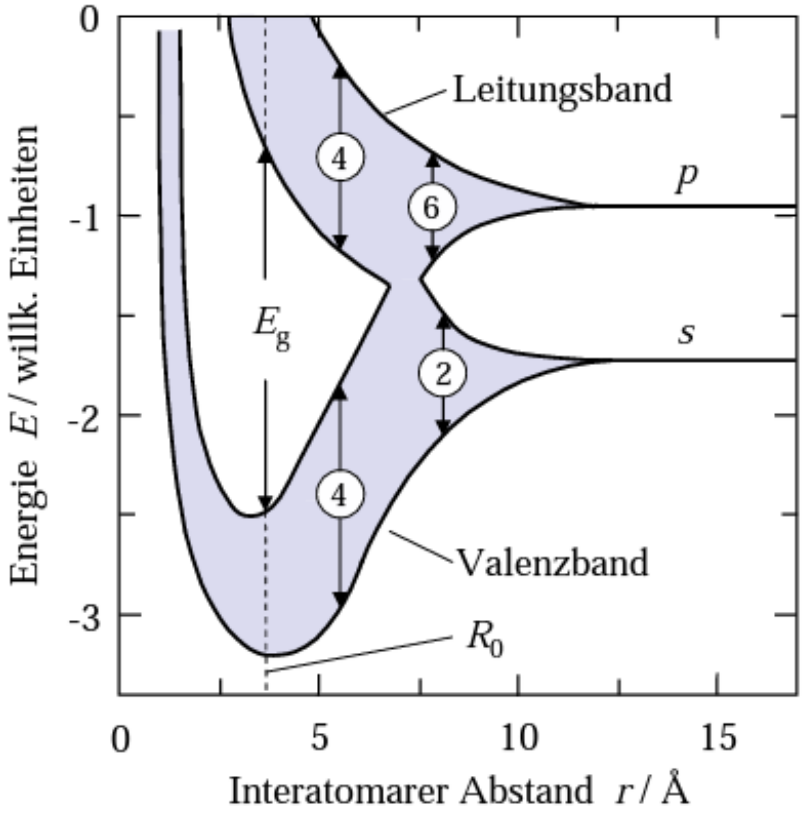
Energiebänder

1. **Elektronen in einem schwachen periodischen Potential**
2. **Bloch-Theorem; Bloch-Funktionen**
3. **Tight-binding-Model: Stark-gebundene Elektronen**
4. **Energiedispersionskurven E(k)**
5. **Brillouin-Zonen und Fermi-Flächen**

