

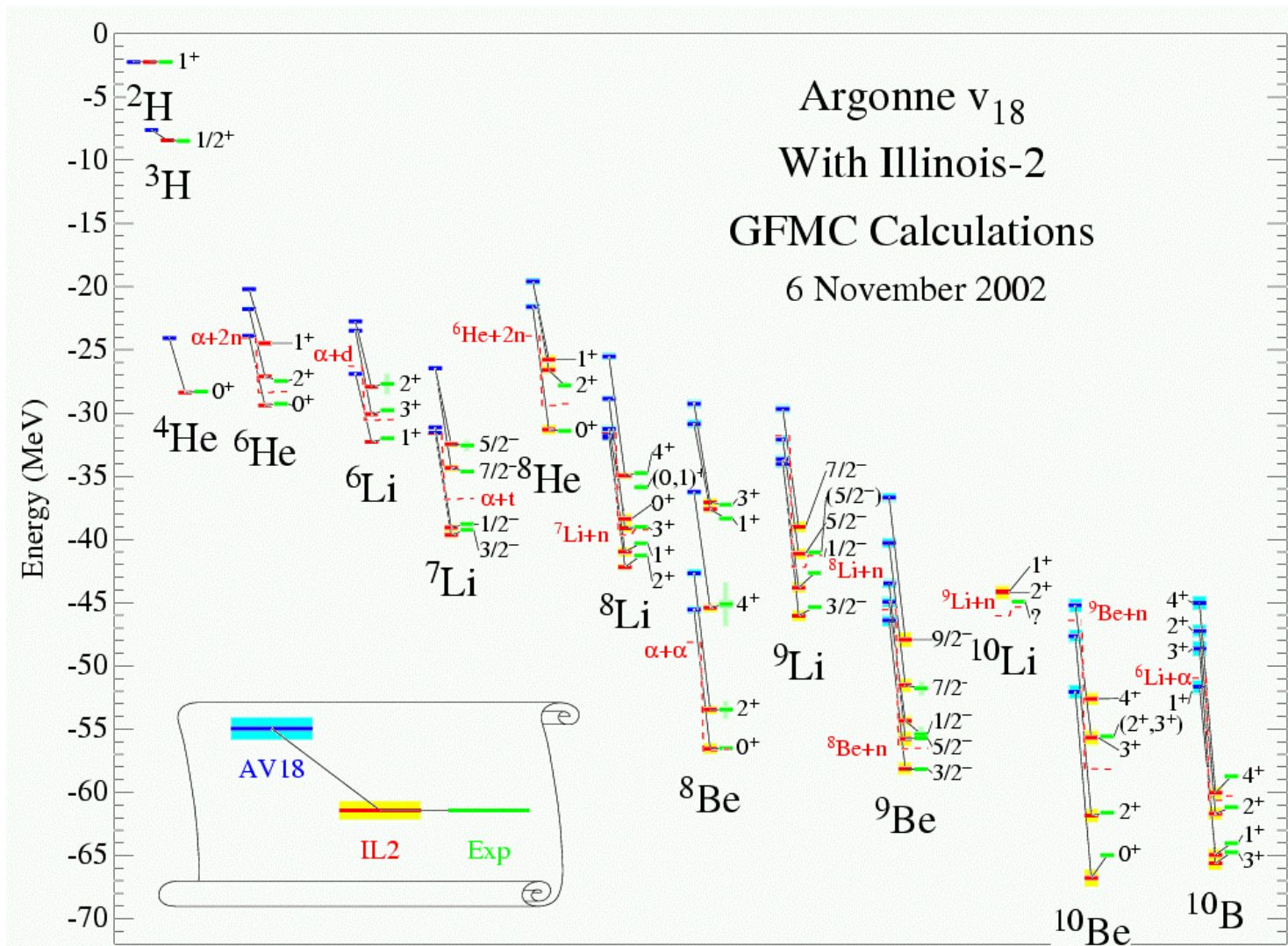


# Einteilchenbewegung im Kern

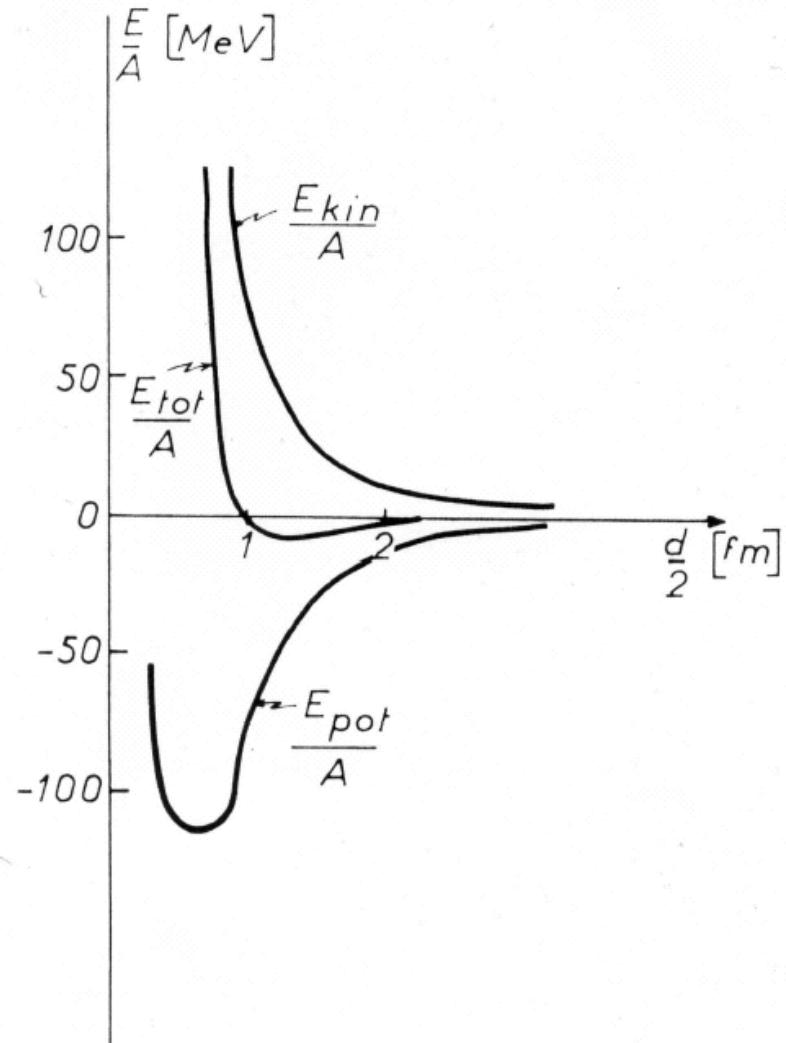
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- Fermi-Gas-Modell
- Schalenmodell
- Restwechselwirkung

