All about electrical transport



Hall effect, especially anomalous

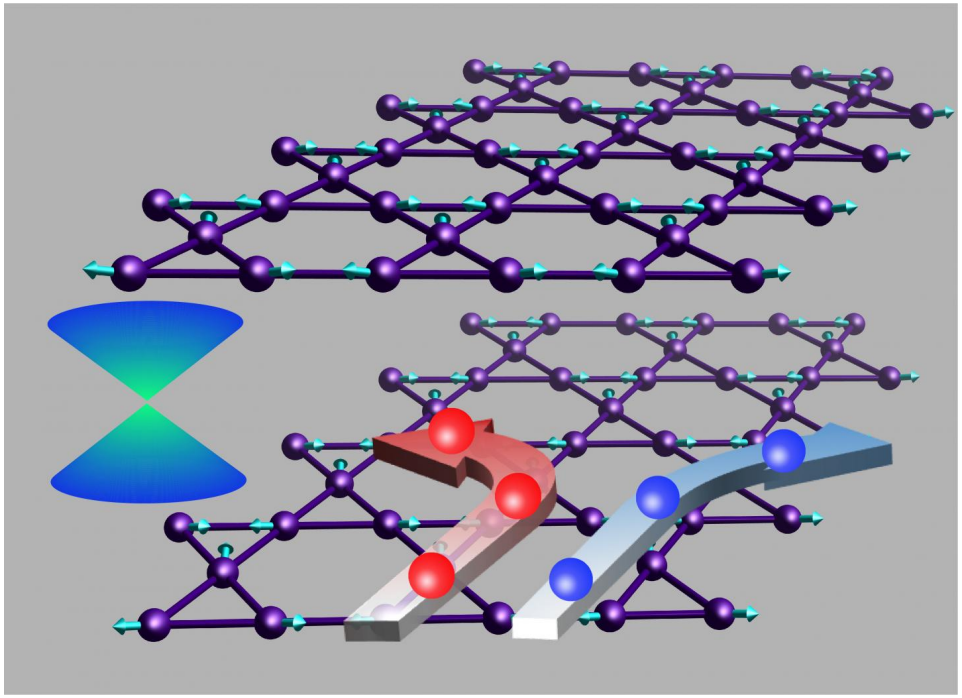
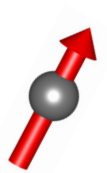


Image by MPI Microstructure Physics, Halle





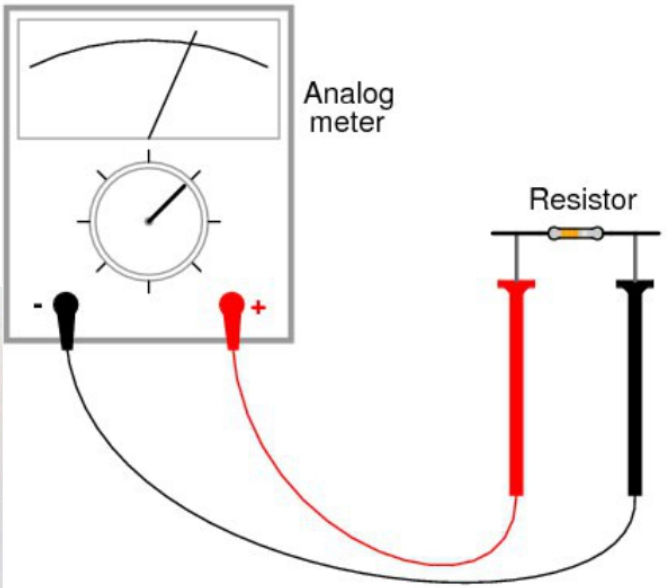
by Alexander Tsirlin, Leipzig University

