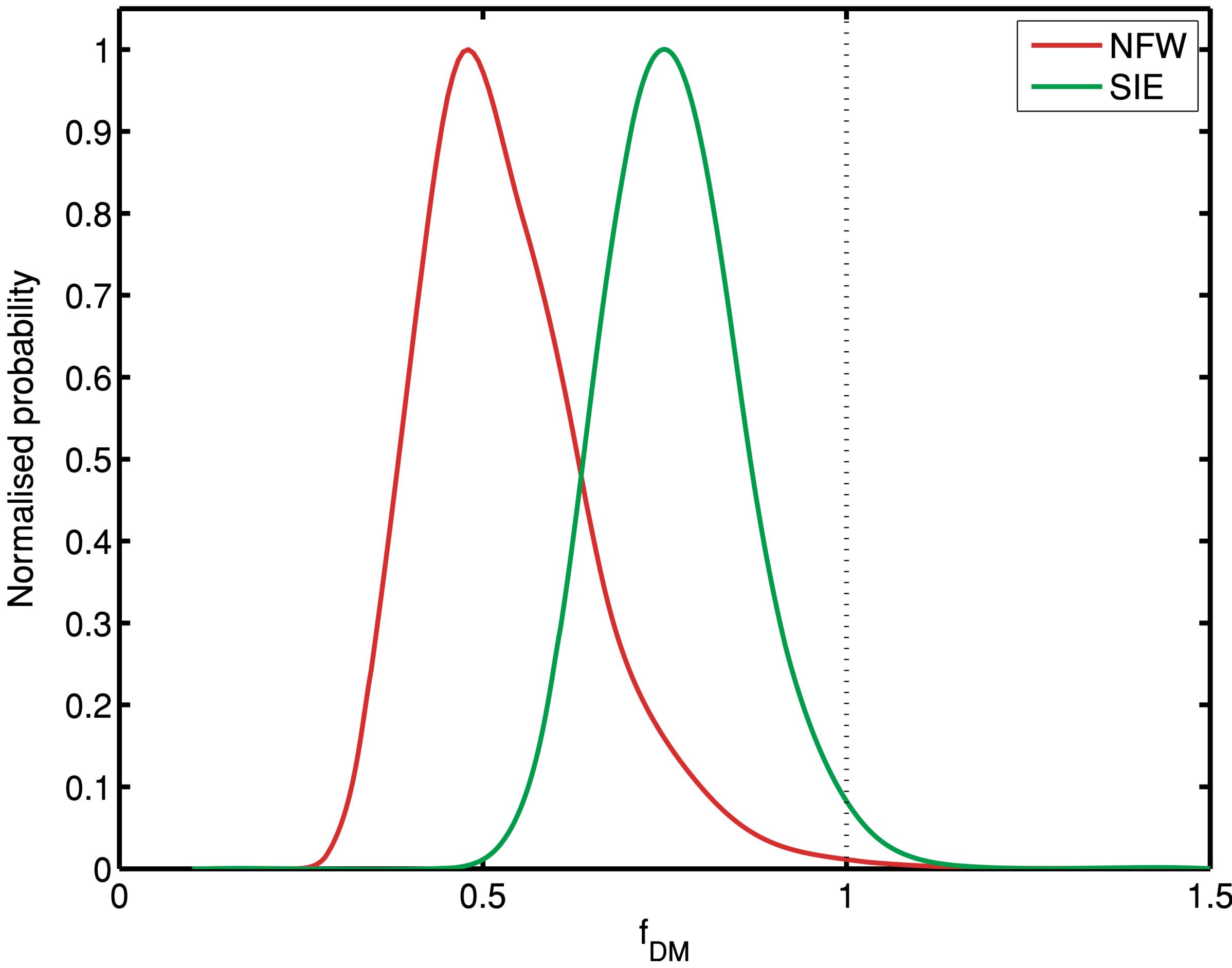
