

Paramagnetismus

Magnetisches Moment der Seltenen Erden

Table 1 Effective magneton numbers p for trivalent lanthanide group ions

(Near room temperature)

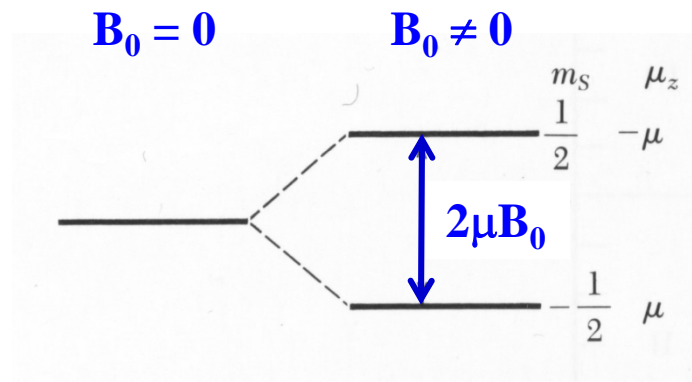
Ion	Configuration	Basic level	$p(\text{calc}) = g[J(J + 1)]^{1/2}$	$p(\text{exp}),$ approximate
Ce ³⁺	4f ¹ 5s ² p ⁶	² F _{5/2}	2.54	2.4
Pr ³⁺	4f ² 5s ² p ⁶	³ H ₄	3.58	3.5
Nd ³⁺	4f ³ 5s ² p ⁶	⁴ I _{9/2}	3.62	3.5
Pm ³⁺	4f ⁴ 5s ² p ⁶	⁵ I ₄	2.68	—
Sm ³⁺	4f ⁵ 5s ² p ⁶	⁶ H _{5/2}	0.84	1.5
Eu ³⁺	4f ⁶ 5s ² p ⁶	⁷ F ₀	0	3.4
Gd ³⁺	4f ⁷ 5s ² p ⁶	⁸ S _{7/2}	7.94	8.0
Tb ³⁺	4f ⁸ 5s ² p ⁶	⁷ F ₆	9.72	9.5
Dy ³⁺	4f ⁹ 5s ² p ⁶	⁶ H _{15/2}	10.63	10.6
Ho ³⁺	4f ¹⁰ 5s ² p ⁶	⁵ I ₈	10.60	10.4
Er ³⁺	4f ¹¹ 5s ² p ⁶	⁴ I _{15/2}	9.59	9.5
Tm ³⁺	4f ¹² 5s ² p ⁶	³ H ₆	7.57	7.3
Yb ³⁺	4f ¹³ 5s ² p ⁶	² F _{7/2}	4.54	4.5

(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

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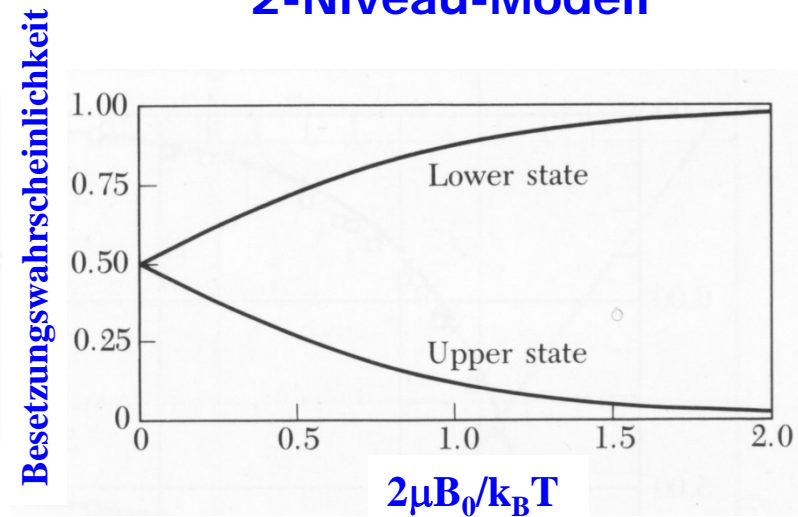
Langevin Paramagnetismus