Lecture 2: October 13, 2026

sponsored by Dean of Studies, Prof. Dr. Jörg Schnauß





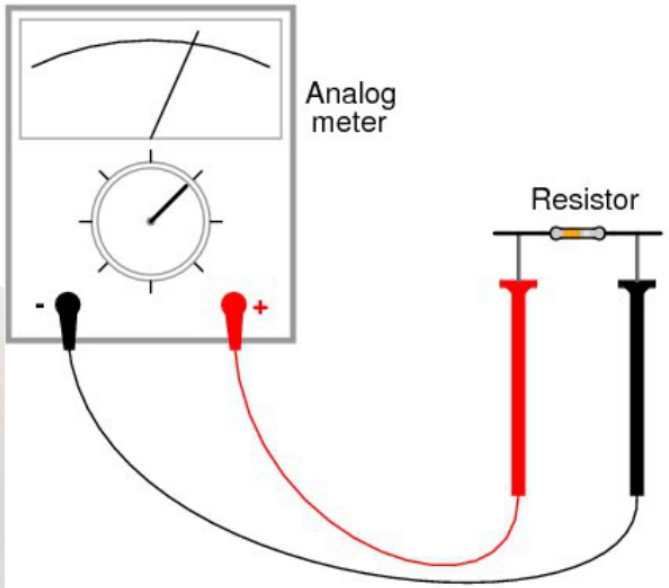


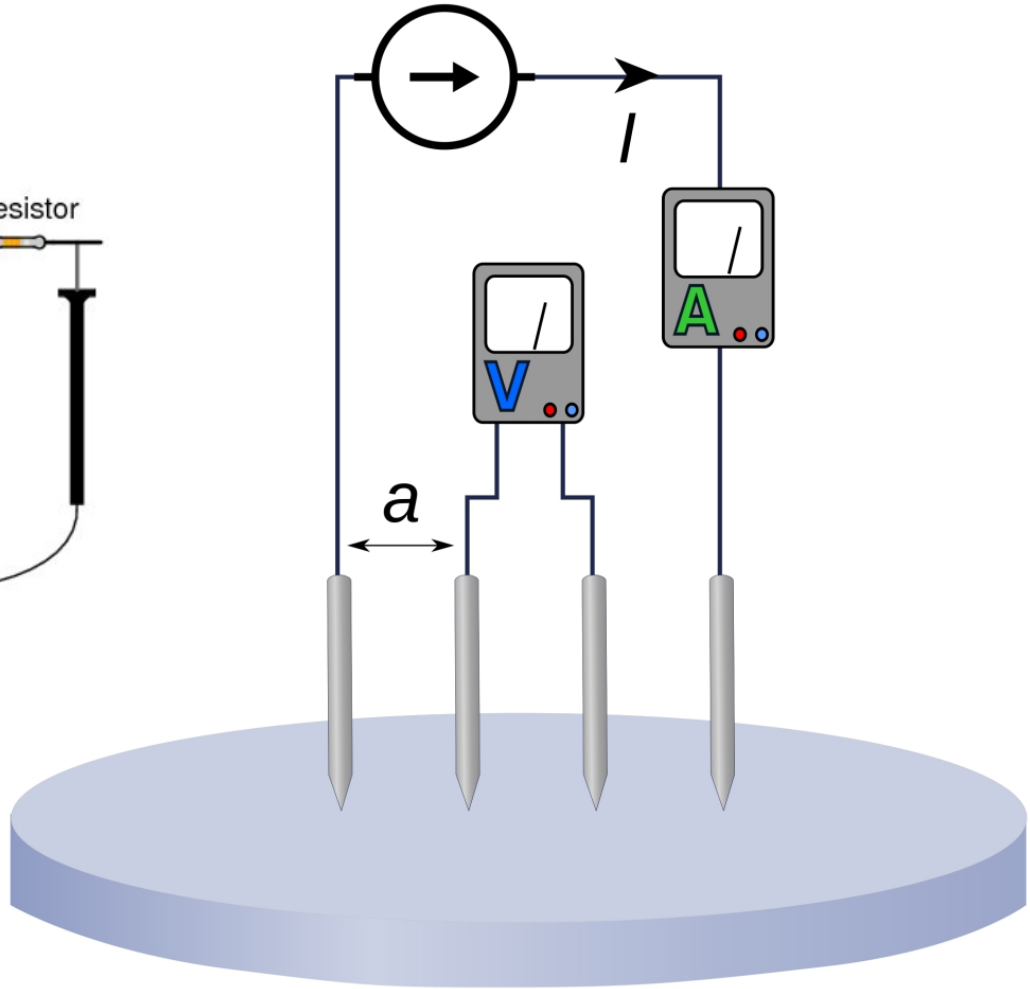
Two-probe method

Image credits: wdwd and Libretexts (CC-BY-SA)

Two-probe vs. four-probe







Two-probe method

contact resistance

Four-probe method

Image credits: wdwd and Libretexts, SpinningSpark (CC-BY-SA)

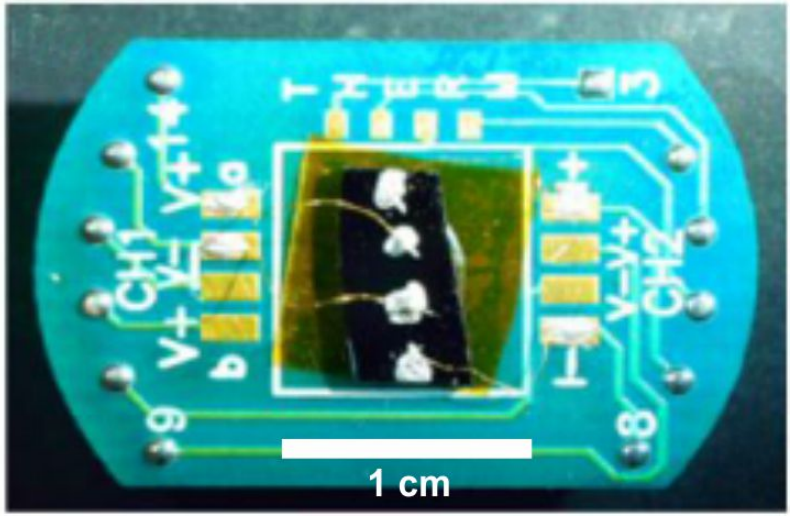
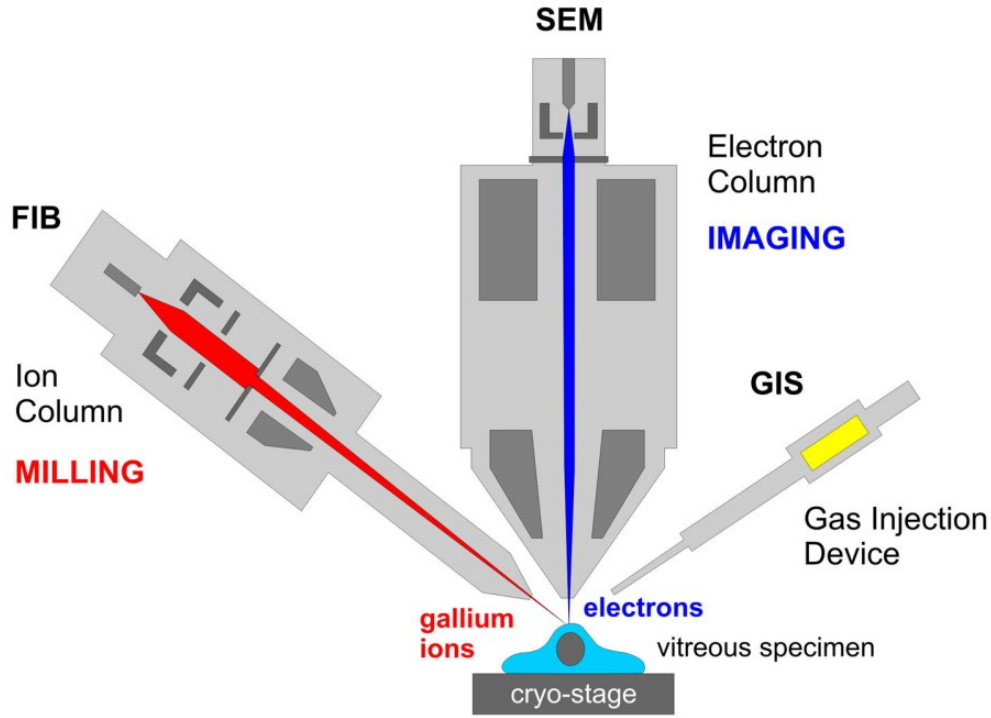
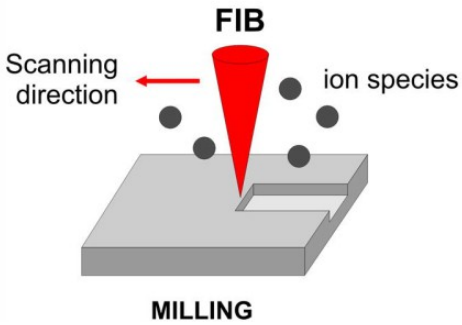