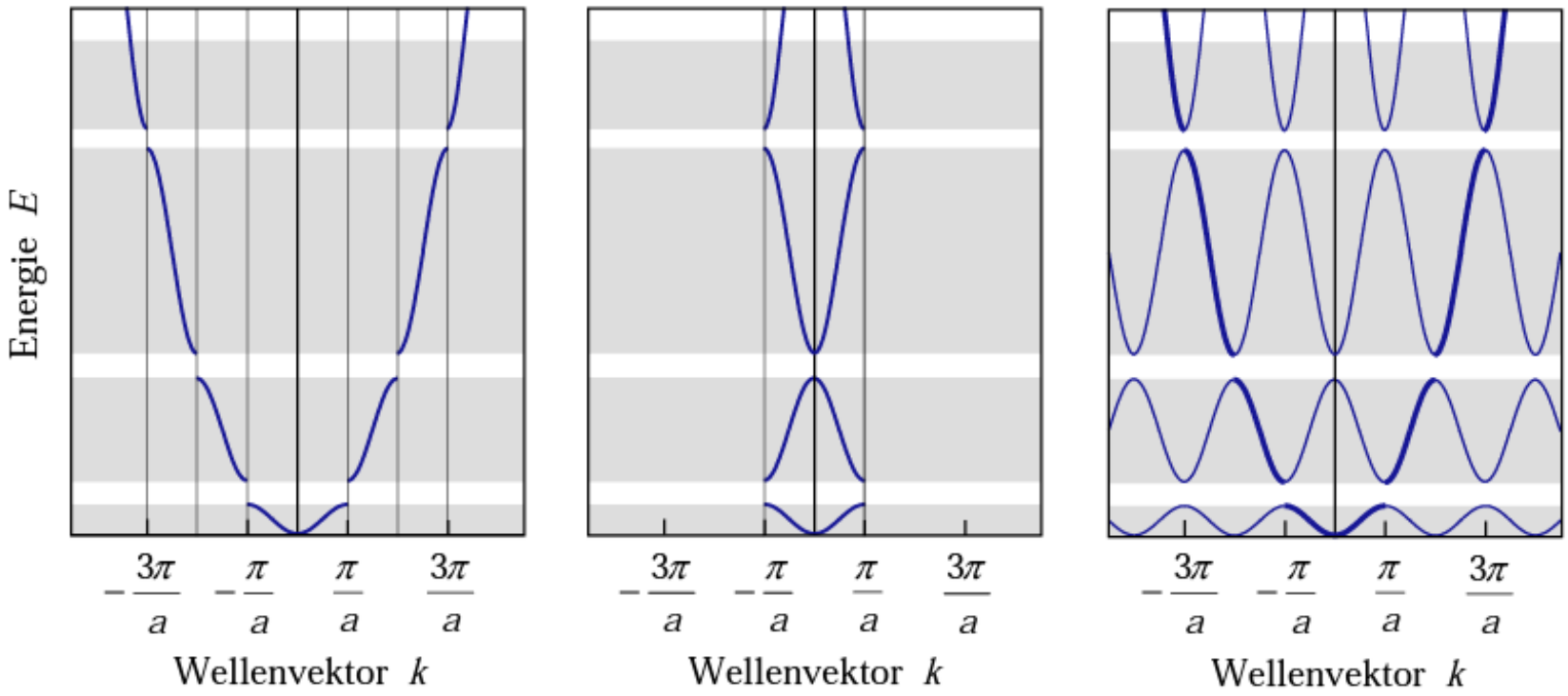
LCAO Rechnung für Diamant

Abstandsabhängigkeil der Energiebänder in Diamant: R_0 = 3,57 Å ; E_g = 5,5 eV



© A.H. Wilson, *The Theory of Metals (*1965)

