Part I: how to prepare good seminar talk?



Image credit: ChatGPT

by Alexander Tsirlin, Leipzig University

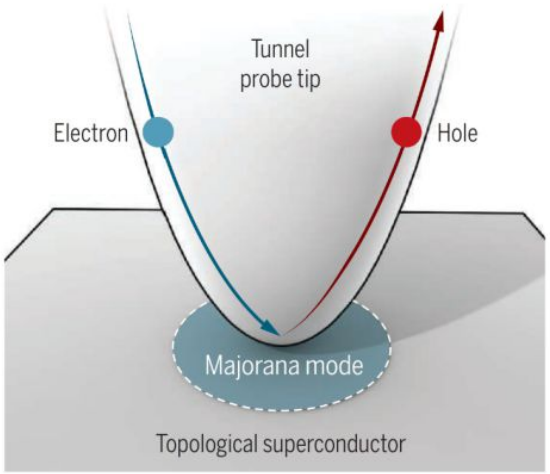
Seminar: October 26, 2026

Seminar topics **15.10.2025**

10. Hunt for Majoranas

- *Nature Phys.* **16**, 718 (2020)
- *Nature Rev. Mater.* **6**, 944 (2021)
- *Nature*, **592**, 350 (2021)

A thrilling story from modern solid-state physics: the search for fictitious Majorana particles that could be used to produce topological qubits and best-ever quantum computers. Hoax, fraud, and fierce scientific battles. In your talk, you can cover any of those aspects and share your own opinion on whether elusive Majoranas have been found and tamed.



11. Superconductors and quantum interference

- *Amer. J. Phys.* **38**, 1071 (1970)
- *Rev. Sci. Instrum.* **77**, 101101 (2006)

Some of the most interesting applications of superconductors are related not to superconductivity itself (the property of zero-resistance current), but to the interference of superconducting wavefunctions across thin insulating barriers, the so-called Josephson junctions. In this presentation,

find this list here!



Easy way to go

- Use suggested references only
- Copy pictures from there
- Copy pieces of text
- Read this text during the talk

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- **If you think of doing any of this, just skip the talk altogether**

Image credit: public domain

Friendly advice

- Pick up the topic that you are really enthusiastic about
  you can propose your own topic too
- References in my list are meant to define the scope,
  they are not necessarily the best sources for a first reading
- Start with simple sources
  (see the second part of today's presentation)
- Aim to cover only the part that you feel you understood,
  even if it is a small part only
- Leaving open questions is fine

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- **Do not give talks**
  about things you do not understand!



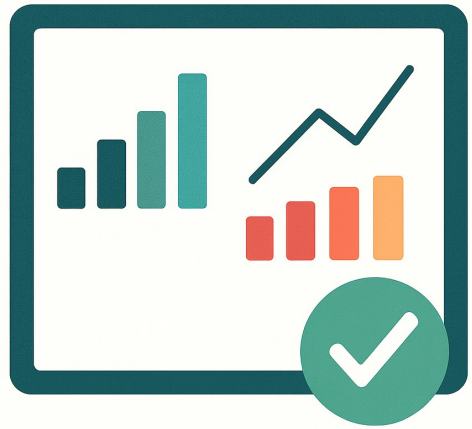
Image credit: ChatGPT

Preparing the talk: slides

- Prepare the talk, not the slide show
  1 slide per minute is an upper limit, better 2 min per slide
- There should be “air” in each slide
  1-2 graphs per slide only
- Prefer graphs over text



- **Give credit** for every image you use
- Put credits/references
  directly onto the slide,
  don’t hide them in the end



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Image credit: ChatGPT

Preparing the talk: technical

- Don't write full text of your talk,
  but **writing the main points**
  may be a good idea

- Avoid repeated rehearsals,
  although doing it once
  will help you to **check your timing**

- You may interact with audience,
  but be prepared to the lack of response





Image credit: ChatGPT

- **Start with the motivation**

  spend at least 3-4 min to explain why you tell us about this topic

- **Start with the basics**

  align with your own knowledge *prior to* the solid-state lecture

- **Keep it simple,** use simple words

  do not try to impress audience with long equations and such



Image credit: ChatGPT

Preparing the talk: content

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Image credit: ChatGPT

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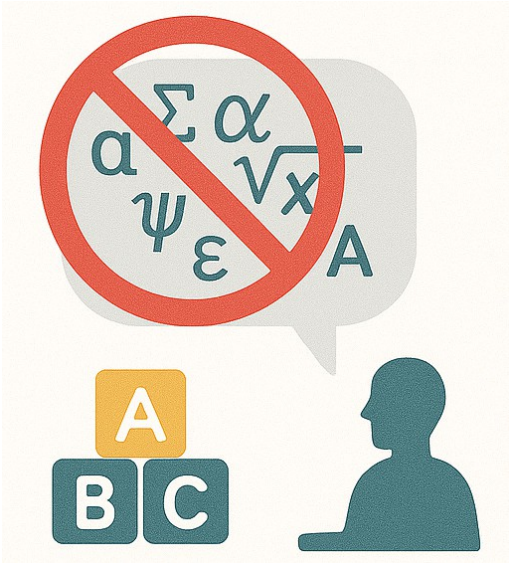


Image credit: ChatGPT

Preparing the talk: style

- Stick to the academic style,
  but do not hesitate to be personal
- If you found a fun fact,
  tell us about it