Image credit: Seyed Majid Mohseni (PhD thesis)





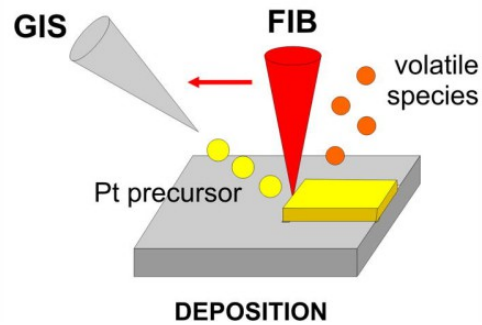
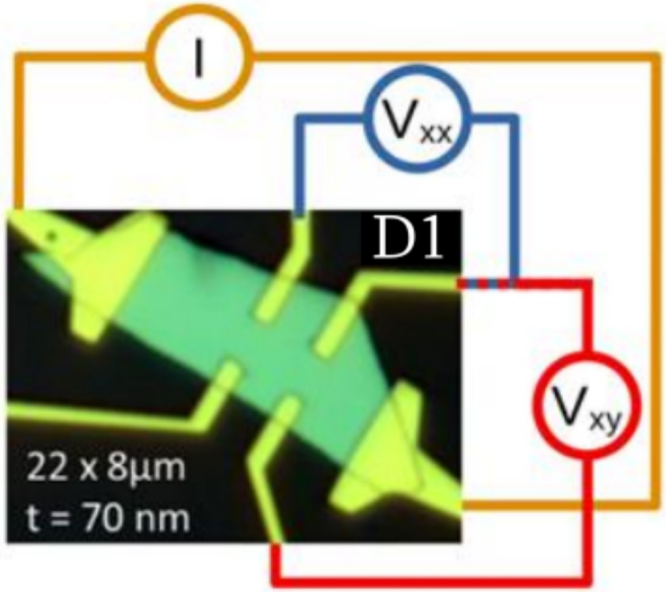
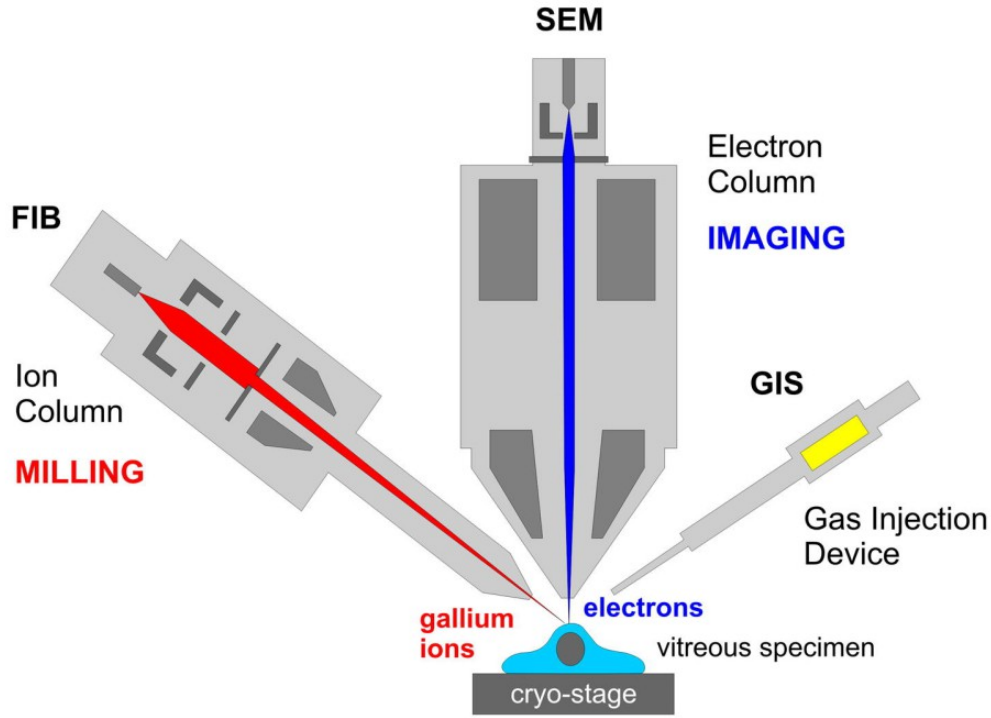
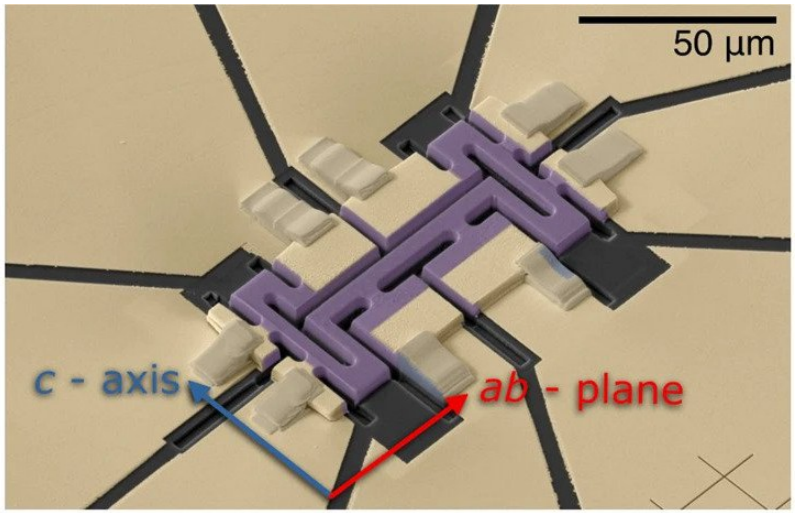
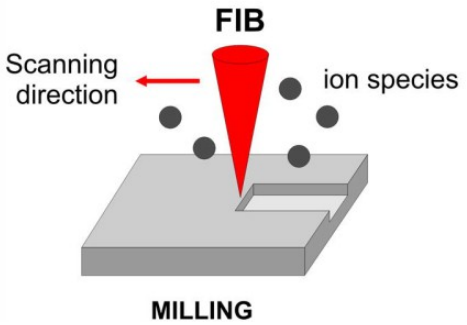


Image credits: Archives Biochem. Biophys. 581, 122 (2015); npj 2D Mater. Appl. 4, 7 (2020); arXiv:2410.12596