Energiedispersionskurven



erweitertes Zonenschema

reduziertes Zonenschema

periodisches Zonenschema

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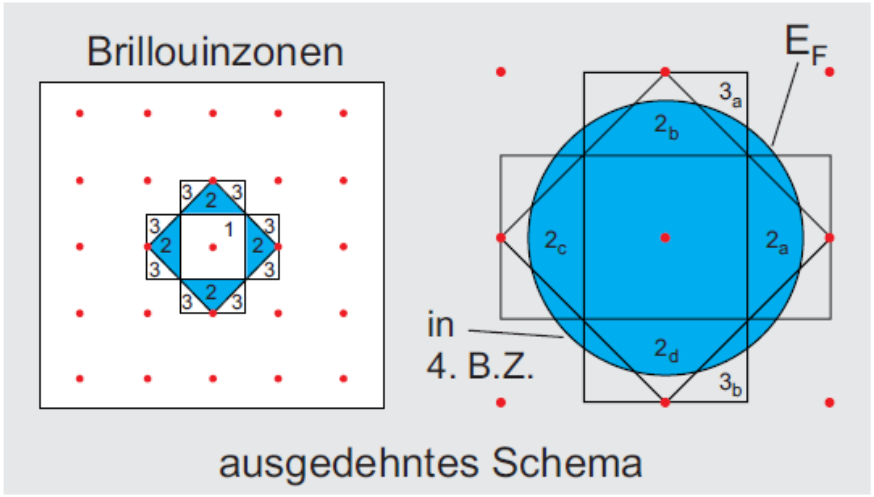
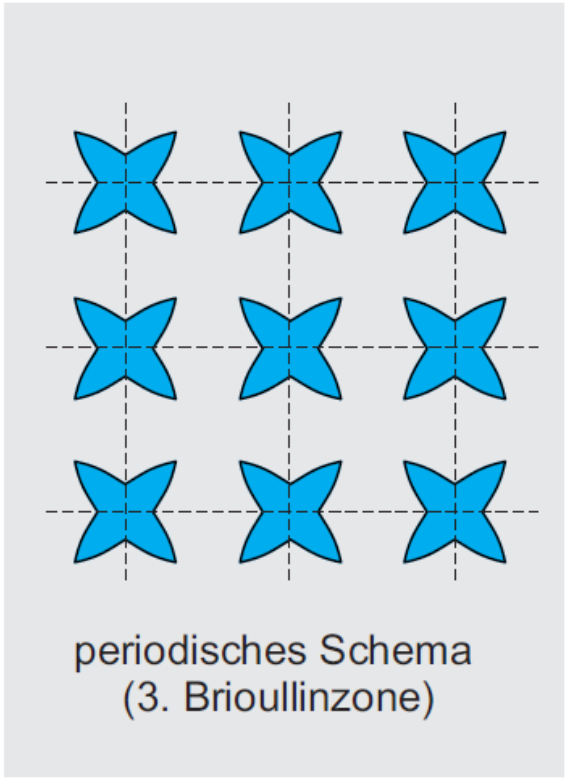
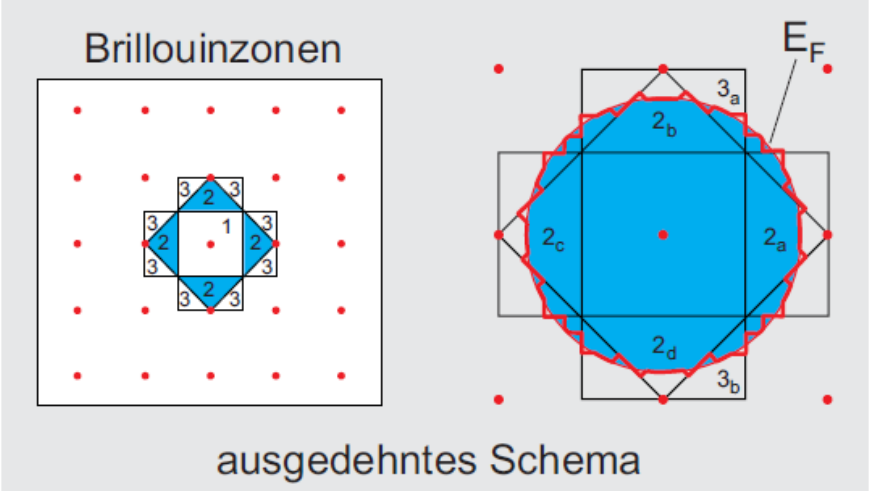
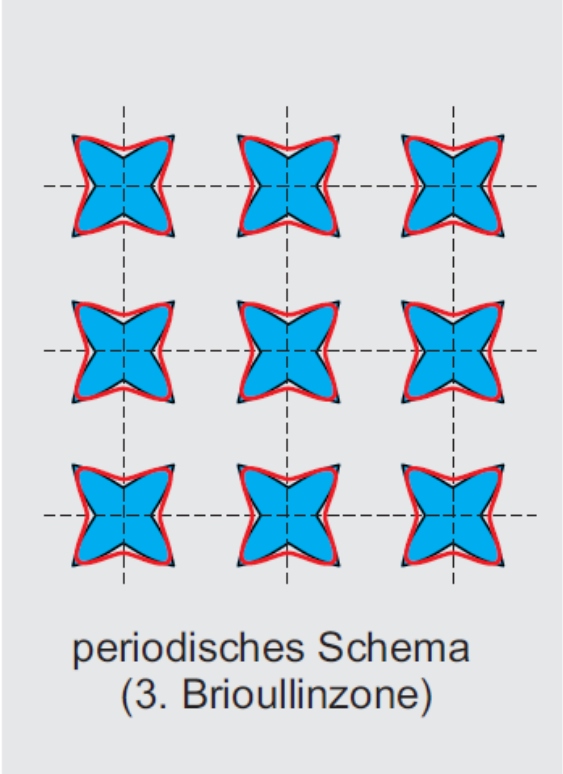
Fermifläche des freien Elektronengases