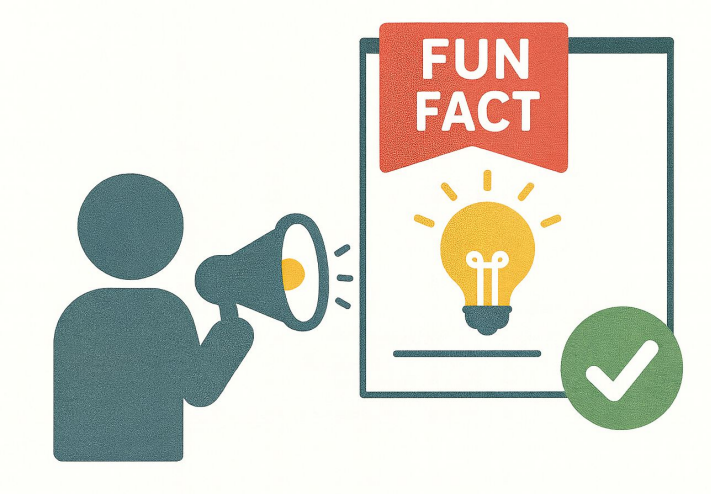
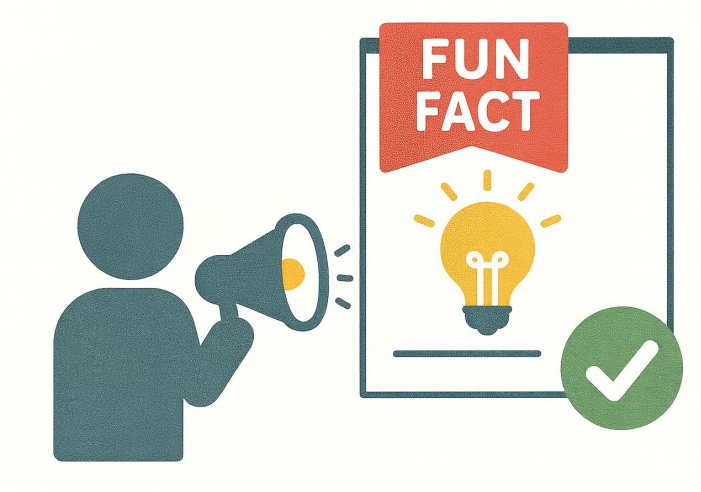


Image credit: ChatGPT

- Stick to the academic style,
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- Plan for **30 min talk** including discussion
- **Feel free to meet me**

  at least 1 week before the talk
  to discuss your slides and content

Image credit: ChatGPT

Part II: how to find literature?

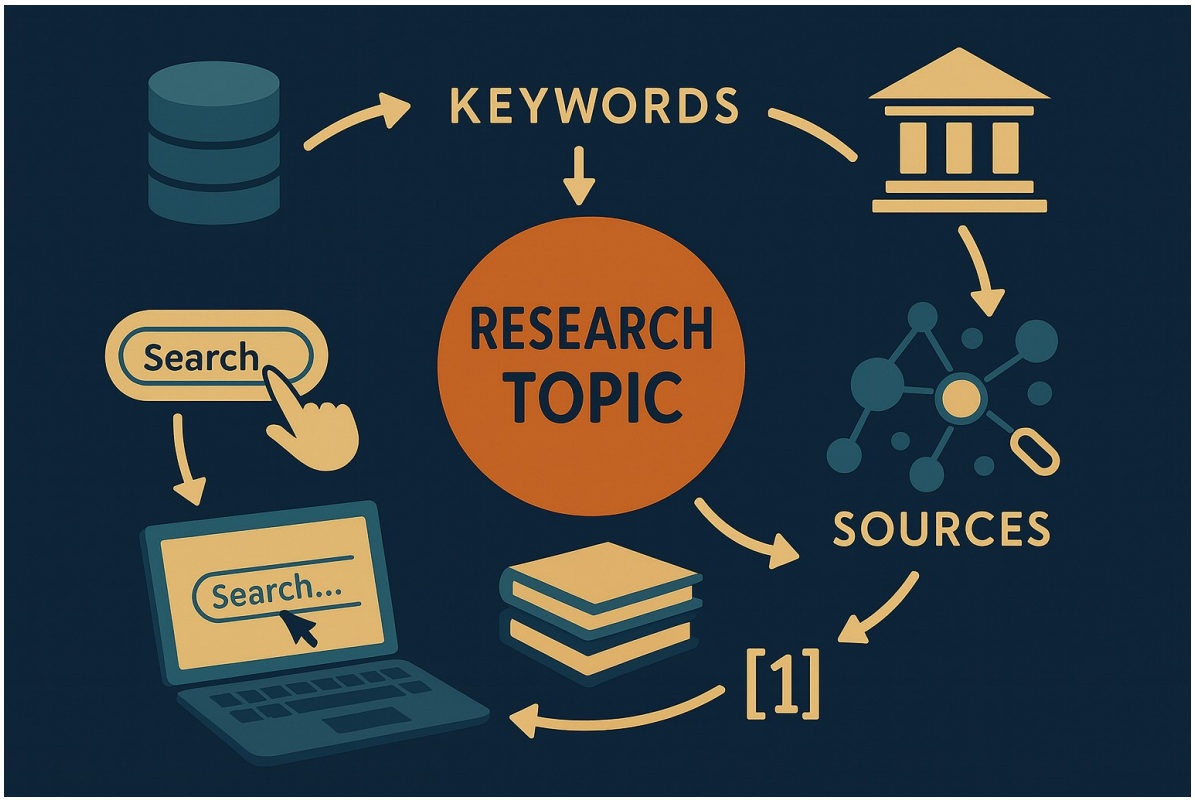
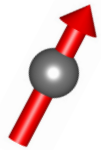