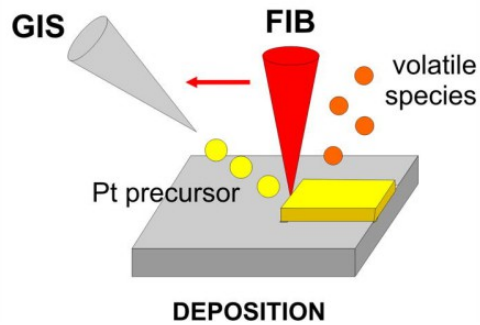
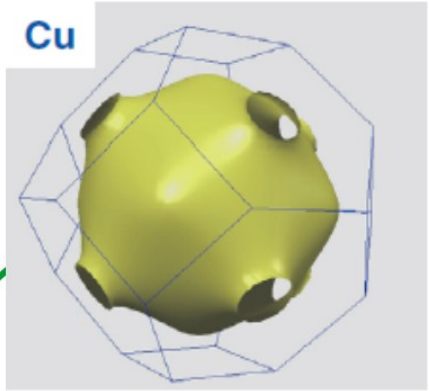


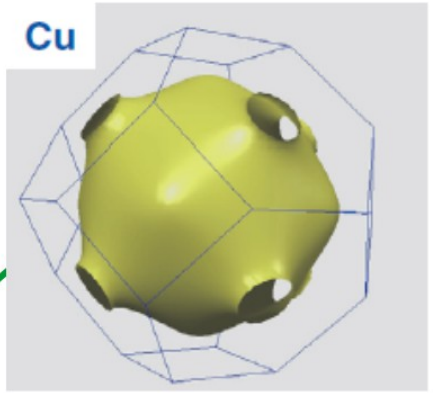
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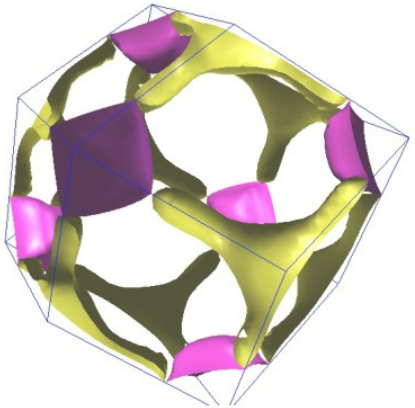
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Na	0.8
K	1.38
Rb	2.2
Cs	4.5
Cu	0.2
Ag	0.3
Au	0.5
Be	
Mg	0.62
Ca	
Sr	7
Ba	17
Nb	3.0
Fe	0.66
Sn	2.1
Pb	4.7
Bi	35



Ashcroft and Mermin
Solid State Physics

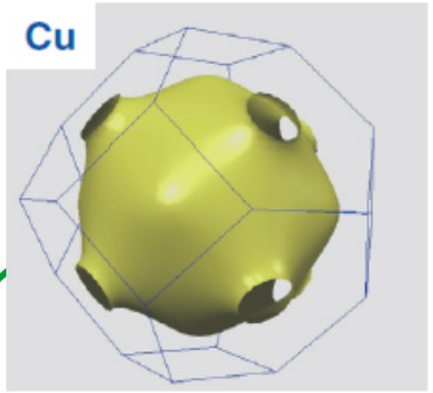
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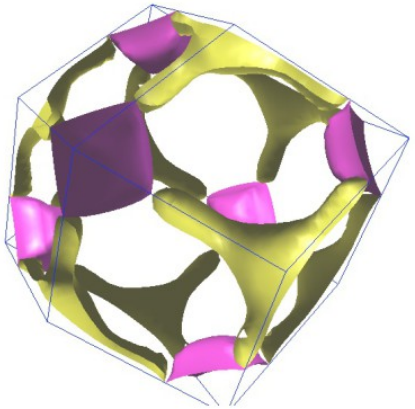


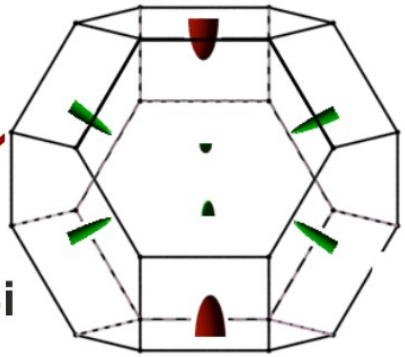


Ashcroft and Mermin
Solid State Physics

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Ashcroft and Mermin
Solid State Physics



Image credit: Mitchell Instrument (fair use)