# Ab-initio Rechnungen

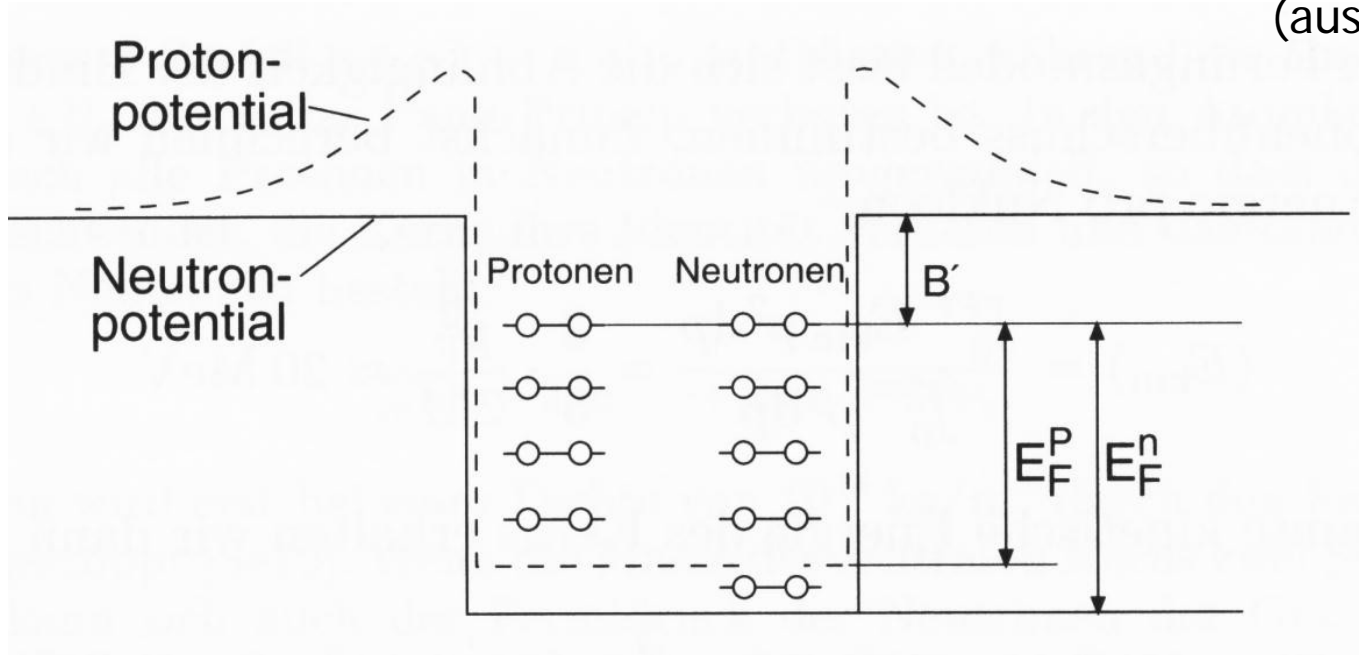


# NN-Potenzial

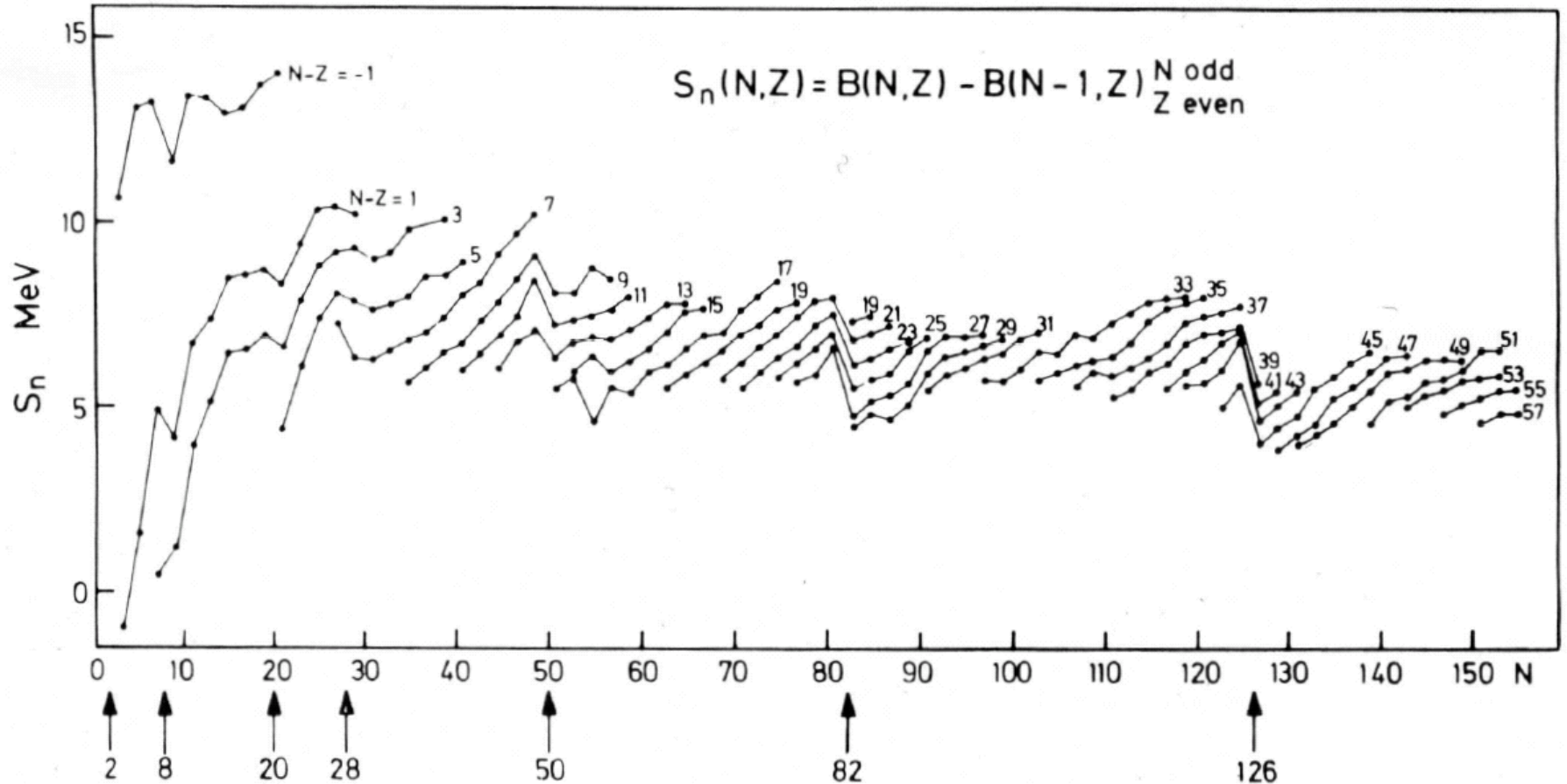


# Fermi-Gas Modell

(aus Povh)

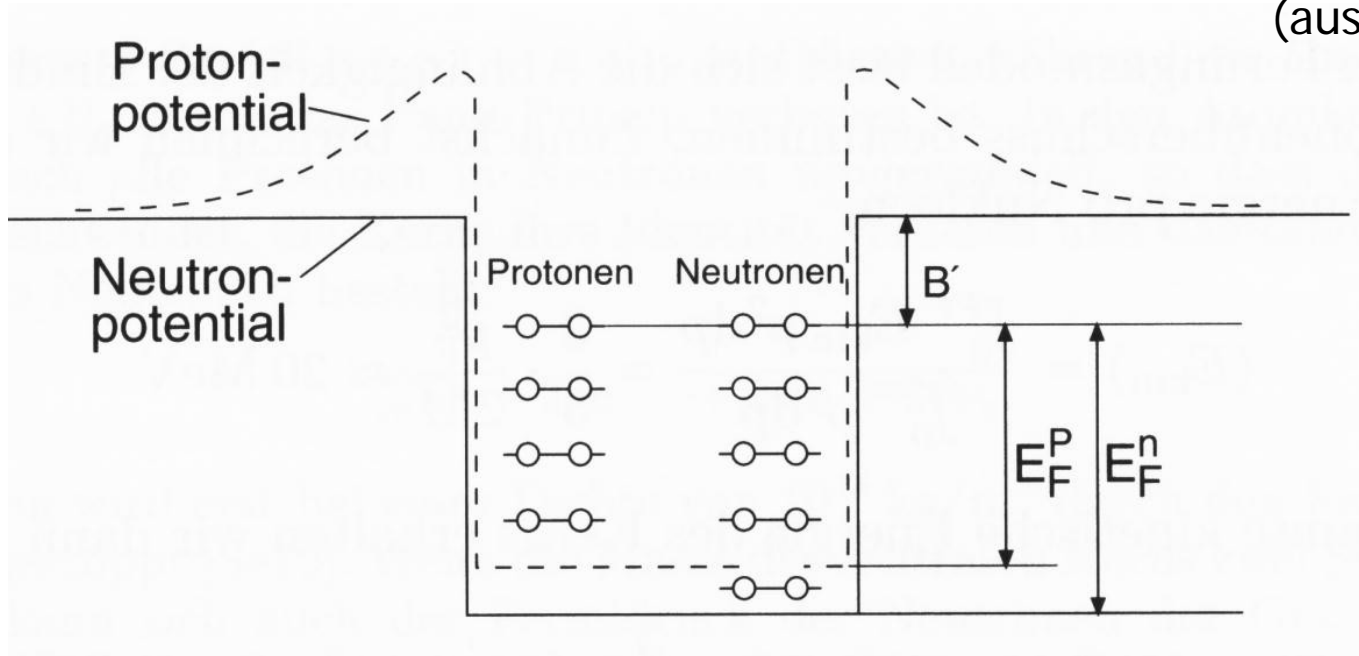


# Separationsenergien



# Fermi-Gas Modell

(aus Povh)