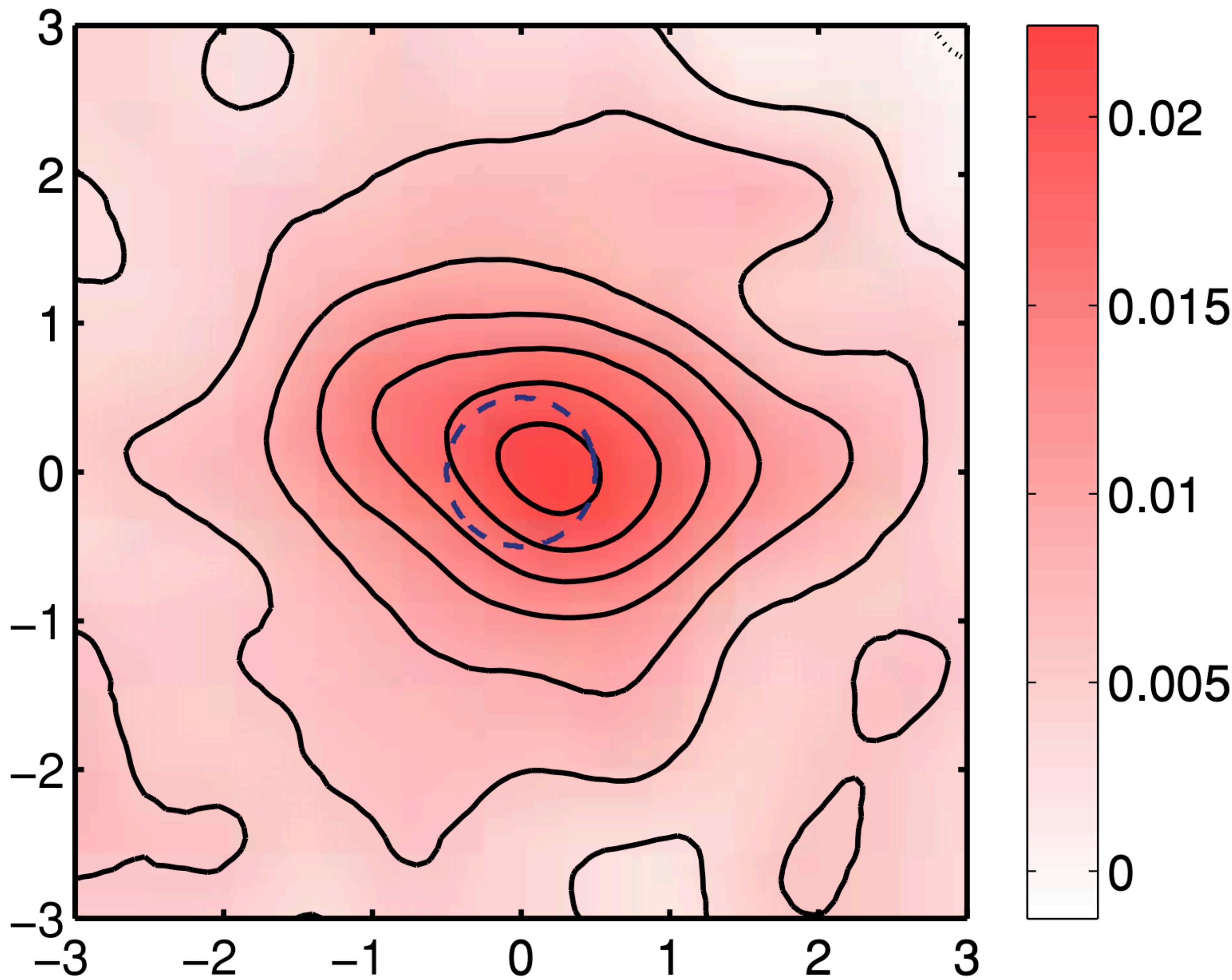