Hall sensor in cars

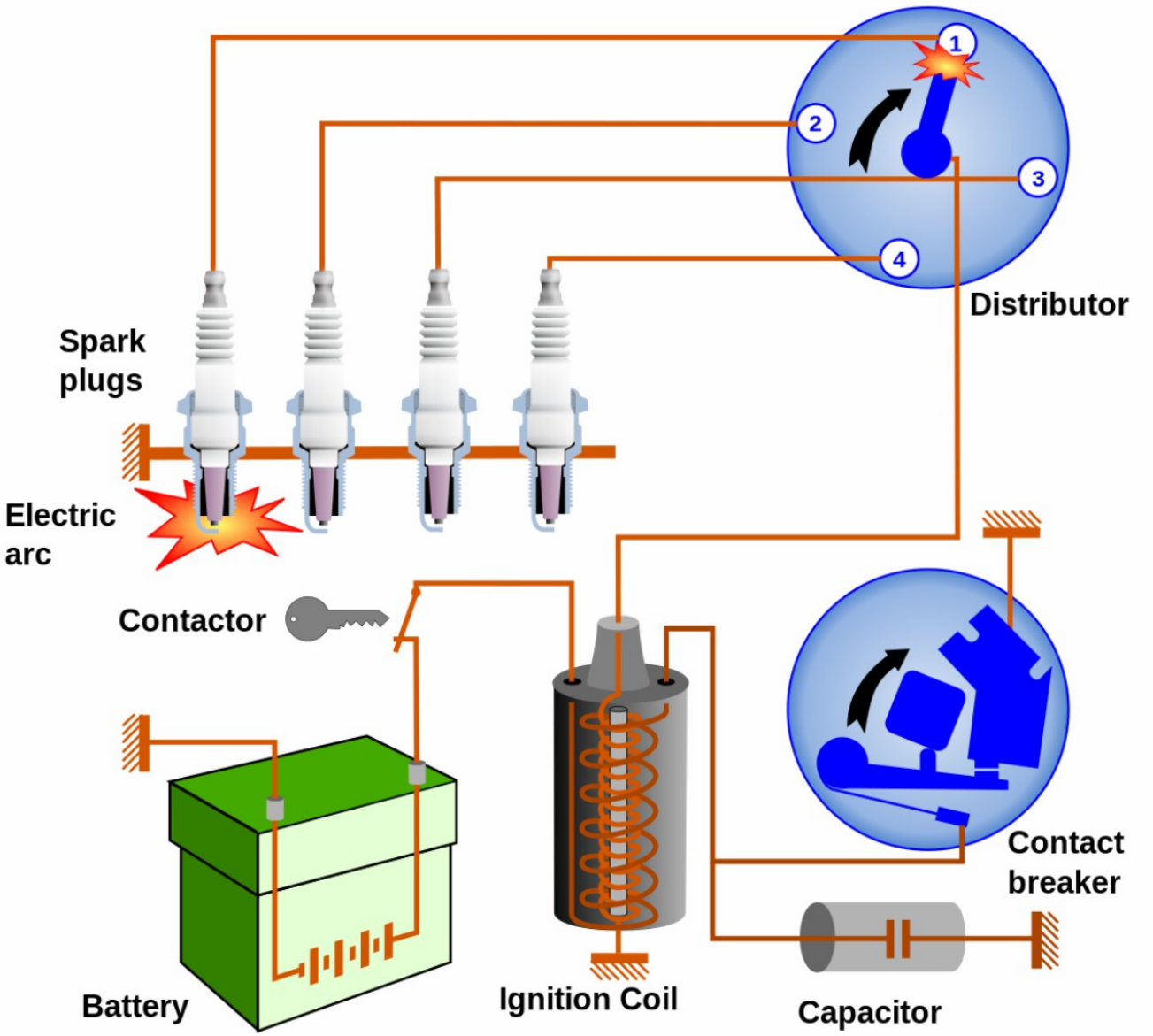
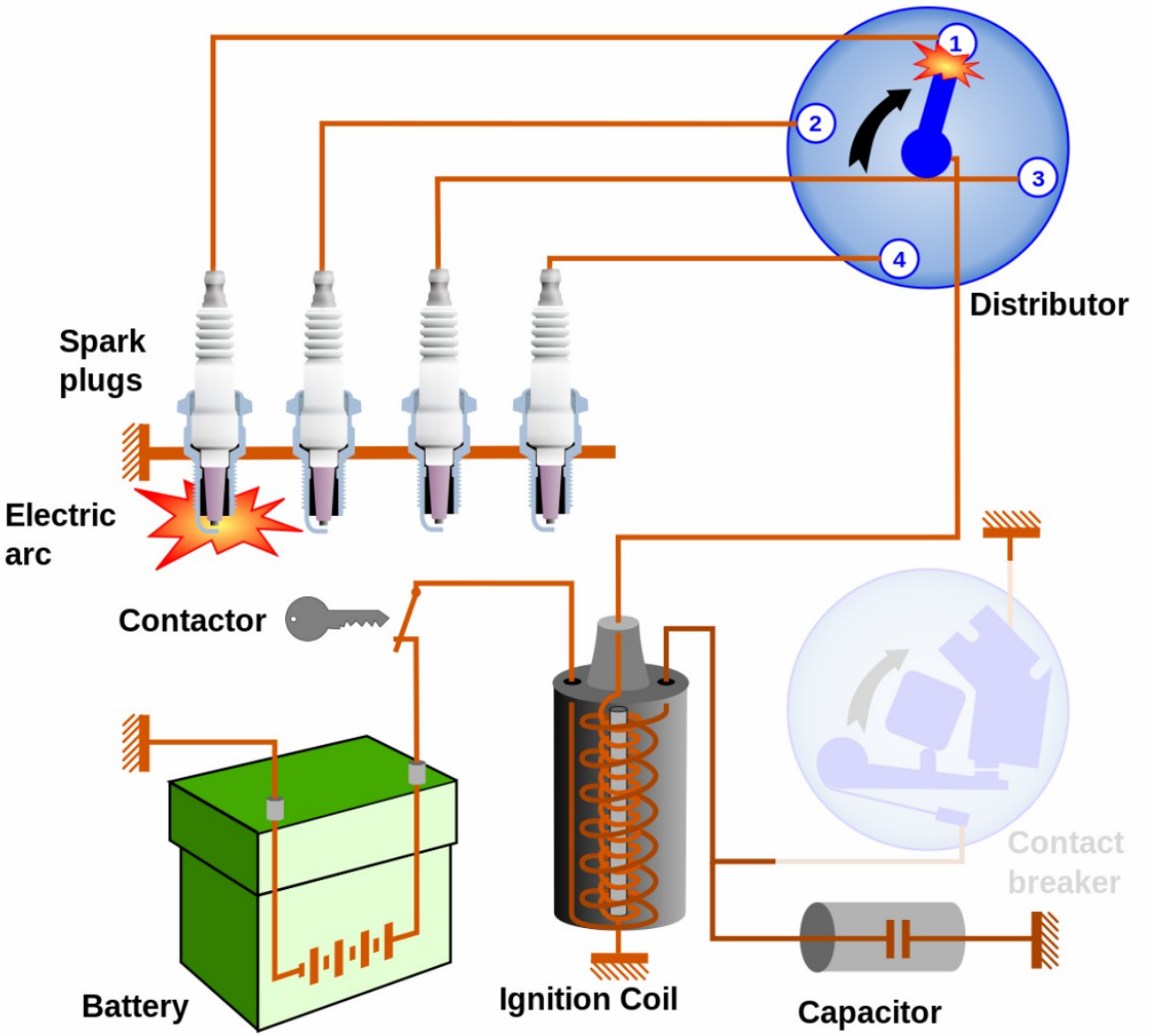




Image credit: Frédéric MICHEL and Rudolf Stricker (CC-BY-SA)