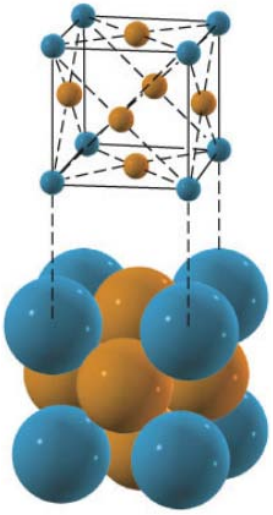


Fermifläche für Elektronen im periodischen Potenzial

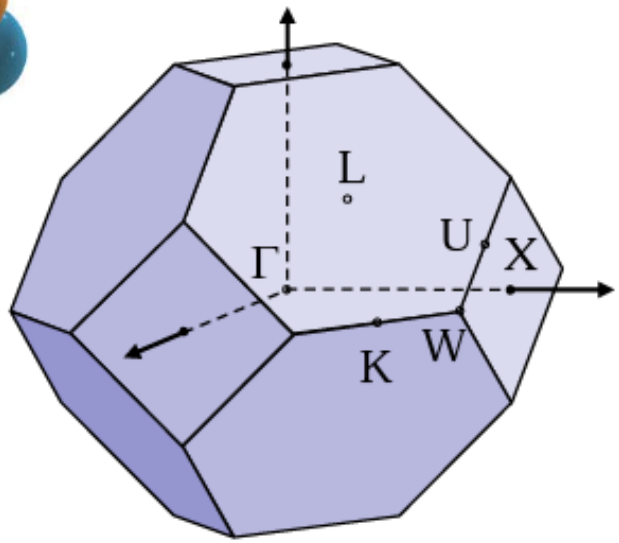




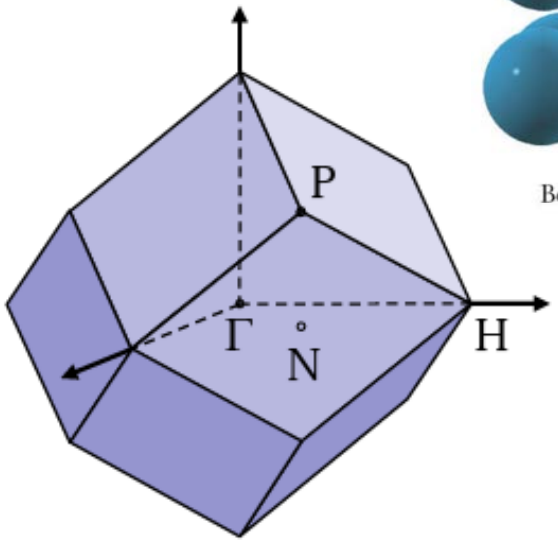
1. Brillouin Zonen



Face-centered



fcc



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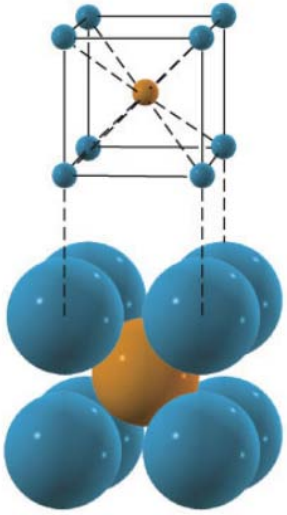
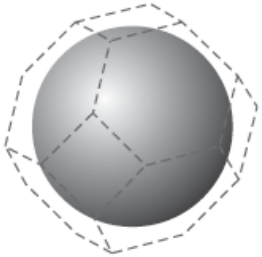
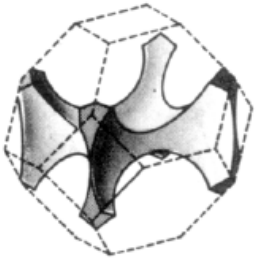
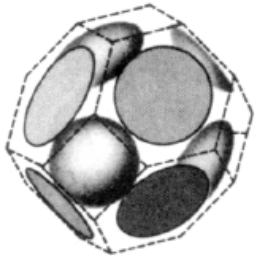
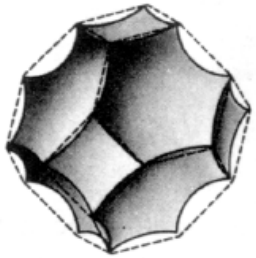
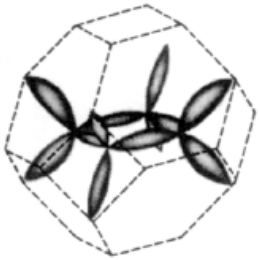
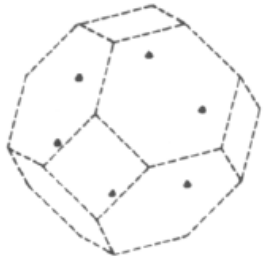