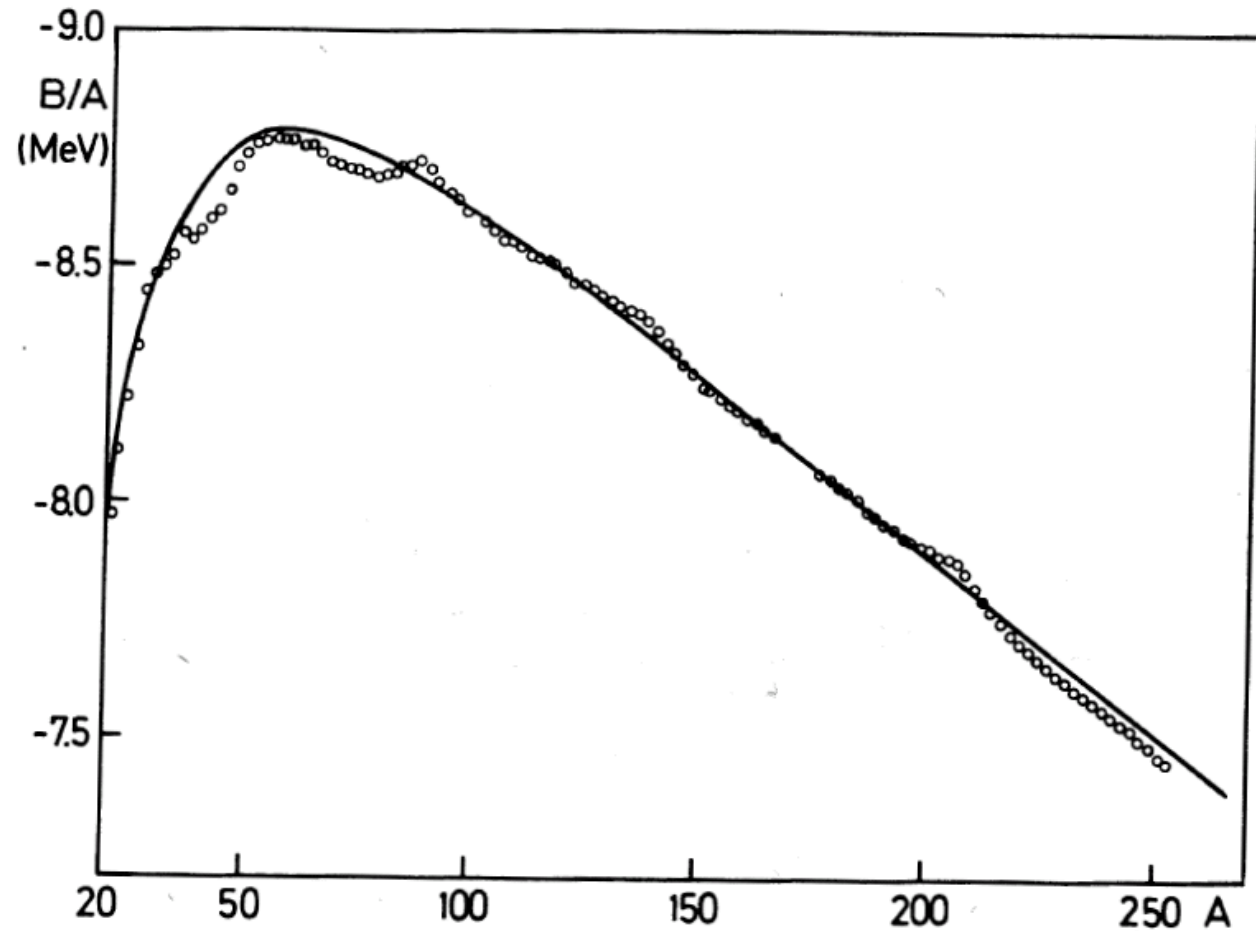


$$E_{kin} = X \cdot A + Y \cdot \frac{(N - Z)^2}{A}$$

$$B(Z, N) = \underbrace{a_v A - a_s A^{2/3}}_{\text{Tröpfchenmodell}} - a_c \frac{Z(Z-1)}{A^{1/3}} - \underbrace{a_a \frac{(N-Z)^2}{A}}_{\text{Fermi-Gas Modell}} + \delta$$