Hall sensor in cars





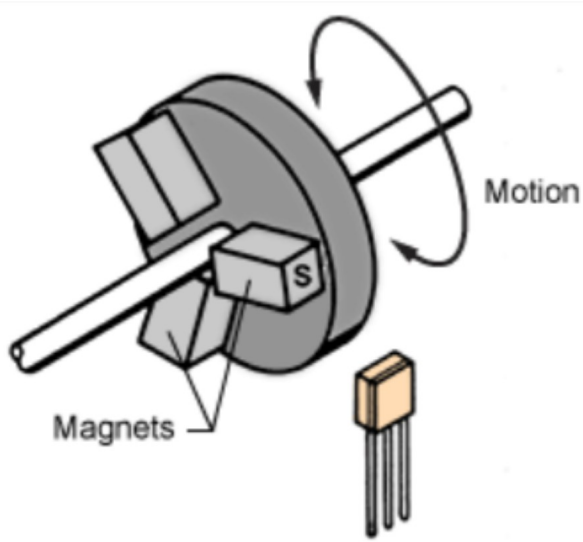


Image credit: Frédéric MICHEL and Vauxford (CC-BY-SA), Allegro Microsystems (fair use)

Hall-effect thruster

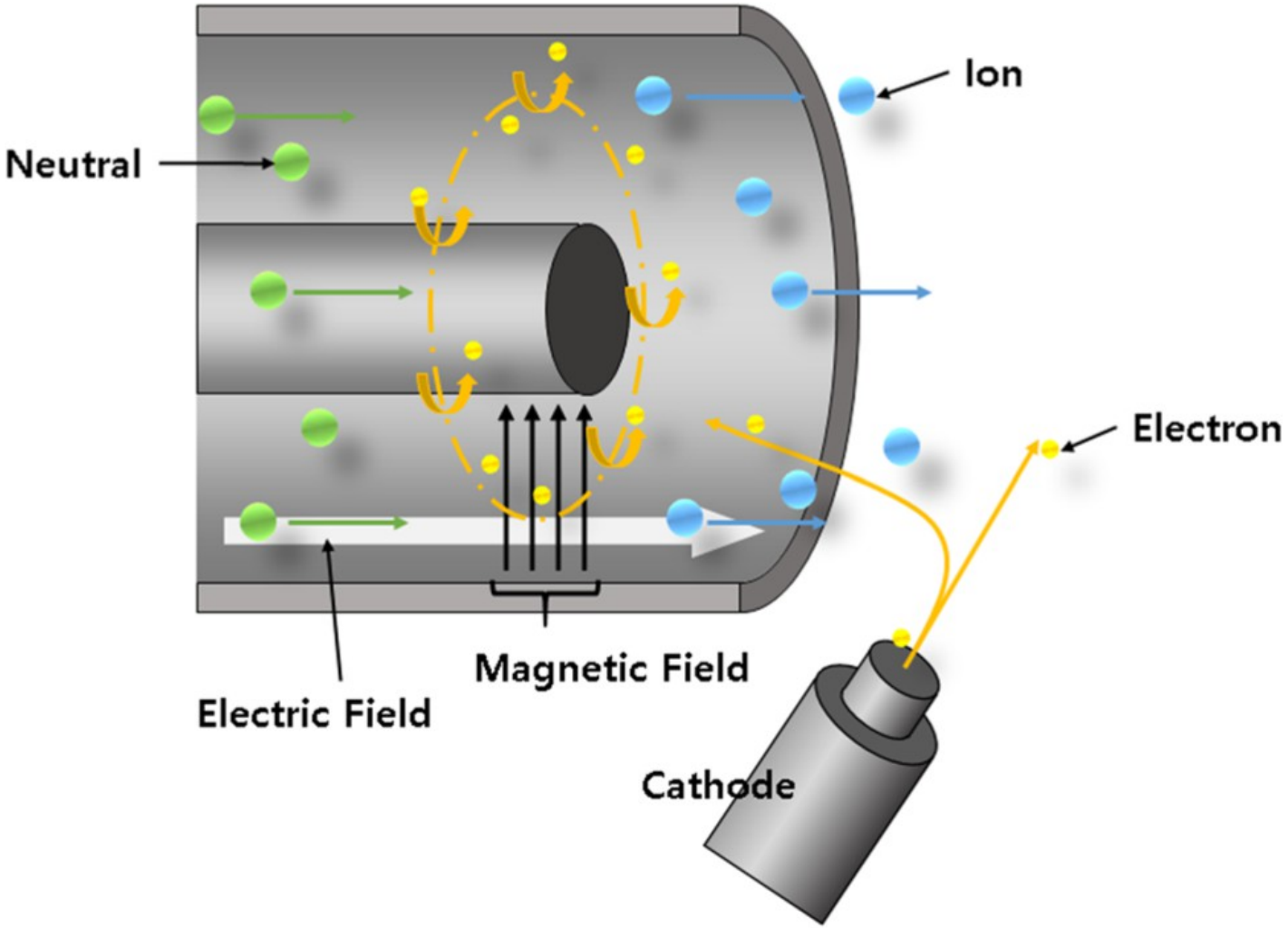
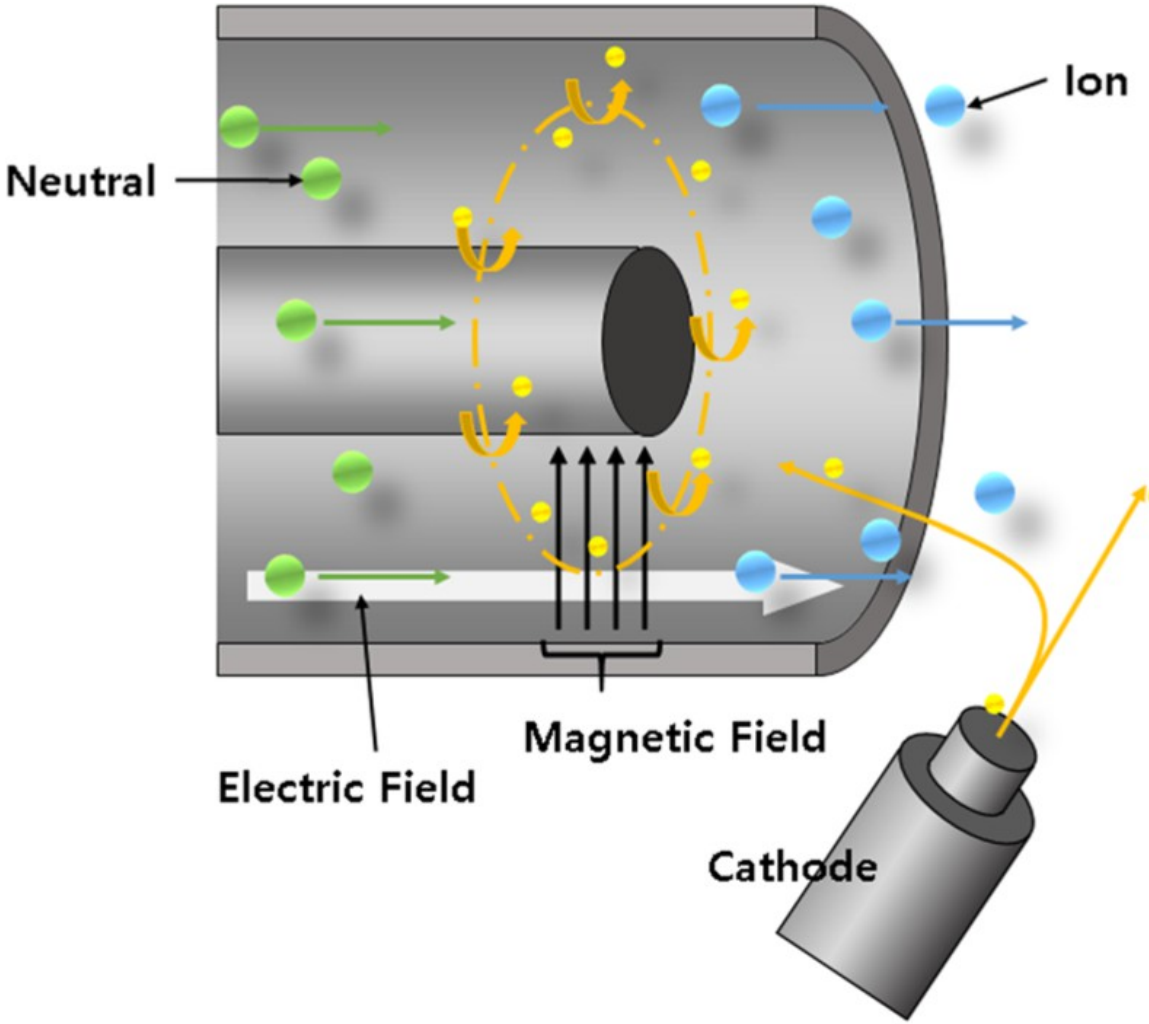