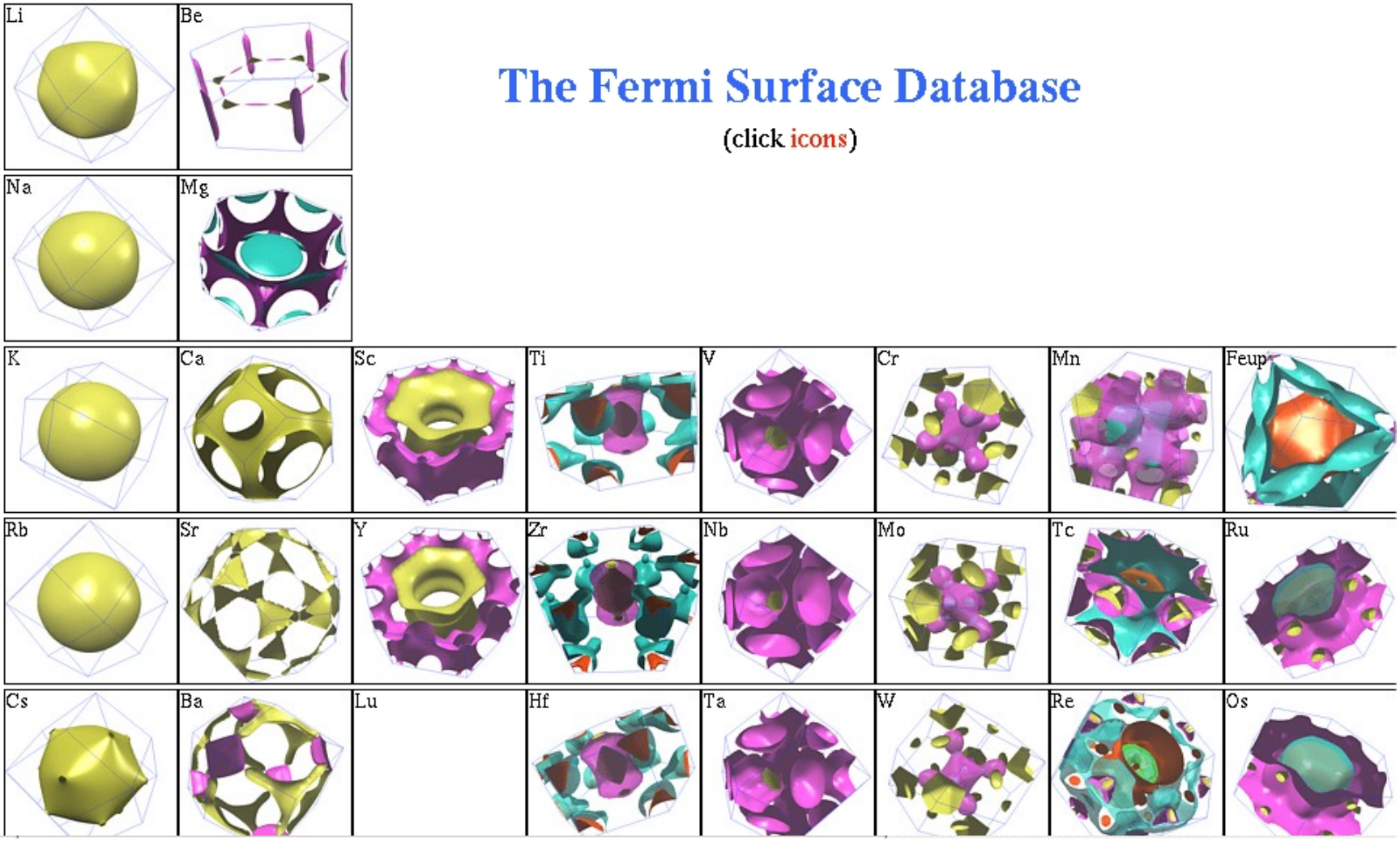
Body-centered

Fermiflächen von fcc-Metallen für freie Elektronen

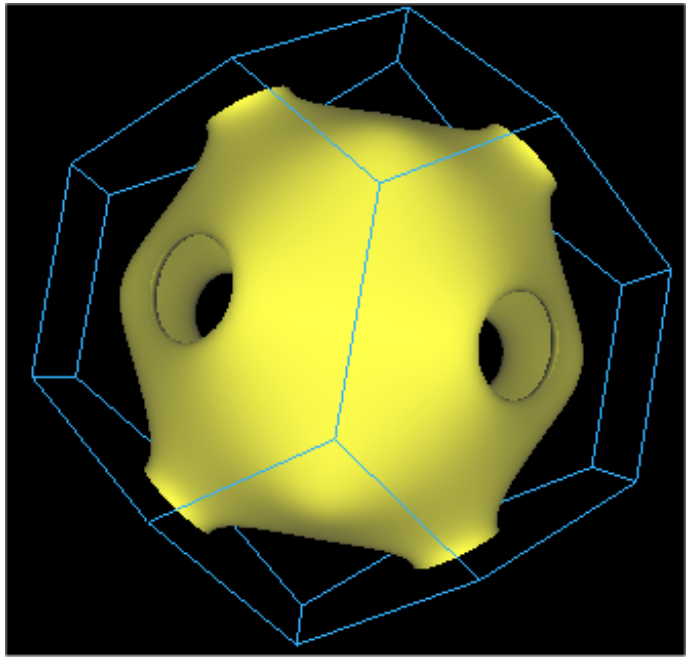
Anteile in verschiedenen Brillouin-Zonen