Image credit: ChatGPT



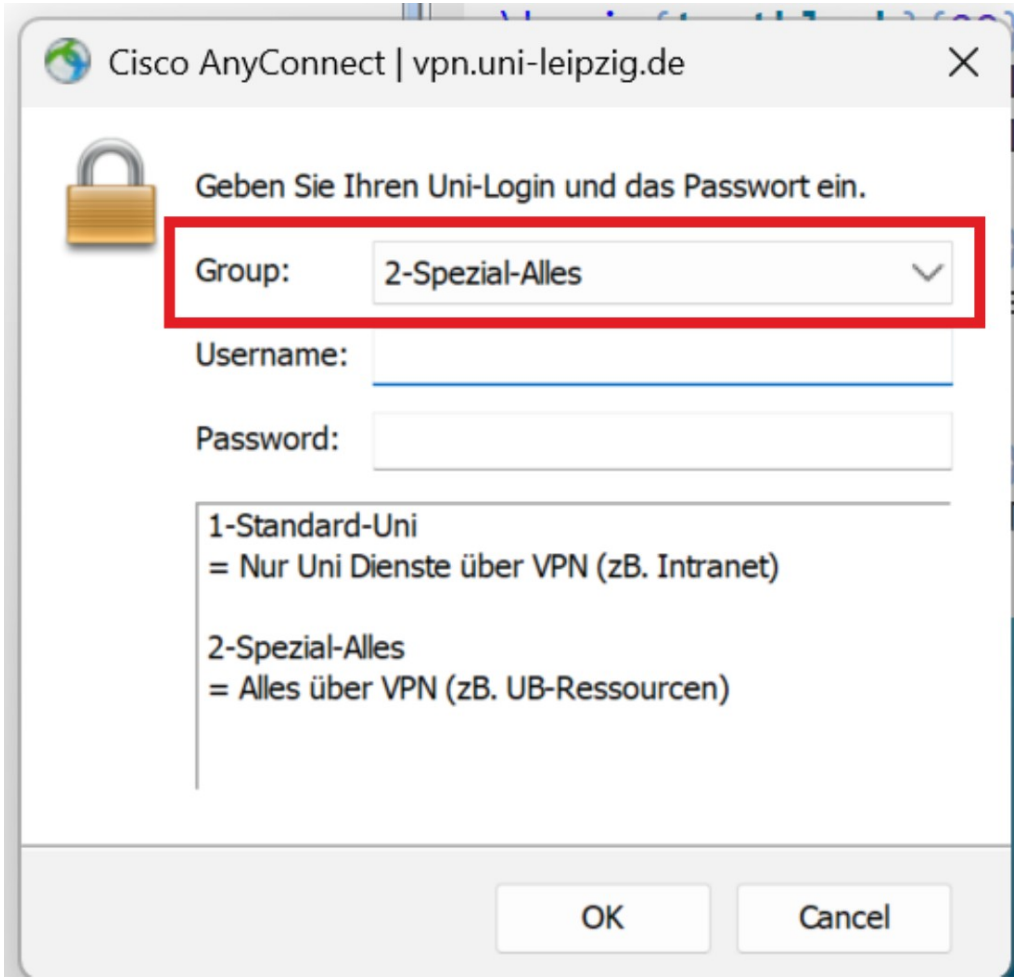
by Alexander Tsirlin, Leipzig University

Seminar: October 26, 2026

Use VPN

Remember to set
“Group: 2-Spezial-Alles” !

ask me if you
can’t reach something



You will very likely use AI, and this is fine,
but **beware** of the following:

- it is biased toward open-access sources
- it does not have a very long memory (no old literature)
- it may hallucinate