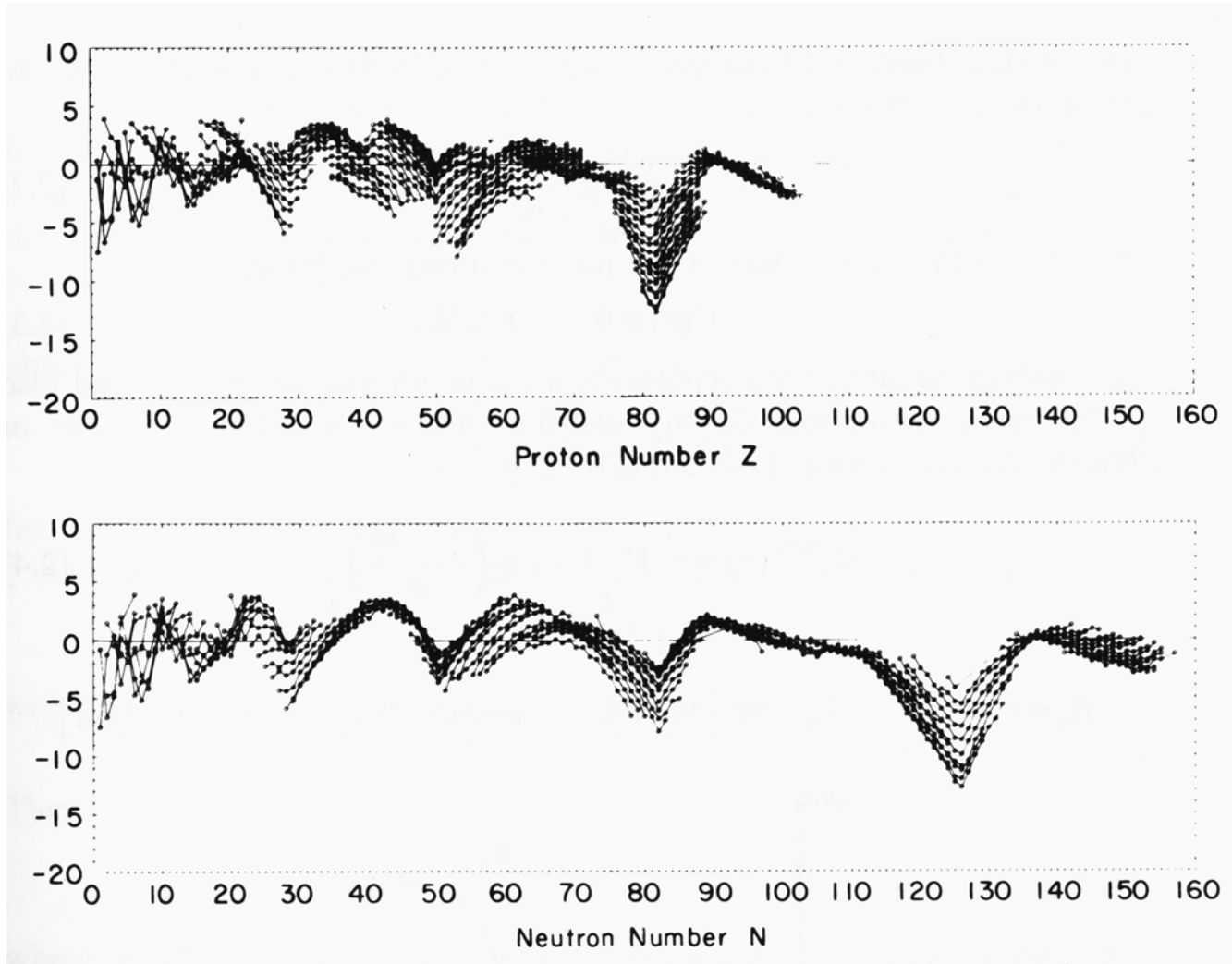
+ 0  
-  $\delta$

# Evidenz für Schalenabschlüsse 1



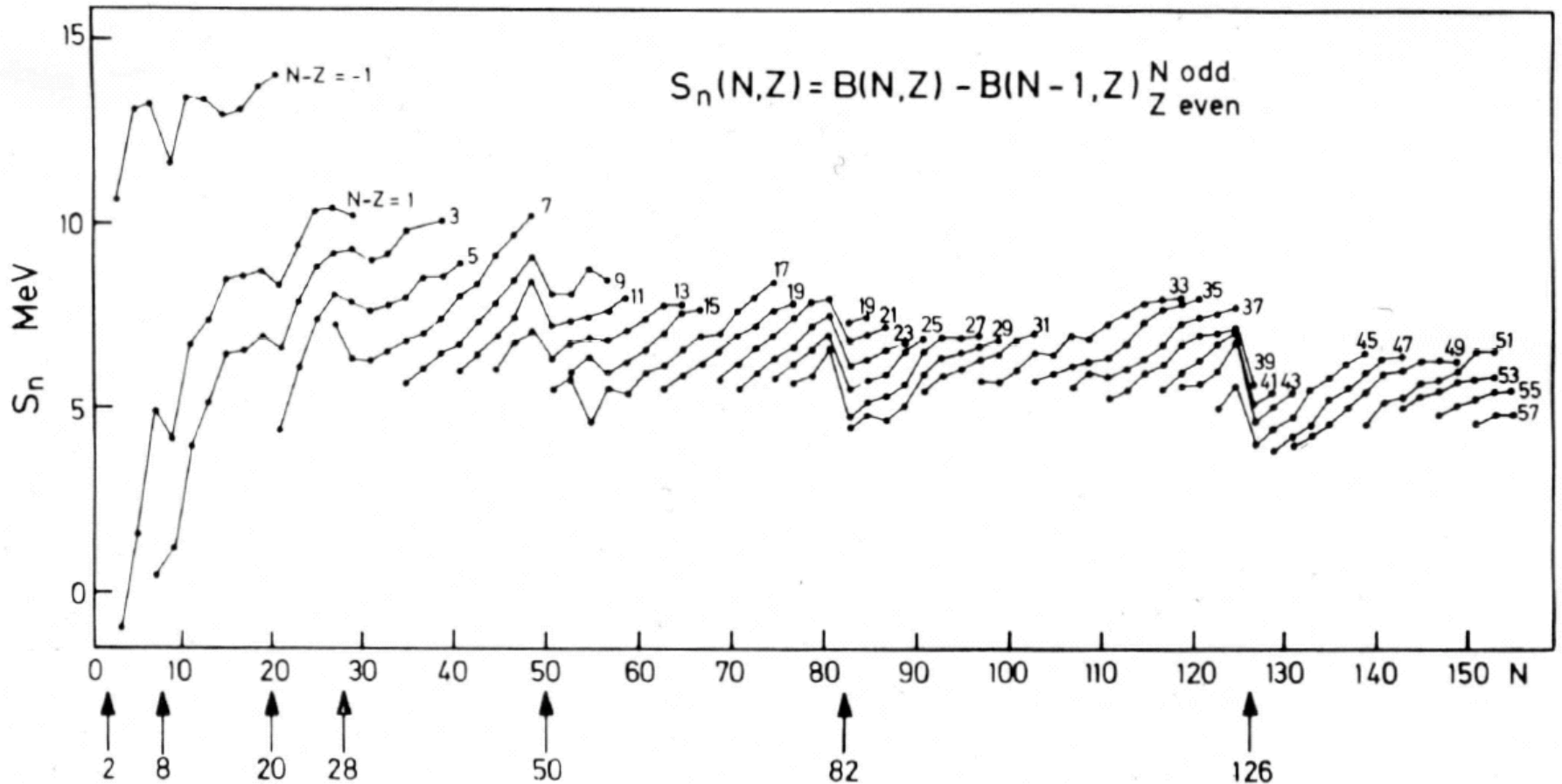
# Evidenz für Schalenabschlüsse 2

$M_{\text{exp}} - M_{\text{weizäcker}}$

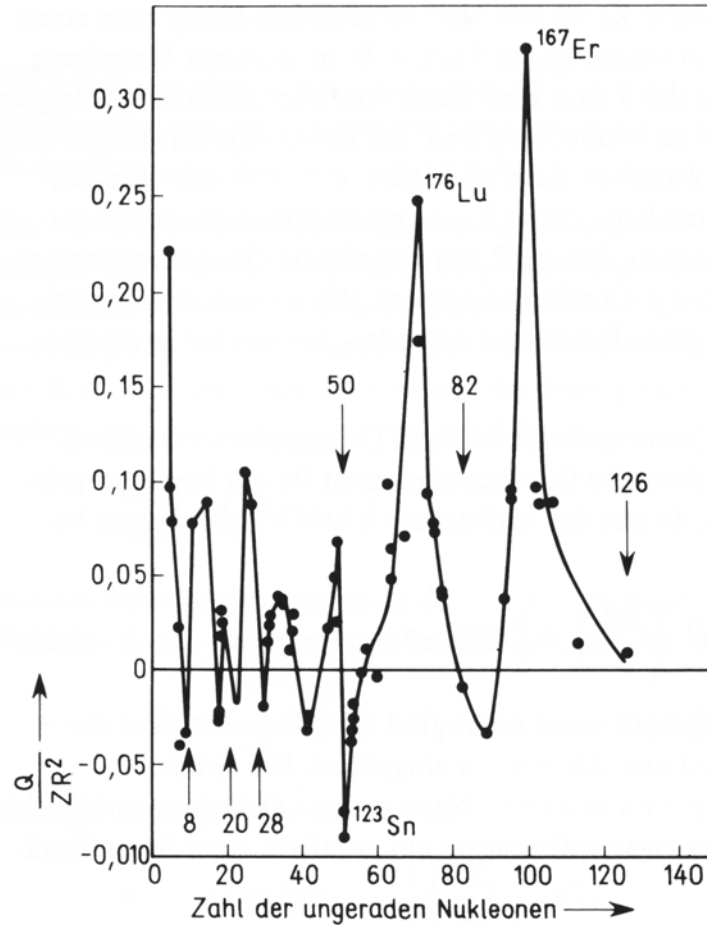




# Evidenz für Schalenabschlüsse 3

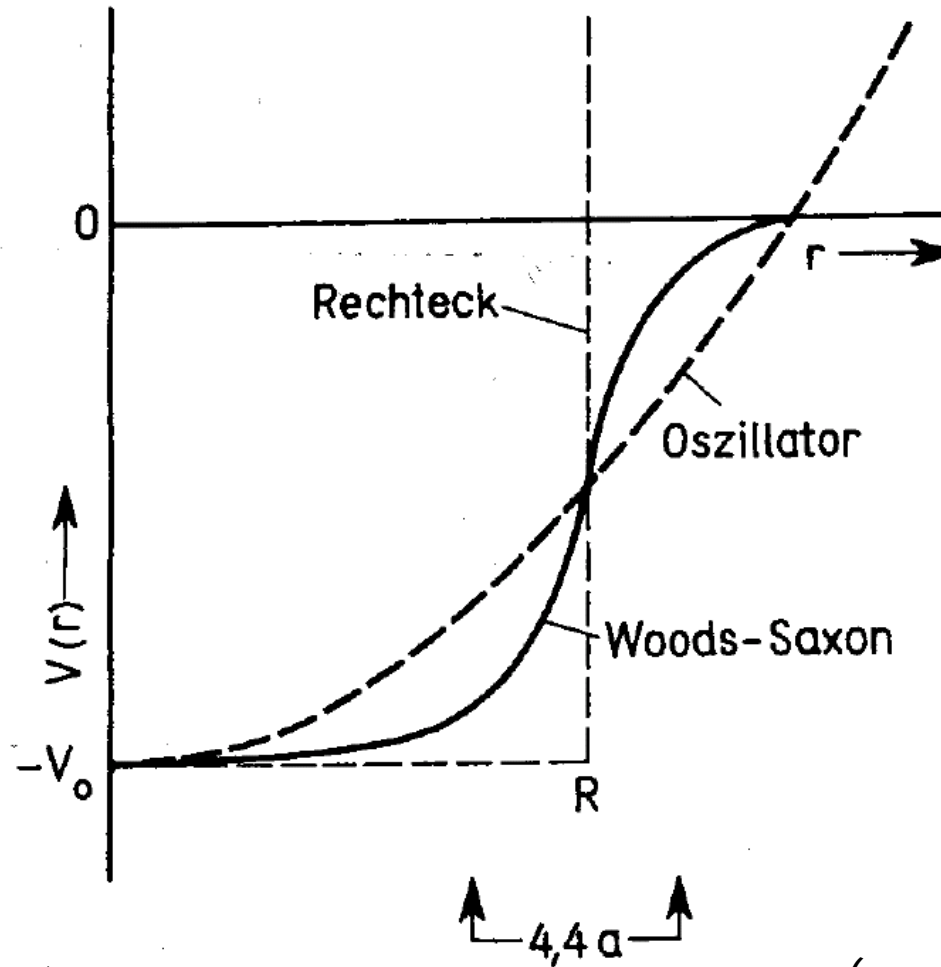


# Evidenz für Schalenabschlüsse 4



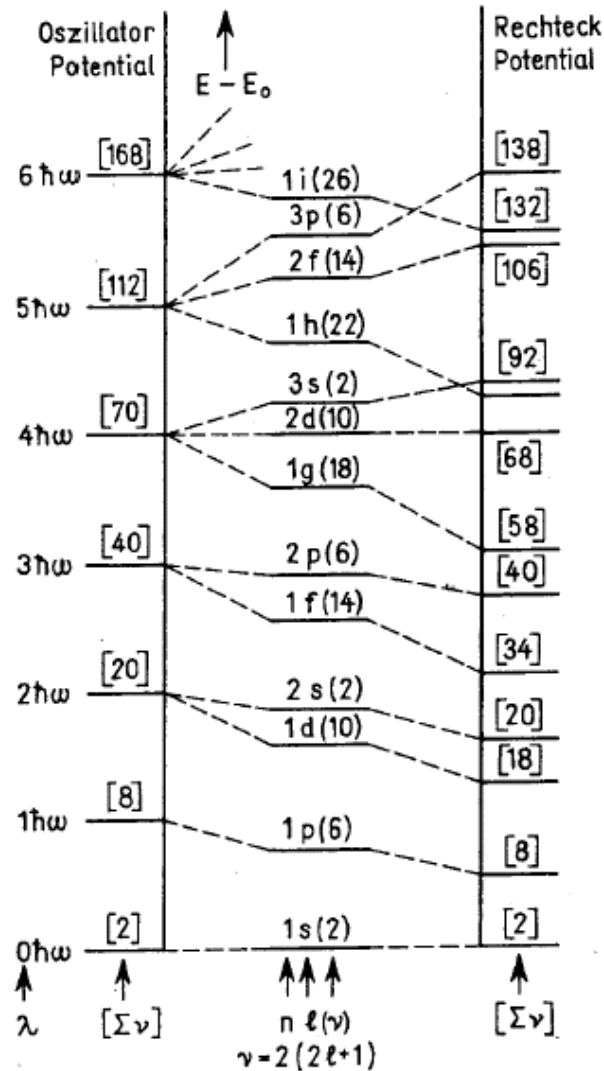
(aus Mayer-Kuckuk)

# Mittlere Potenziale



(aus Mayer-Kuckuk)