Figure 1. Relative probability distribution for the dark matter axis ratio f_{DM} . The dark, red line shows result from the NFW model, and the light, green line shows result from the SIE model. The dotted vertical line shows $f_{\text{DM}} = 1$, corresponding to a circular distribution.



Example from:

<https://iopscience.iop.org/article/10.1088/0004-637X/695/2/1446#apj300502f4>

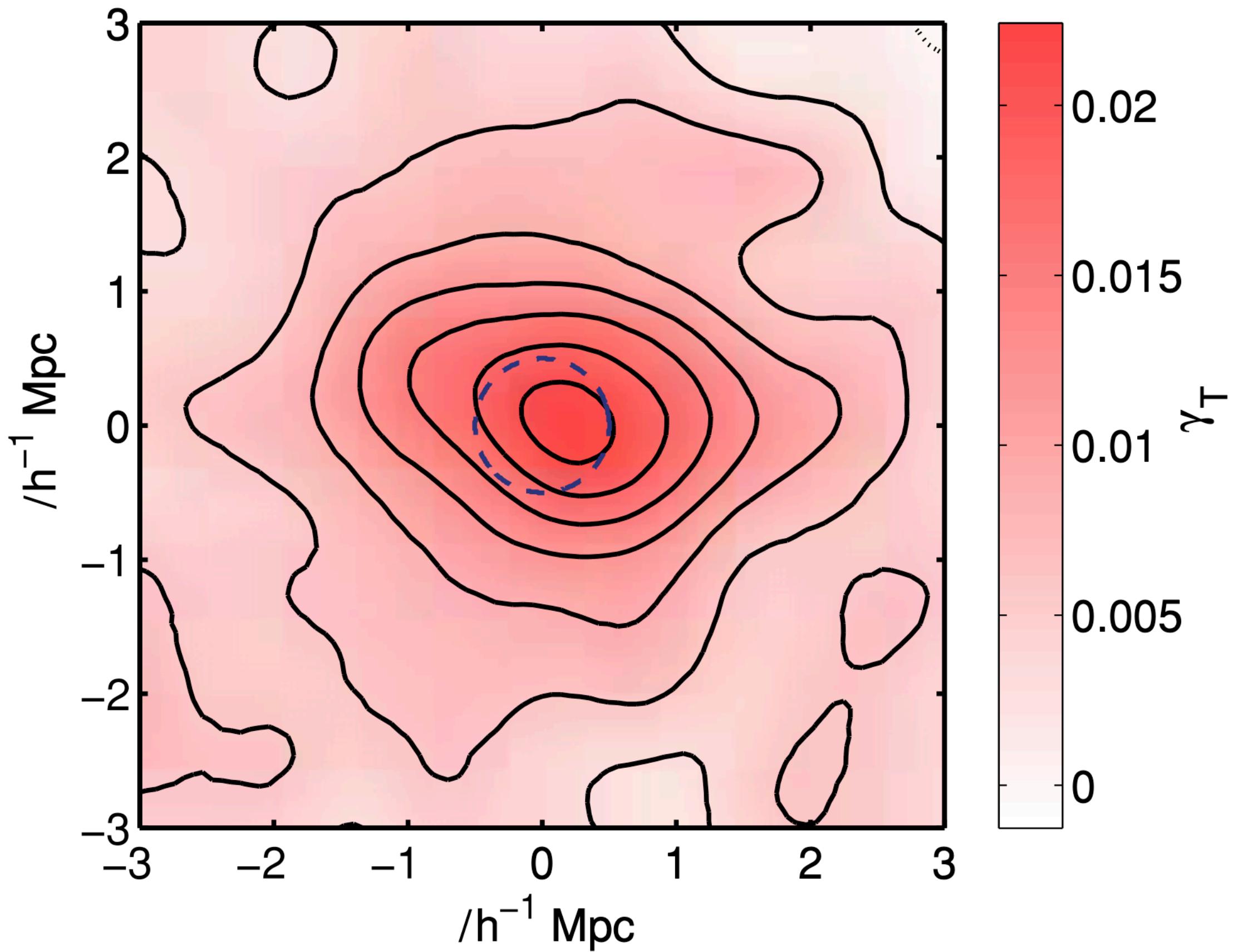


Figure 2. Tangential shear, $\hat{\gamma}_T$, as measured from all galaxies in the background galaxy catalogue for a zoomed-in view of the postage stamp.