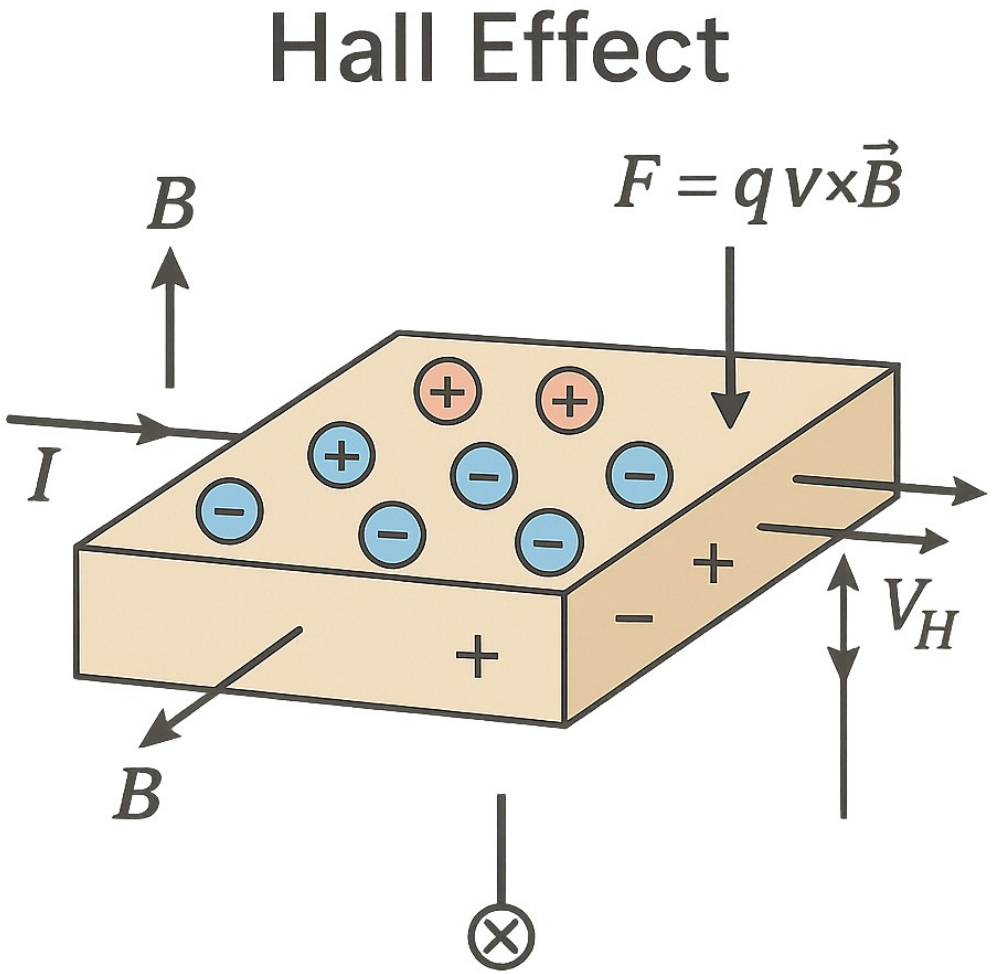
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Practical advice:

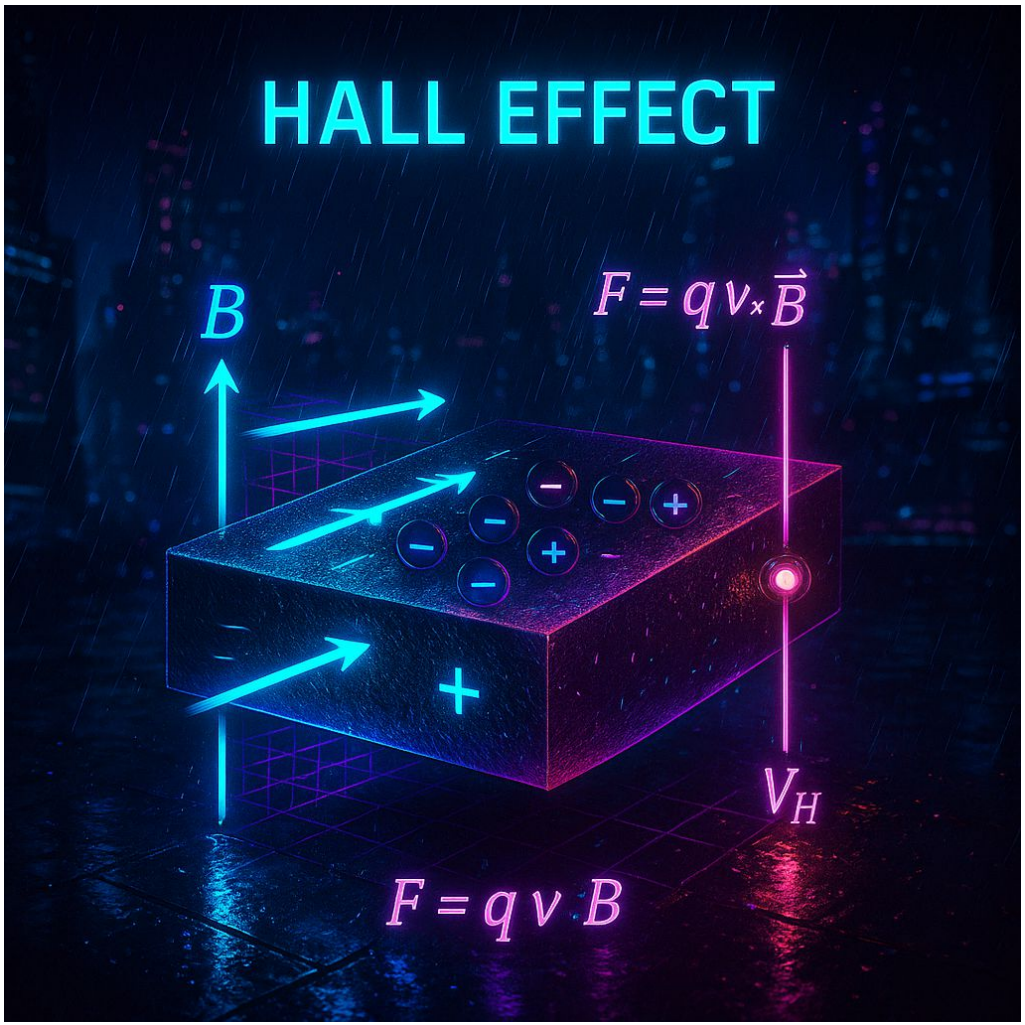
- use it as an **assistant**, not as a magic box
- **read the sources,** ask for sources if they are not given
- ask additional questions based on your own knowledge, not the prompts, which AI suggests to you