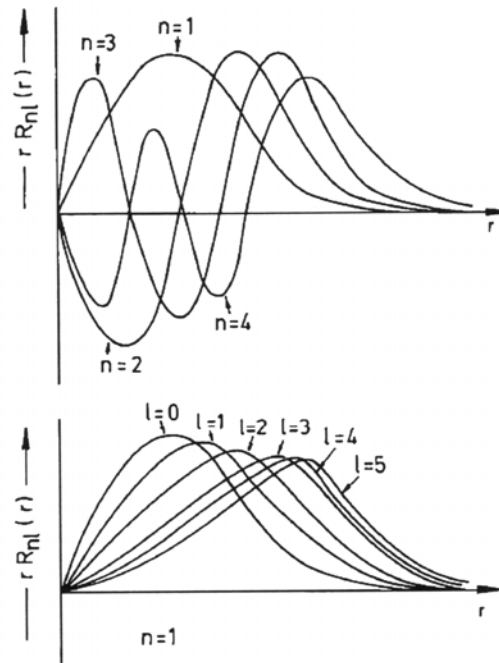
# Einteilchenniveaus im Vergleich



(aus Mayer-Kuckuk)

# 3D-Harmonischer Oszillator

$N$	$E_N (\hbar\omega)$	$(n, l)$	$\sum_{nl} 2(2l + 1)$	Total
0	3/2	1s	2	2
1	5/2	1p	6	8
2	7/2	2s, 1d	12	20
3	9/2	2p, 1f	20	40
4	11/2	3s, 2d, 1g	30	70
5	13/2	3p, 2f, 1h	42	112
6	15/2	4s, 3d, 2g, 1i	56	168



(aus Casten)

# Exp. Messung einer Wellenfunktion durch Elektronenstreuung

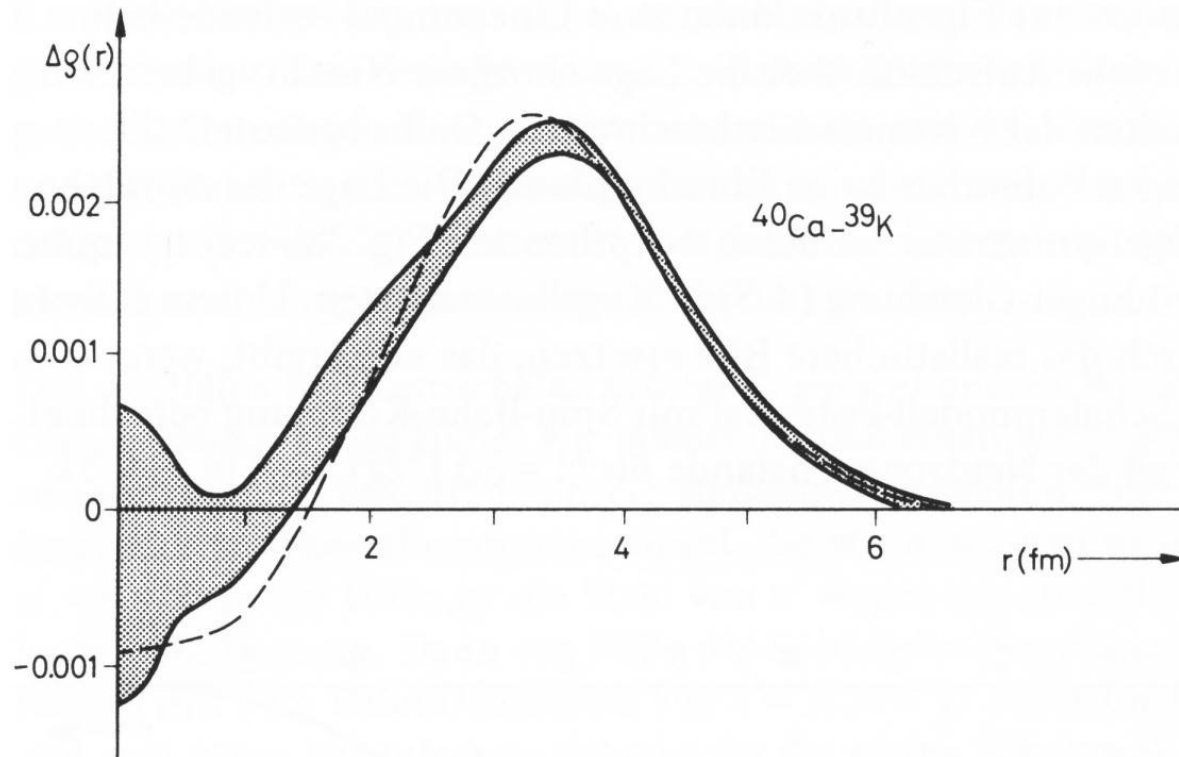
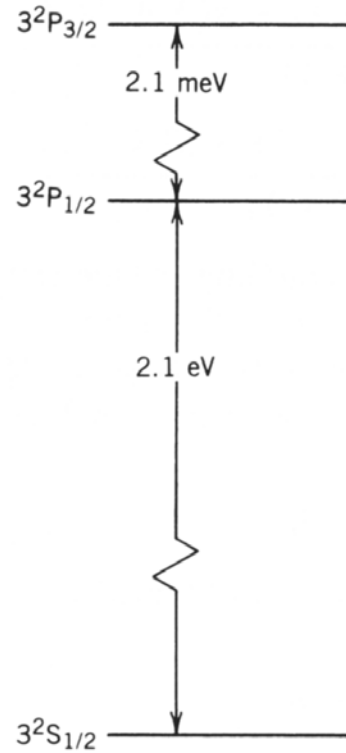