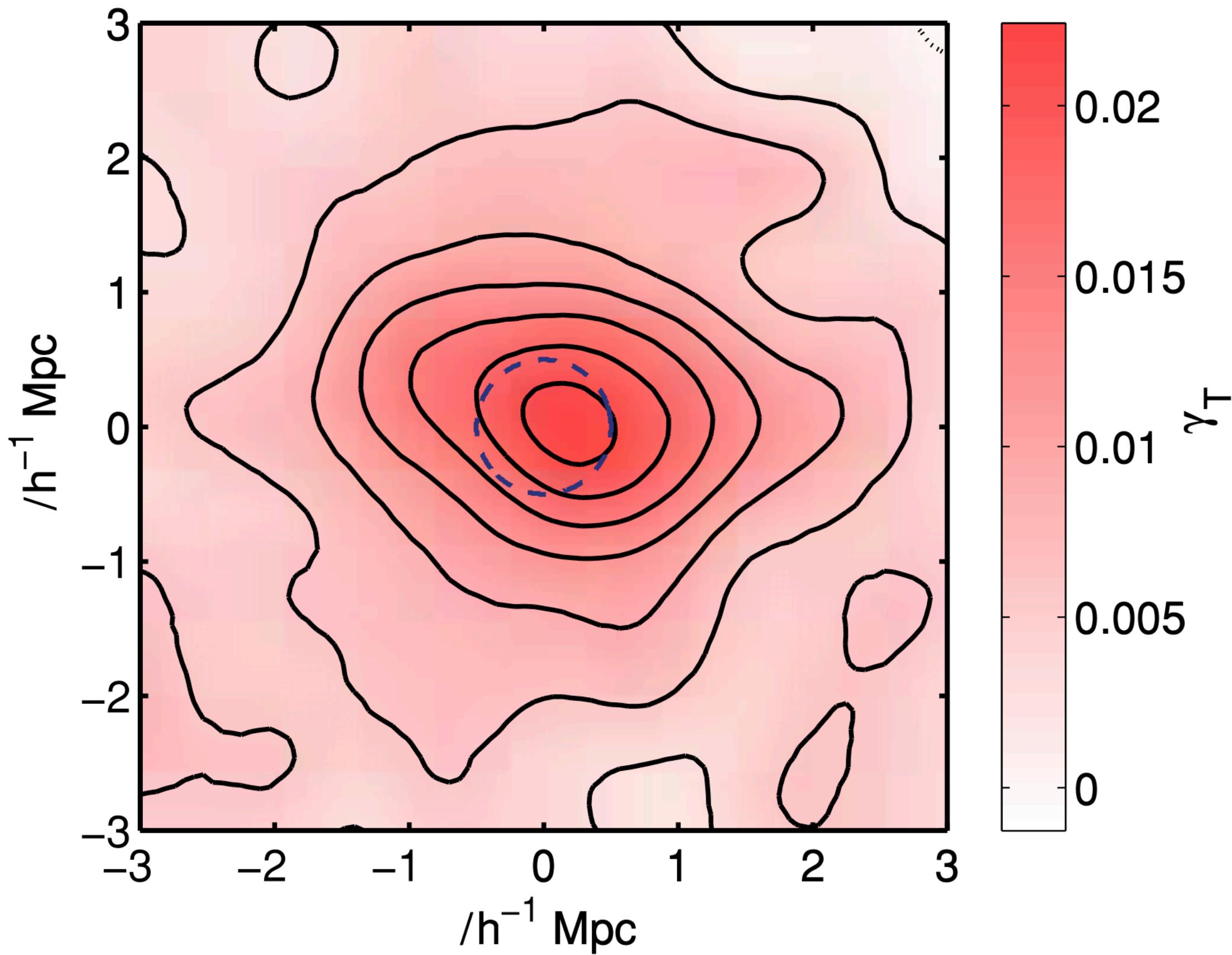


Figure 2. Tangential shear, $\hat{\gamma}_T$, as measured from all galaxies in the background galaxy catalogue for a zoomed-in view of the postage stamp. To reduce the noise, we have smoothed with a Gaussian with standard deviation $1 h^{-1} \text{ Mpc}$. The location of the mask is shown by the dashed circle.

Building science



How to cite

- Citations in text...

Early indications of this fact came from the magnitude-redshift relationship of galaxies (Solheim 1966)

... and discussed in several recent community papers [1–3].

How to cite

- Citations in text and a list of references at the end:

[1] Morten Hjorth-Jensen. Computational physics, lecture notes fall 2015. *Department of Physics, University of Oslo*, page 173, 2015.

[2] G. L. Squires. Practical physics. *Cambridge Univserity Press*, 4(5):29–52, 2001.

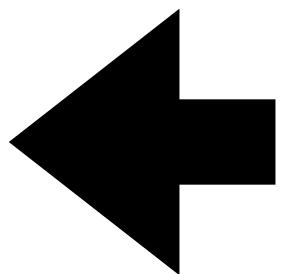
How to cite

- Citations in text and list of references at the end.
- Be consistent to your style.
- Explicitly cite all items in your reference list.
- Don't copy without citing!
- Cite original sources (don't cite Wikipedia).
- Cite webpages properly (e.g. including *when* you accessed them).
- sokogskriv.no

Using citations correctly ensures that:

(From Henrik Sveinsson's Library tutorial)

- the reader knows where to read more about something
- the reader can check your facts and verify your results
- you credit the right person for a discovery, claim, line of reasoning etc rather than pretending you made it up yourself



Avoid plagiarism!

Read:

[uio.no/studier/eksamen/fusk](http://www.uio.no/studier/eksamen/fusk)

[uio.no/english/studies/examinations/cheating](http://www.uio.no/english/studies/examinations/cheating)

“It is considered as cheating not to state sources or mark quotes correctly.”