please, prepare an illustration of Hall effect



ChatGPT 2025

please, prepare an illustration of Hall effect



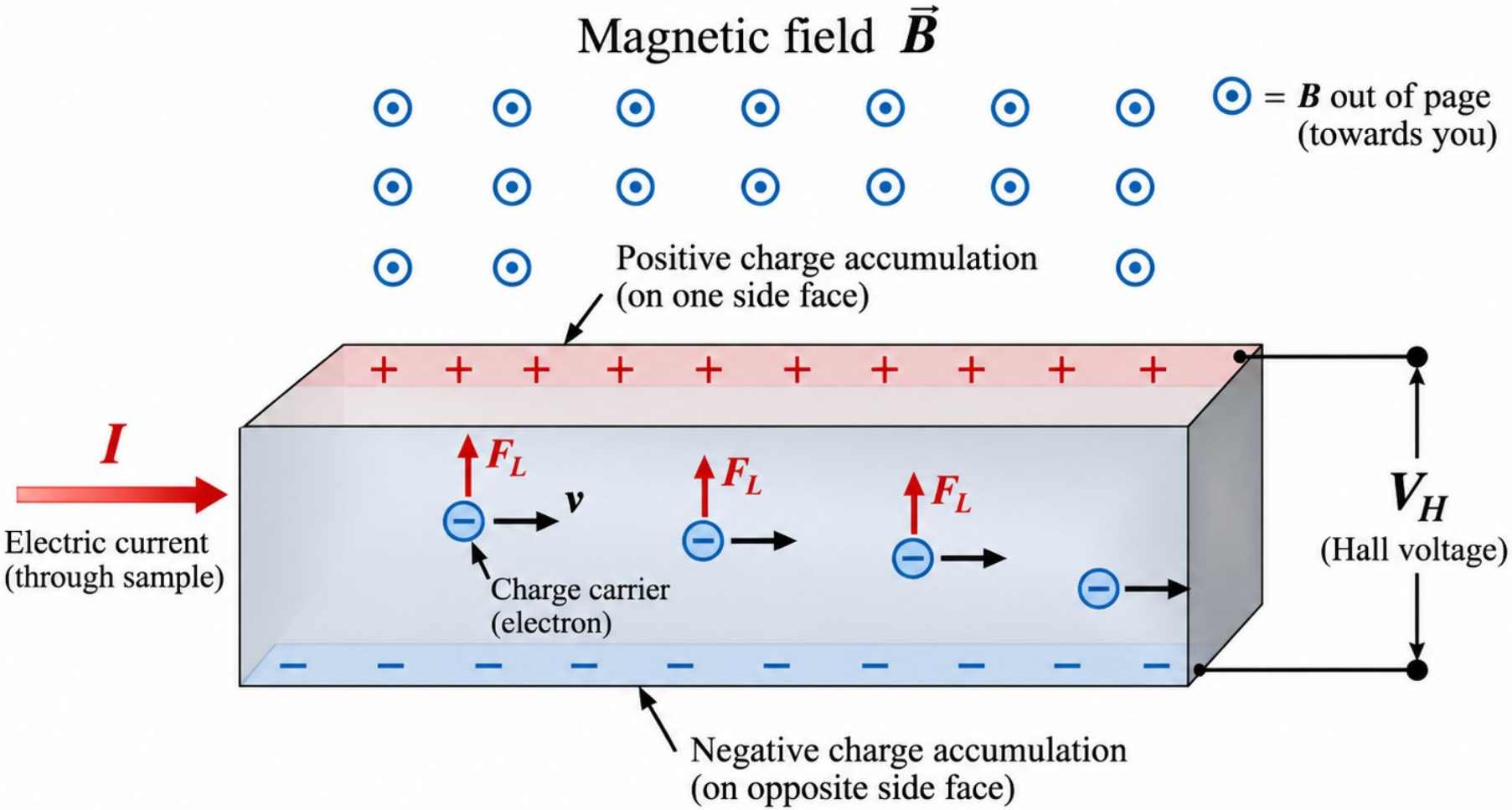
ChatGPT 2025

please, prepare an illustration of Hall effect



ChatGPT 2025

Use case: illustrations



almost there...

ChatGPT 2026

Hierarchy of review articles

- **Popular articles**

  Physics Today, Physik in unserer Zeit...

- **Introductory reviews**

  Nature journals, especially Nature Reviews Physics, Nature Reviews Materials; Annual Reviews (of something)

  10-20 pages, professional illustrations

- **Technical reviews**

  Reviews of Modern Physics, Reports on Progress in Physics, Advances in Physics...

  50+ pages, boring (but useful at times)

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Do not overlook original publications

(at least as sources of graphs and, perhaps, interesting details)

How to read original publications?