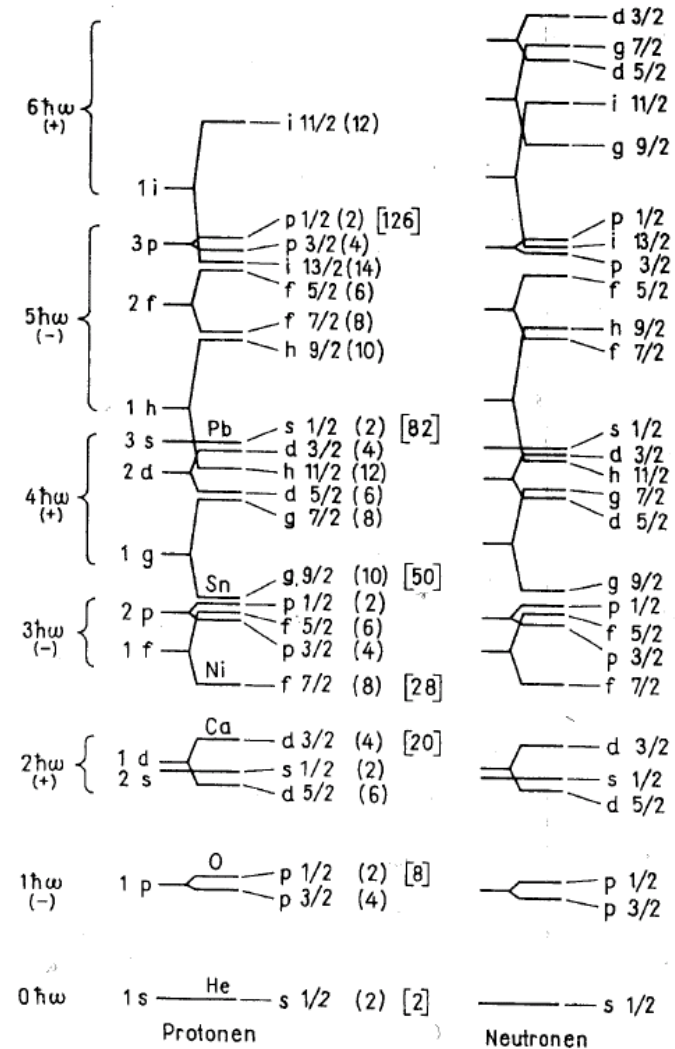
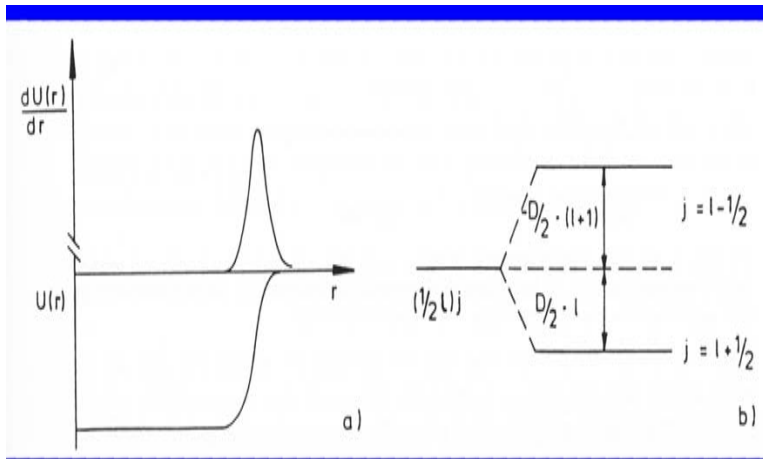
Fig. 82 ·  
Differenz der Ladungsdichteverteilungen von  $^{40}\text{Ca}$  und  $^{39}\text{K}$  als Beispiel für die Aufenthaltswahrscheinlichkeit eines  $d\ 3/2$ -Protons. Gestrichelt: Schalenmodellvorhersage (einschließlich Rumpfpolarisation); nach [Sic 75]

# Spin-Bahn-Kopplung im Atom



Natrium

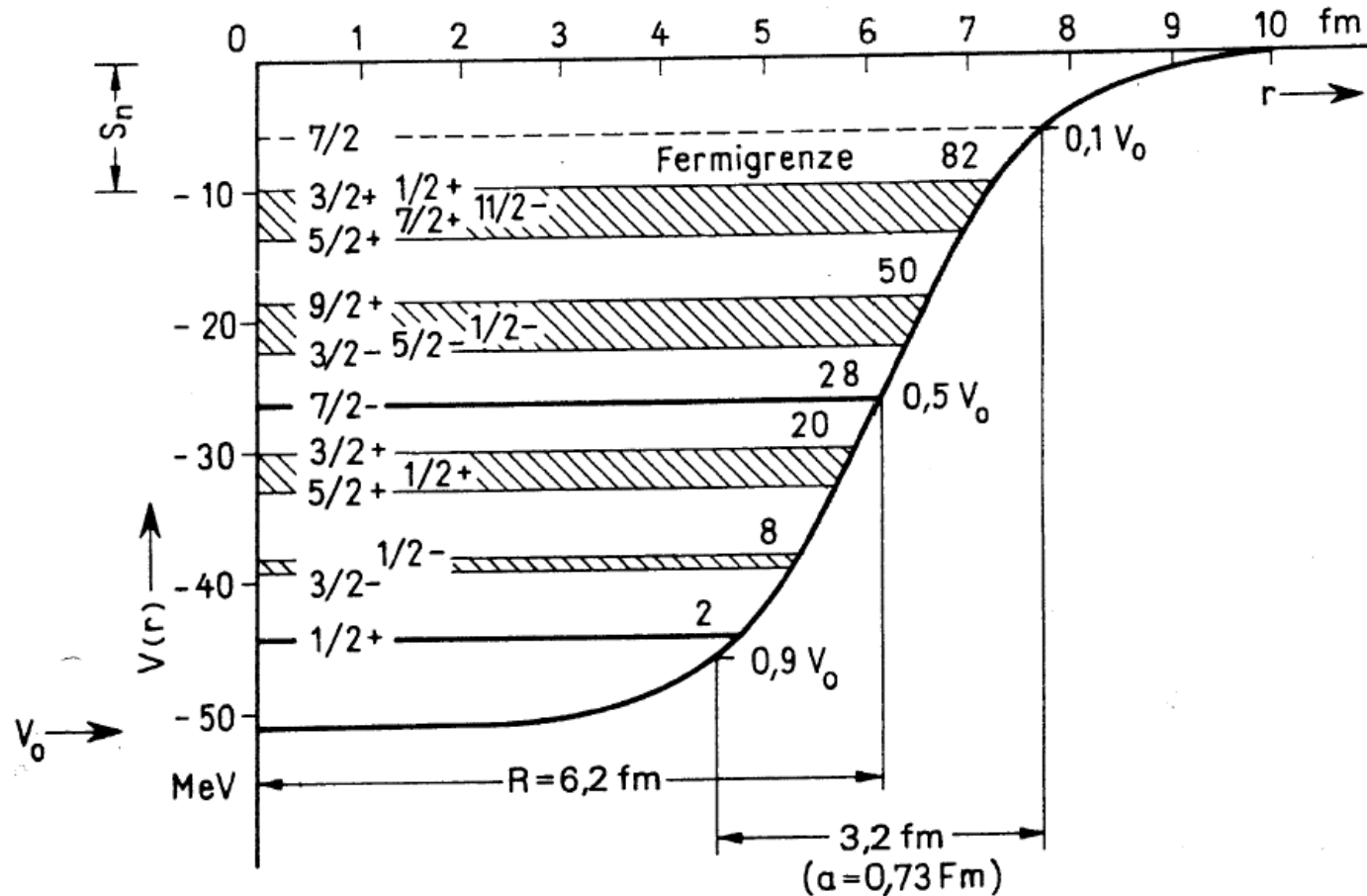
# Effekt der Spin-Bahn Kopplung im Kern



(aus Mayer-Kuckuk)