	erste Zone	zweite Zone	dritte Zone	vierte Zone
einwertig		—	—	—
zweiwertig			—	—
dreiwertig	—			

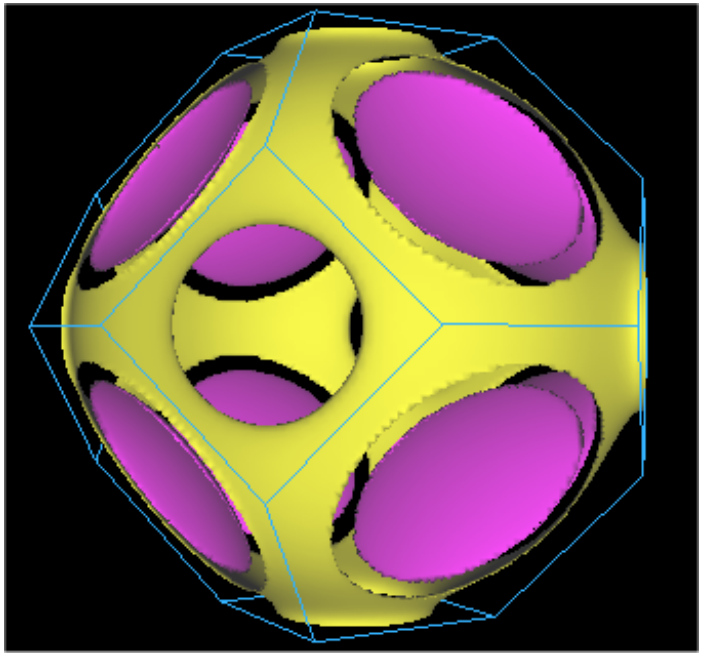
The Fermi Surface Database
http://www.phys.ufl.edu/fermisurface/