NB: Also applies to re-using your own previous work! (self-plagiarism)



Take advantage of your resources

Final advice

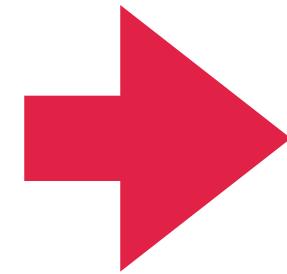
- Study the templates and checklist.
- Read the feedback you get.
- In addition to the course resources, you can also check out:

ub.uio.no/English/writing-publishing/index.html

(including useful links and help on referencing)

Stuck with a LaTeX problem? → latexguru@ub.uio.no

[Henrik Sveinsson's library tutorial for Physics students](#)



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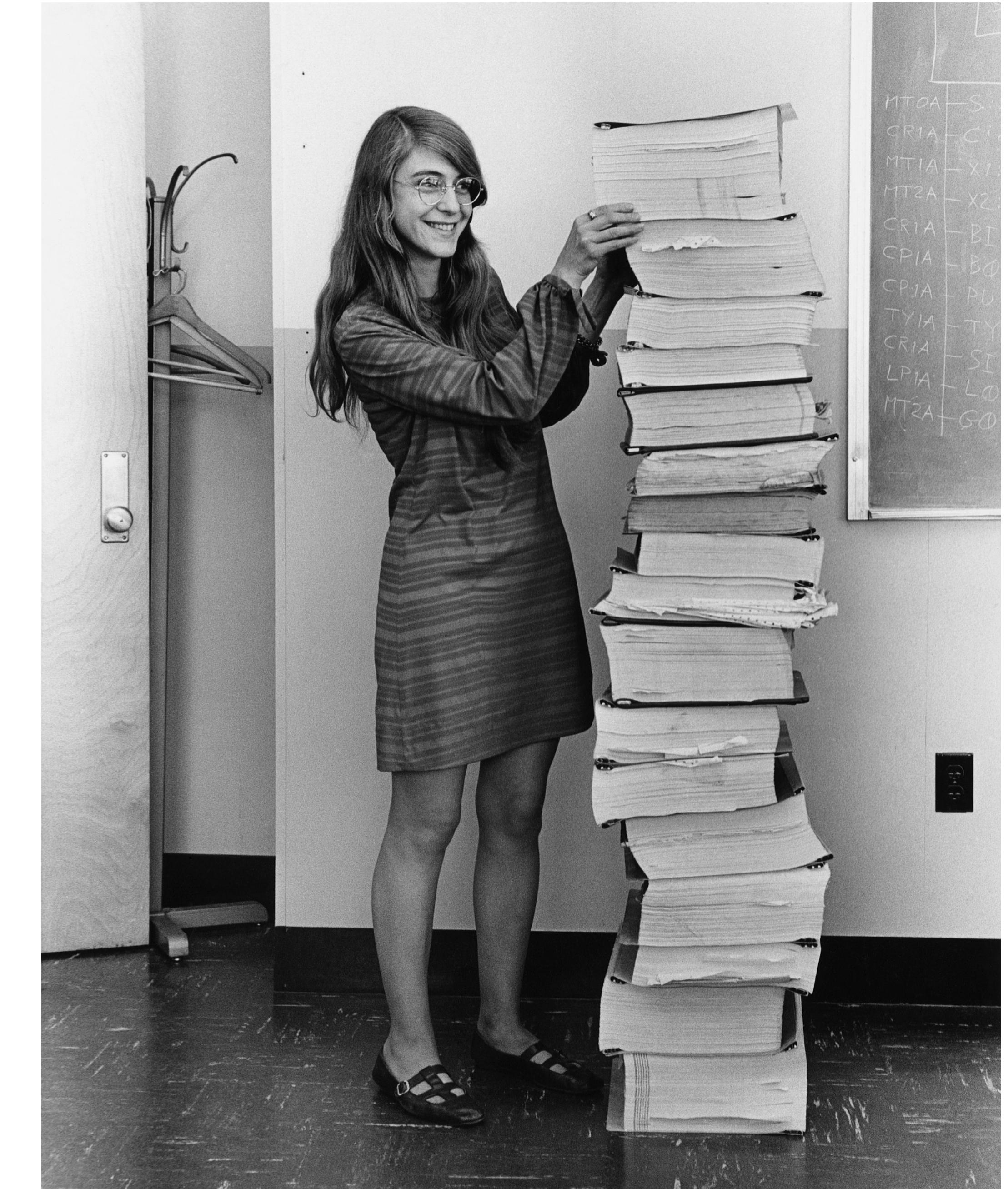
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<https://www.ub.uio.no/om/ansatte/mednat/undervisning/aevans/index.html>

Good luck!



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