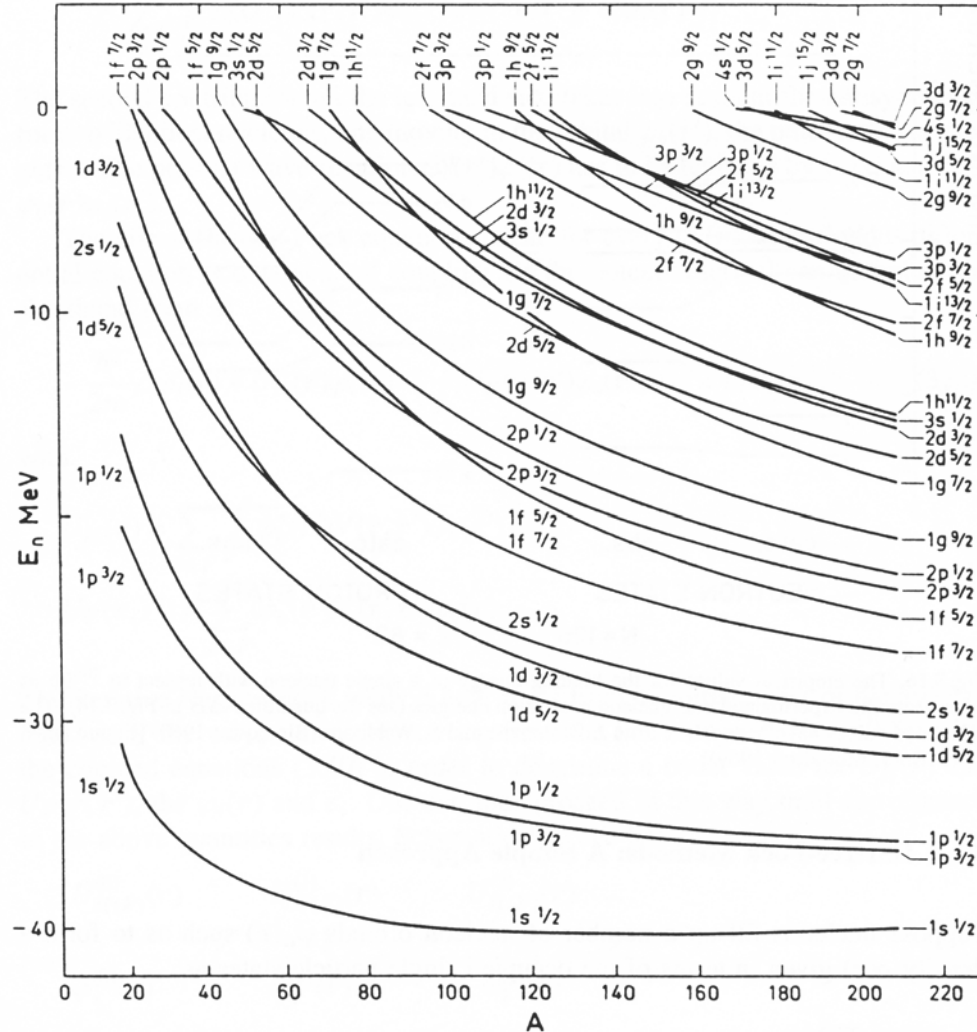


# Schalen im Woods-Saxon Potenzial

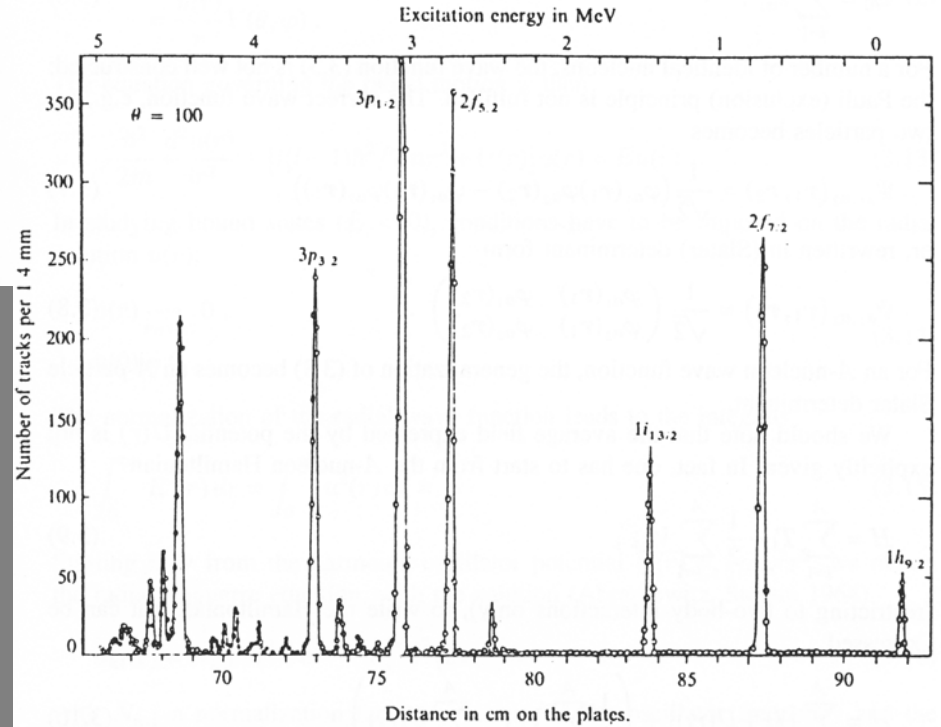
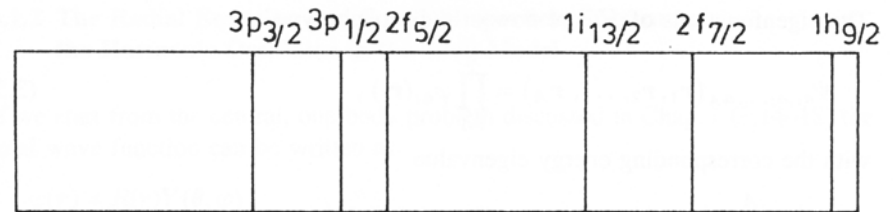
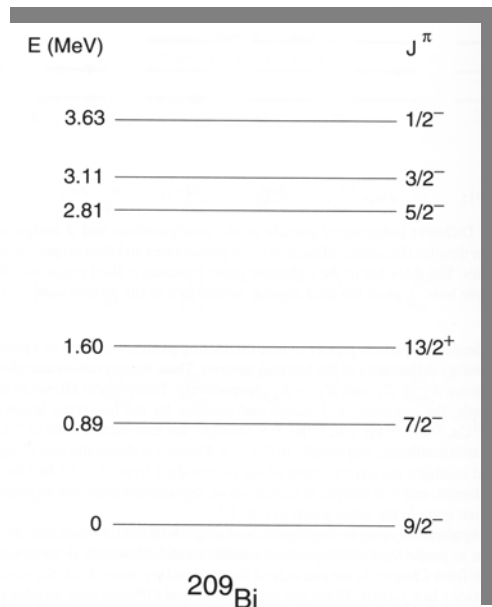
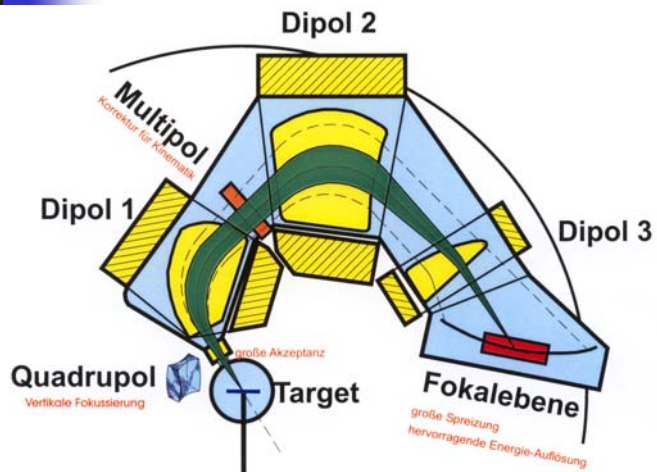