z.B.
http://www.phys.ufl.edu/fermisurface/

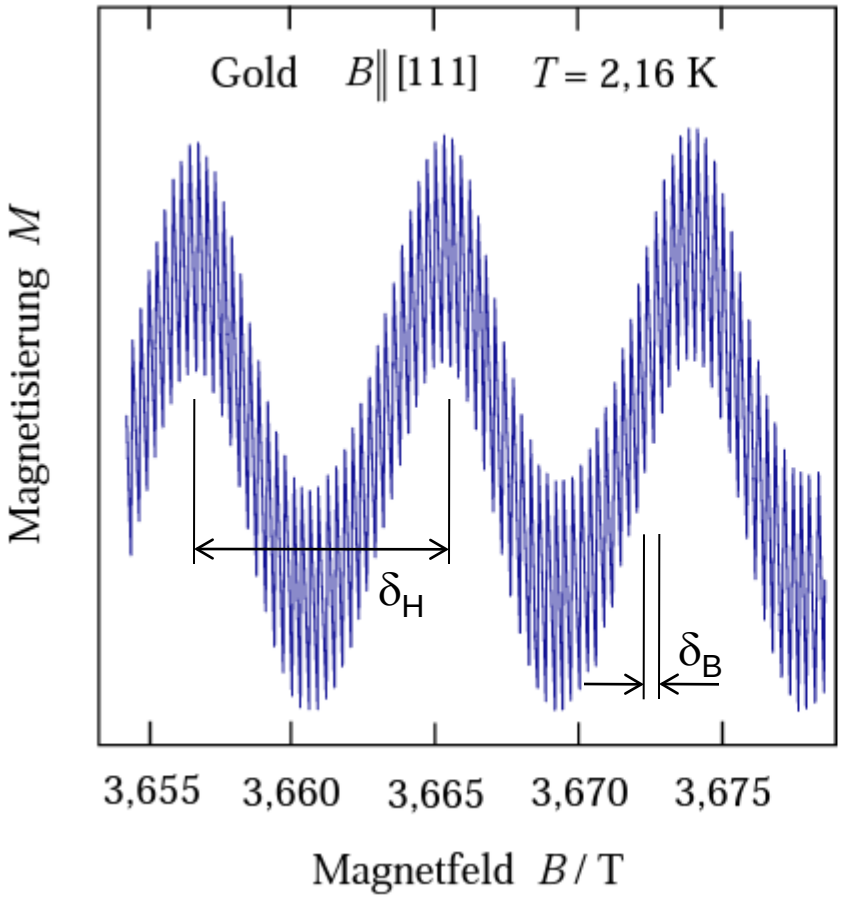


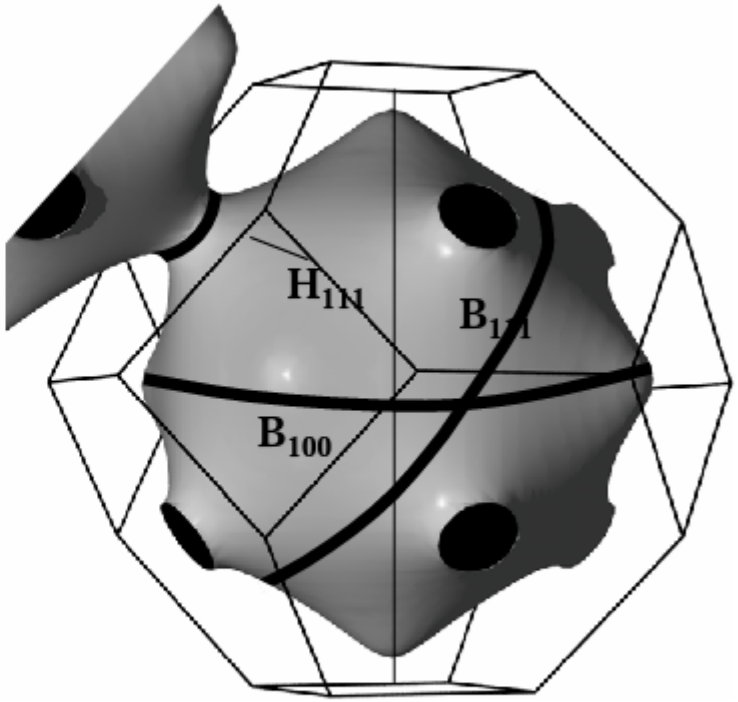
Cu



Zn

De-Haas-van-Alphén-Effekt in Au