Zeeman-Aufspaltung



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

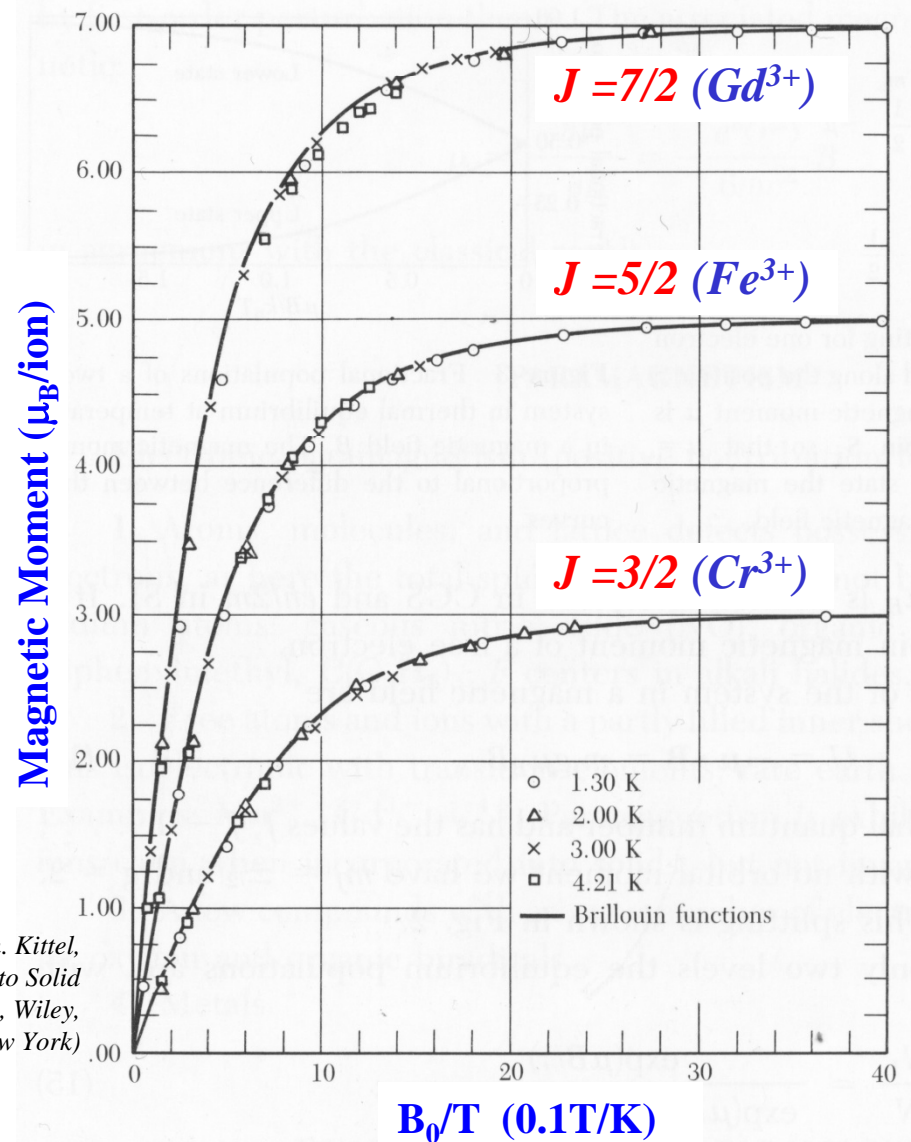
2-Niveau-Modell



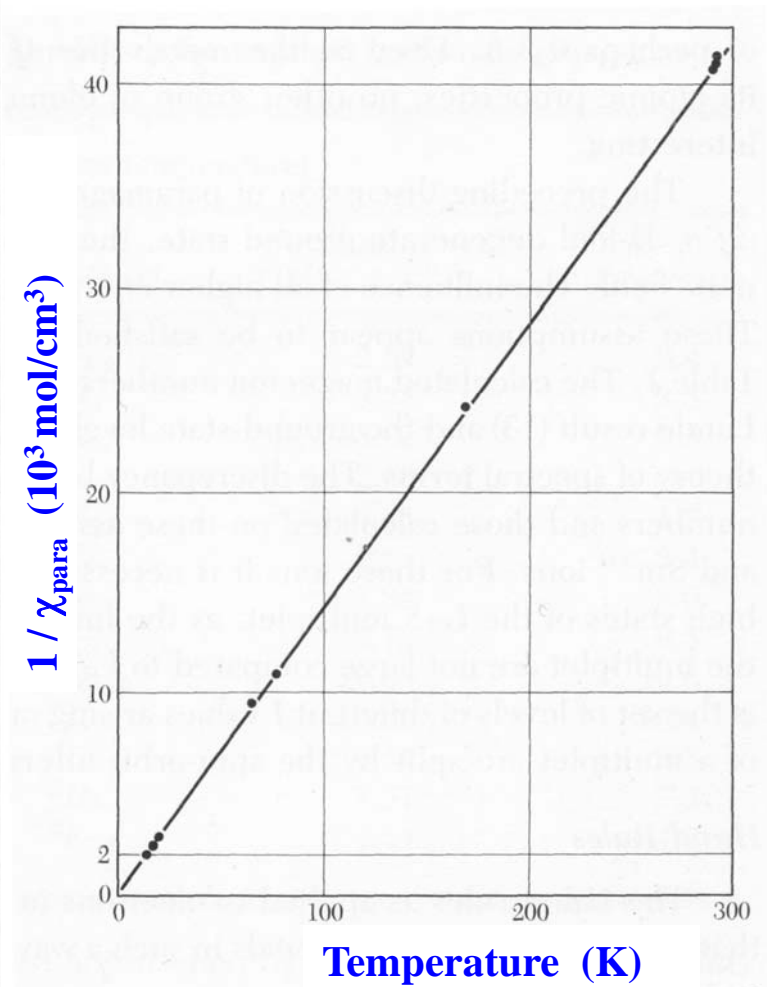
(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Paramagnetismus

Brillouin-Funktion



Curie-Gesetz



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)