A typical publication has several components:

- main text
  (often concise, Letter format: 4-5 pages in total)
- Supplemental Material / Supporting Information
  (often very extensive: 20-30 pages and more)
- raw data supporting the study (last 4-5 years)

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Additionally, for high-profile publications:

- popular summaries, written by researchers
- press releases, written by journalists!
- video summaries / podcasts

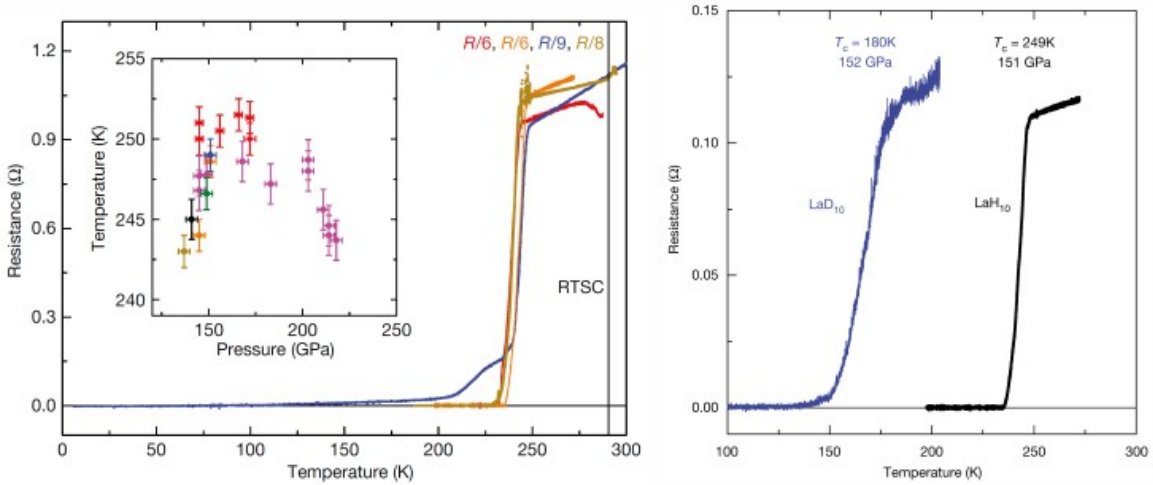
Letter | Published: 22 May 2019

Superconductivity at 250 K in lanthanum hydride under high pressures

A. P. Drozdov, P. P. Kong, V. S. Minkov, S. P. Besedin, M. A. Kuzovnikov, S. Mozaffari, L. Balicas, F. F. Balakirev, D. E. Graf, V. B. Prakapenka, E. Greenberg, D. A. Knyazev, M. Tkacz & M. I. Eremets

Nature **569**, 528–531 (2019) | Cite this article

62k Accesses | **1456** Citations | **637** Altmetric | Metrics



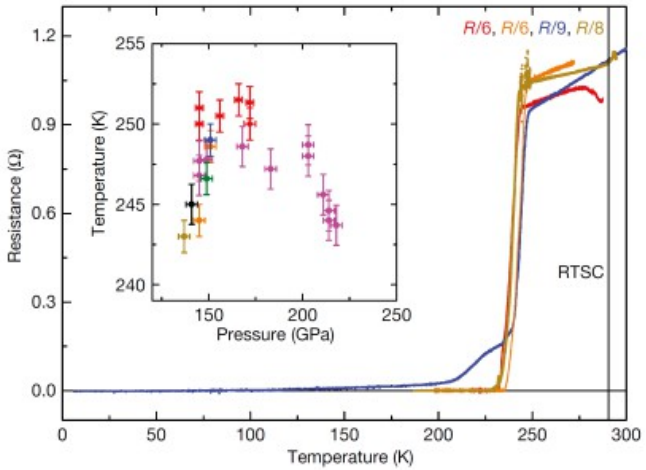
→ 4 pages, 4 figures only!

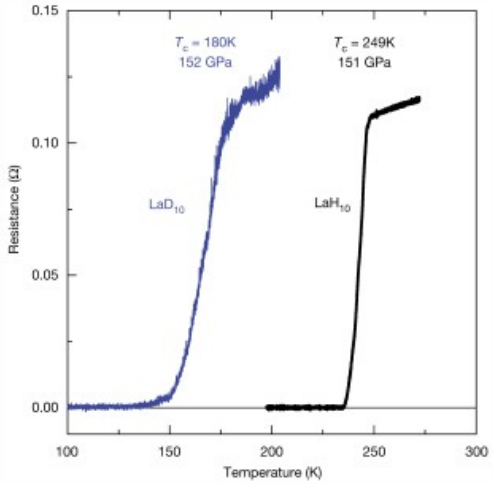
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Sections | Figures

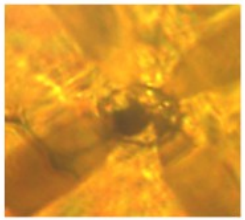
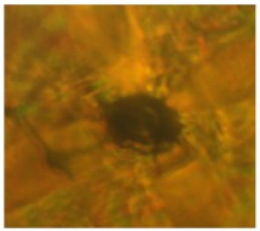
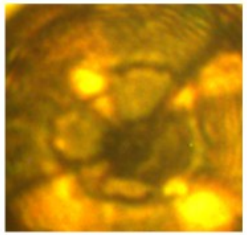
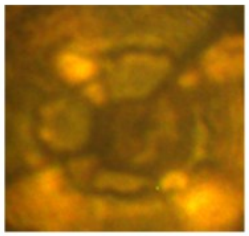
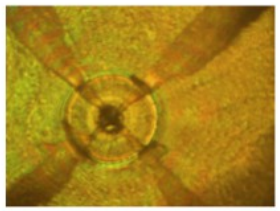
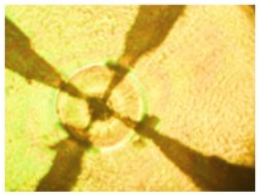
Abstract
Main
Methods
Data availability
References
Acknowledgements
Author information
Ethics declarations
Additional information
Extended data figures and tables
Supplementary information

→ 4 pages, 4 figures only!