Image credit: Int. J. Aeronaut. Space Sci. 21, 1028 (2020)

Hall-effect thruster

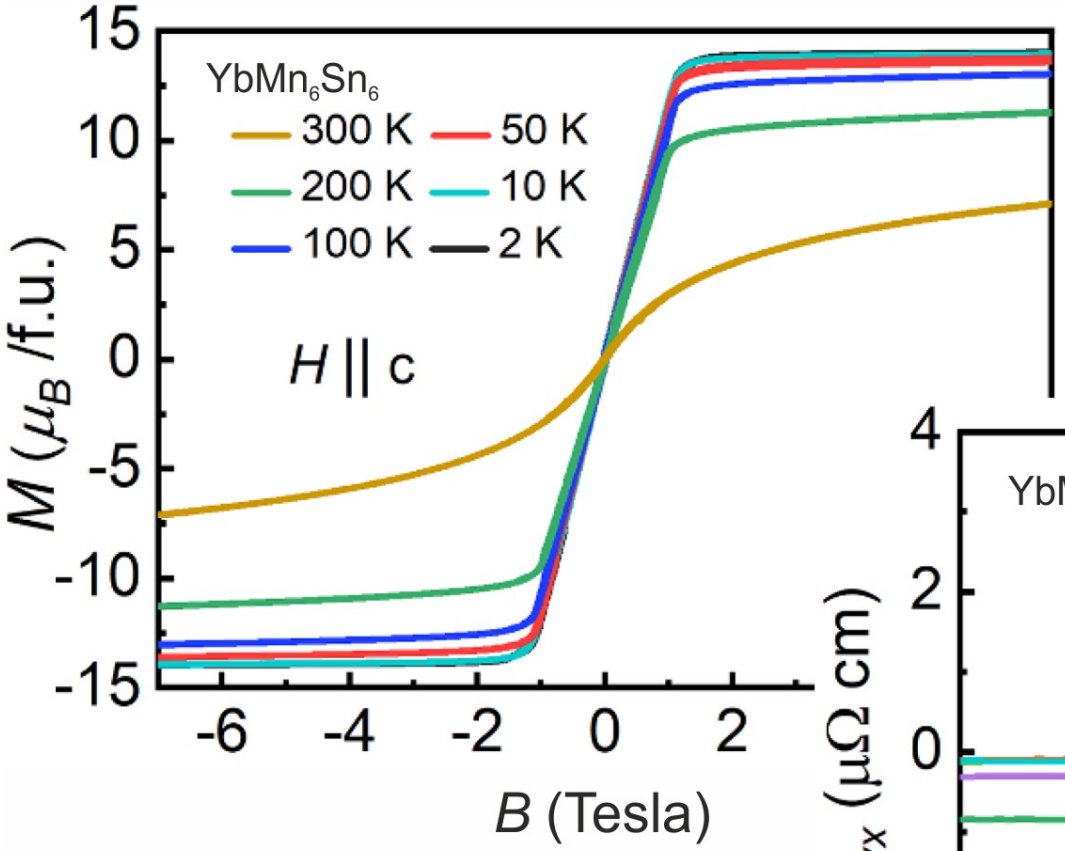


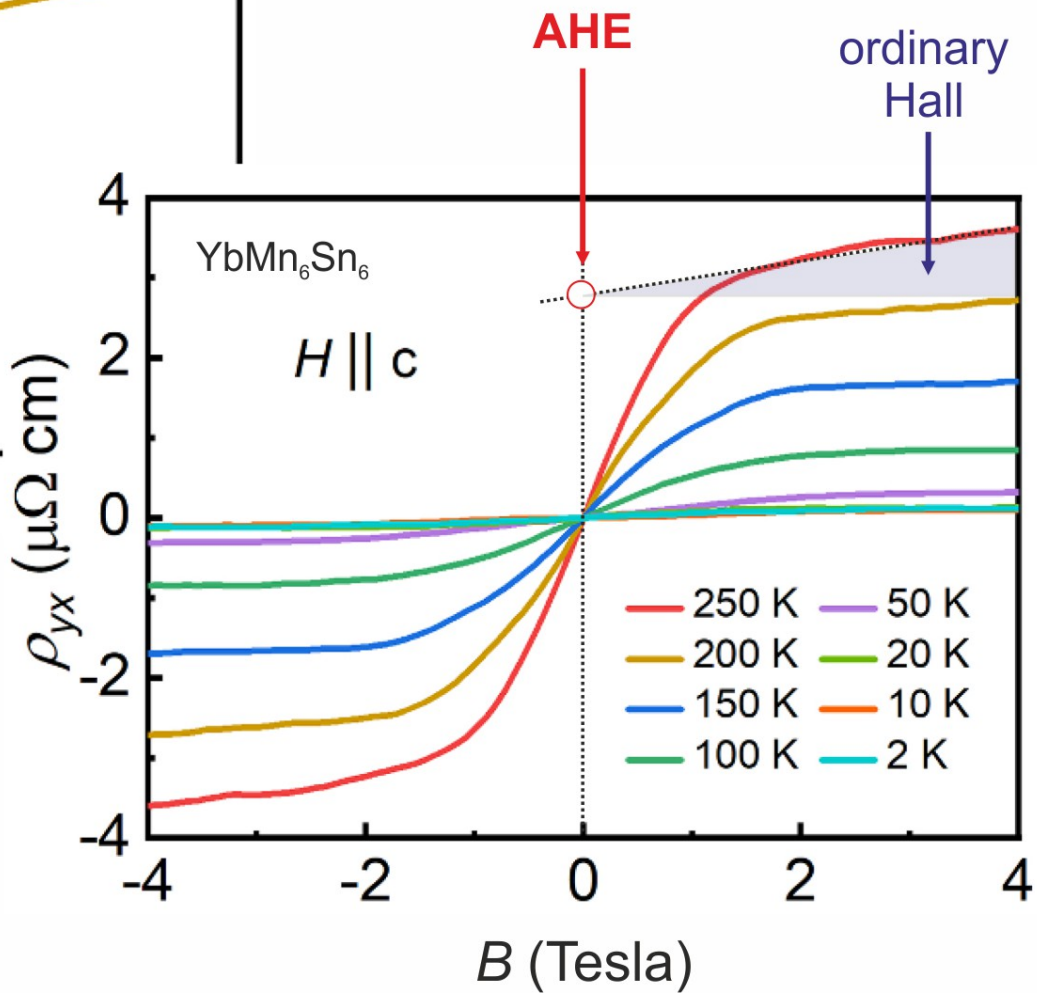


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