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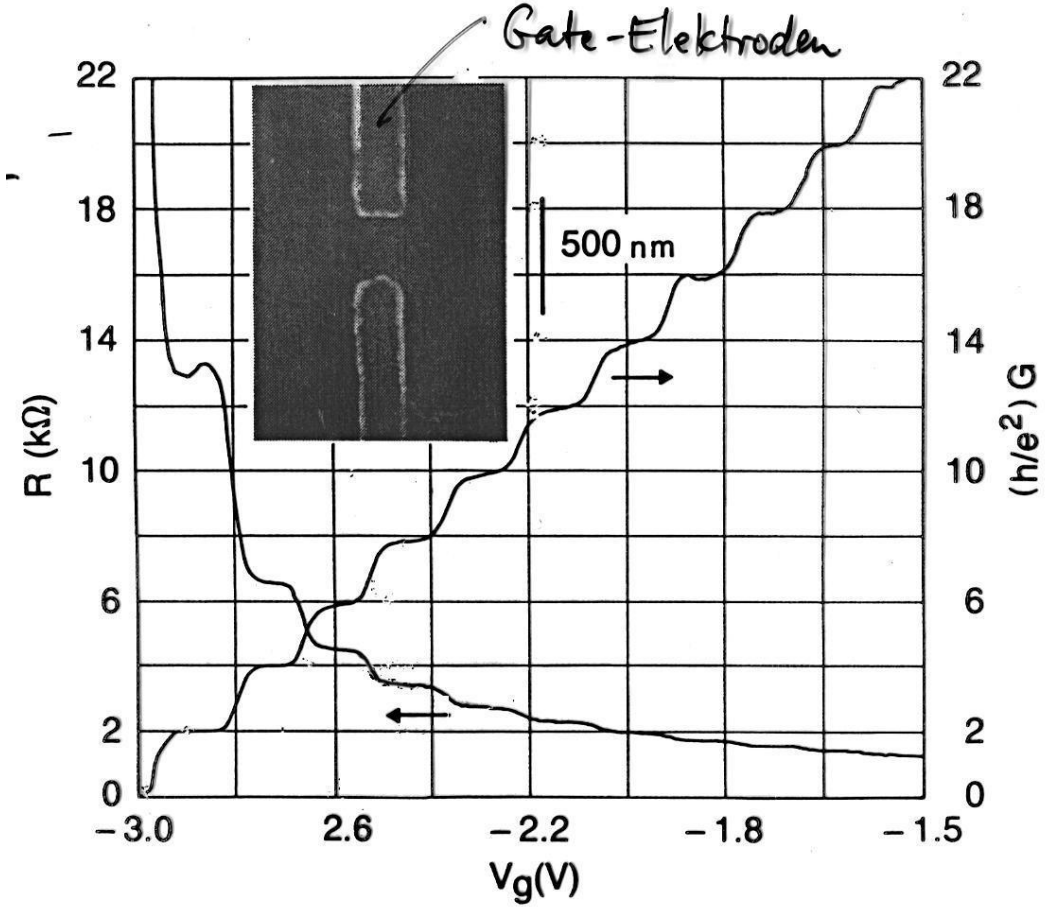
Quantisierung des Leitwerts in Quantenpunktkontakten



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