Extended data figures and tables

Supplementary information

21 samples in total!

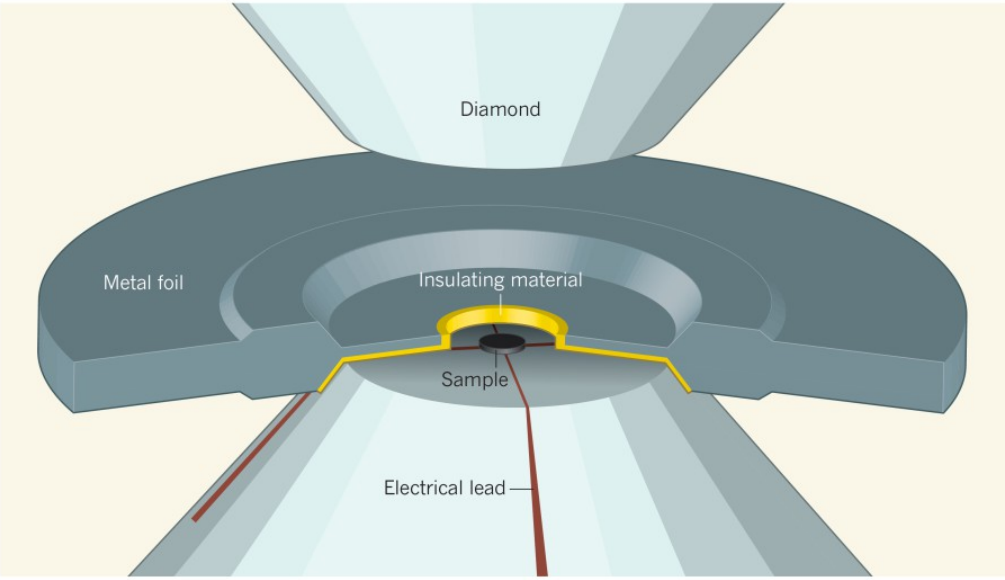
Sample	*Stoichiometry of superconducting phase*	*Synthesis conditions*	*Photo before and after heating*		*Electrical measurements*	*X-ray diffraction*
			Before	*After*		
1	LaH_{10} (expected from the value of T_c)	**La + H_2** **145 GPa laser heated** Mixture of La and excess of H_2 was compressed to 145 GPa. After the laser heating, H_2 vibron is seen around the sample			**P = 145 GPa, T_c ~ 244 K** **P = 151 GPa, T_c ~ 249 K** Resistance dropped to 0 Ω. Red and orange curves; and orange points, Fig. 1; Fig. ED 5	-----
2	LaH_{10}	**La + H_2** **137 GPa laser heated** Mixture of La and great excess of H_2 was pressurized to 137 GPa and then heated by laser			**P = 137 GPa, T_c ~ 243 K** Sharp superconductive transition to 0 Ω. Dark yellow curve and points in Fig. 1	***Fm-3m***, dominant phase, a=5.1578(5) Å, V=137.21(4) Å^3; with impurity of *hcp (II):* ***$P6_3/mmc$ (LaH_{10})*** a=3.7525(7) Å, c=5.561(2) Å, V=67.81(2) Å^3; and minor impurity of *hcp (I):* ***$P6_3/mmc$ (LaH_{10})*** a=3.66 Å, c=5.95 Å, V=69.0 Å^3. Fig. 3a,b,d
3	LaH_{10}	**La + H_2** **150 GPa laser heated** La was pressurized in H_2 to 150 GPa and then heated by laser. All H_2 was absorbed by La			**P = 150 GPa, T_c ~ 249K** Blue curve and points in Fig. 1	***Fm-3m***, dominant phase, a=5.1019(5) Å, V=132.80(4) Å^3; with minor impurities of *hcp (I):* ***$P6_3/mmc$ (LaH_{10})*** a=3.6226(8) Å, c=5.895(2) Å, V=66.99(3) Å^3; and ***Pm-3m ($LaH_{\sim 12}$)*** a=3.2929(8) Å, V=35.70(3) Å^3. Fig. 3a,b,d

NEWS AND VIEWS | 22 May 2019

Superconductivity near room temperature

For a century, researchers have sought materials that superconduct – transport electricity without loss – at room temperature. Experimental data now confirm superconductivity at higher temperatures than ever before.