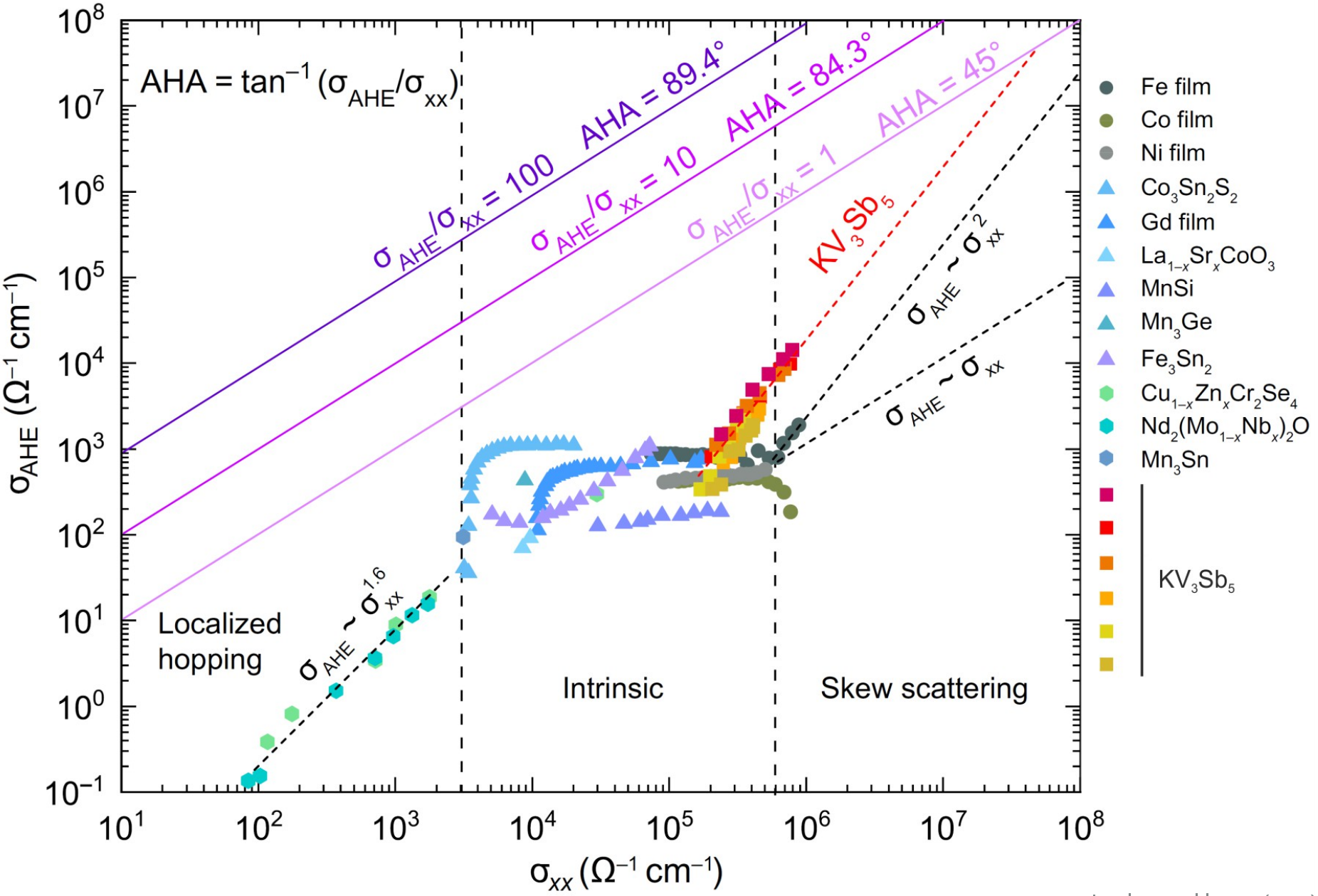
Image credit: Int. J. Aeronaut. Space Sci. 21, 1028 (2020) and Starlink

Anomalous Hall effect





J. Phys.: Condens. Matter 36, 315701 (2024)



Sci. Adv. 6, eabb6003 (2020)