By James J. Hamlin



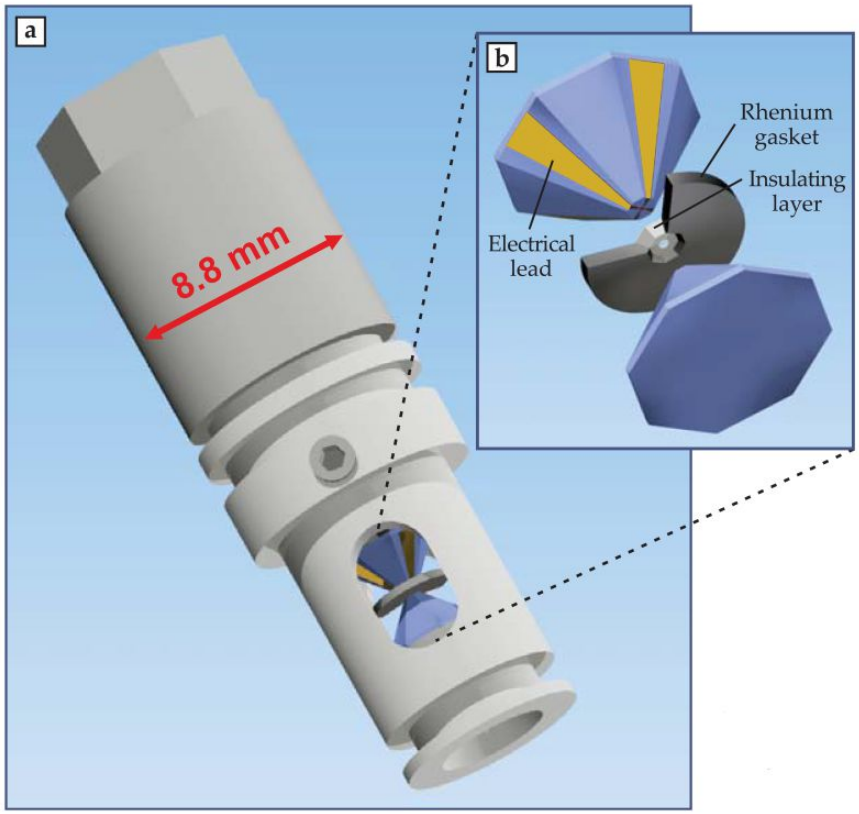
Nature 569, 491 (2019)

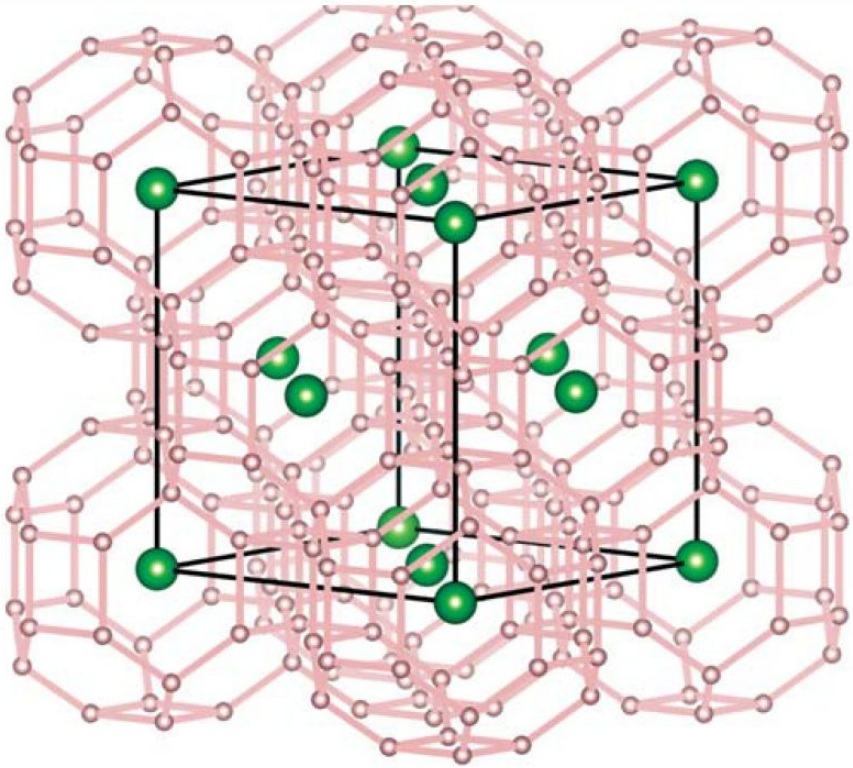
FEATURES / ARTICLE

The quest for room-temperature superconductivity in hydrides

MAY 01, 2019

 Warren Pickett  Mikhail Eremets





Physics Today 72(5), 52 (2019)

Another major step towards room-temperature superconductivity

MAY 23, 2019

MAX PLANCK INSTITUTE FOR CHEMISTRY

NATIONAL HIGH MAGNETIC FIELD LABORATORY

"Superhydride" Shows Superconductivity at Record-Warm Temperature

Published May 22, 2019



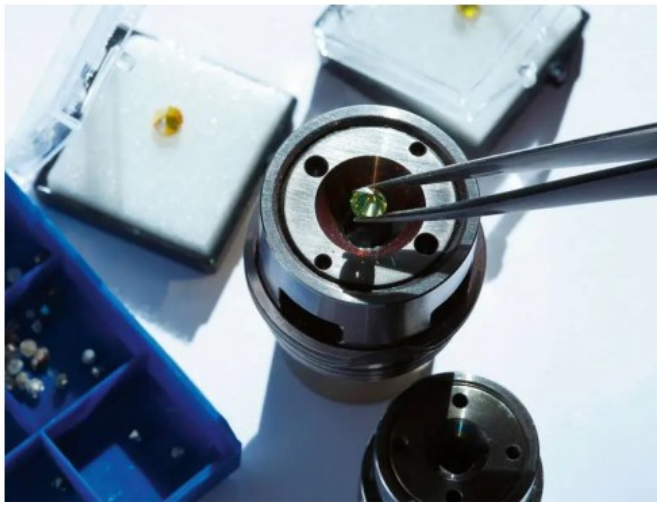


Image credits: Stephen Bilenky and Thomas Hartmann

Seminar talk is not mandatory... What are the **incentives?**

- gain insight into a topic of your interest
- hands-on experience with scientific literature
- train your soft skills
- if you ask me for a recommendation letter,
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- **Choose your topic by 31.10**



Image credit: ChatGPT