(aus Mayer-Kuckuk)

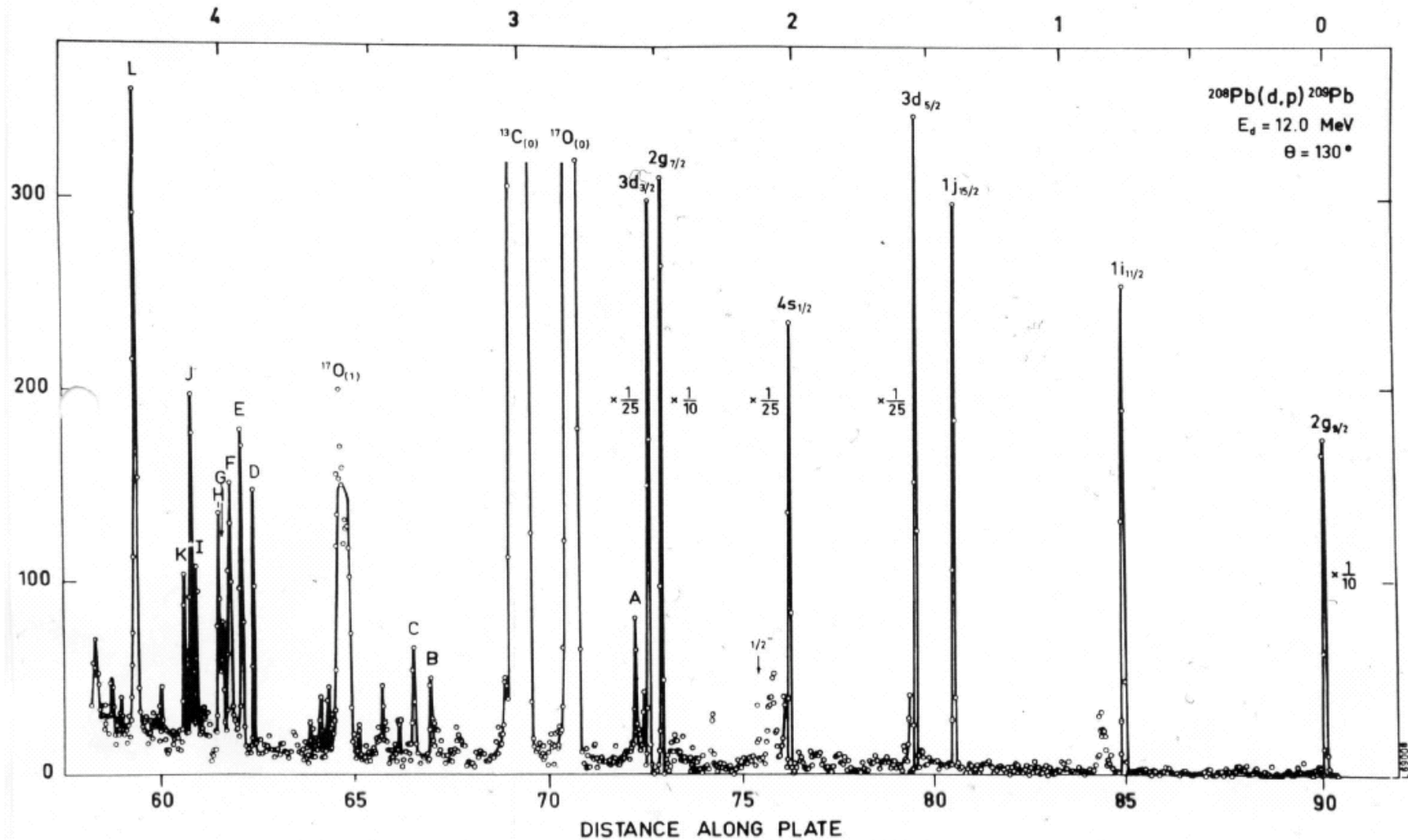
# Schalenmodell – Massenabhängigkeit der Energien



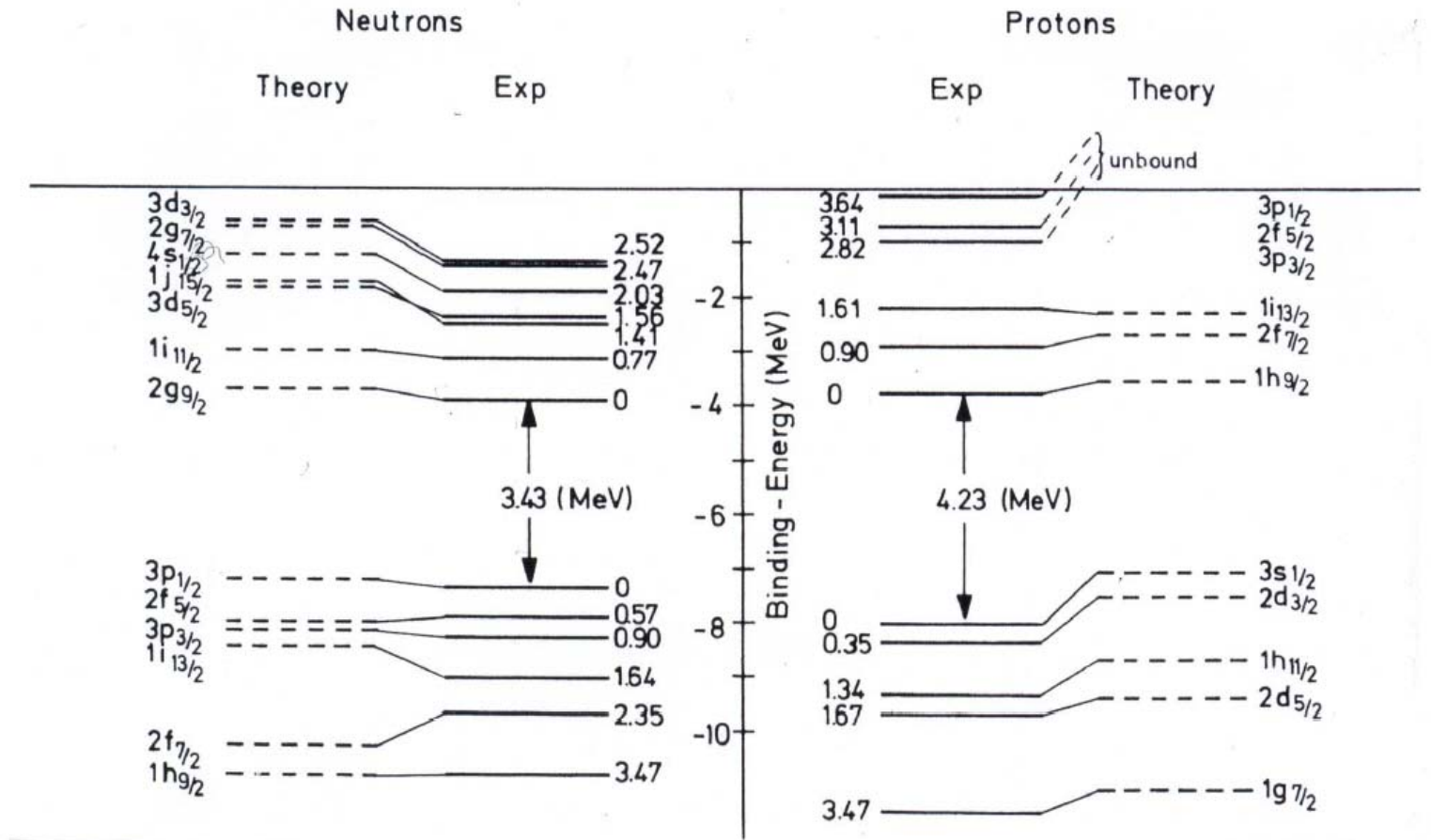
# Transfer-Reaktionen – $^{208}\text{Pb}(^3\text{He},d)^{209}\text{Bi}$



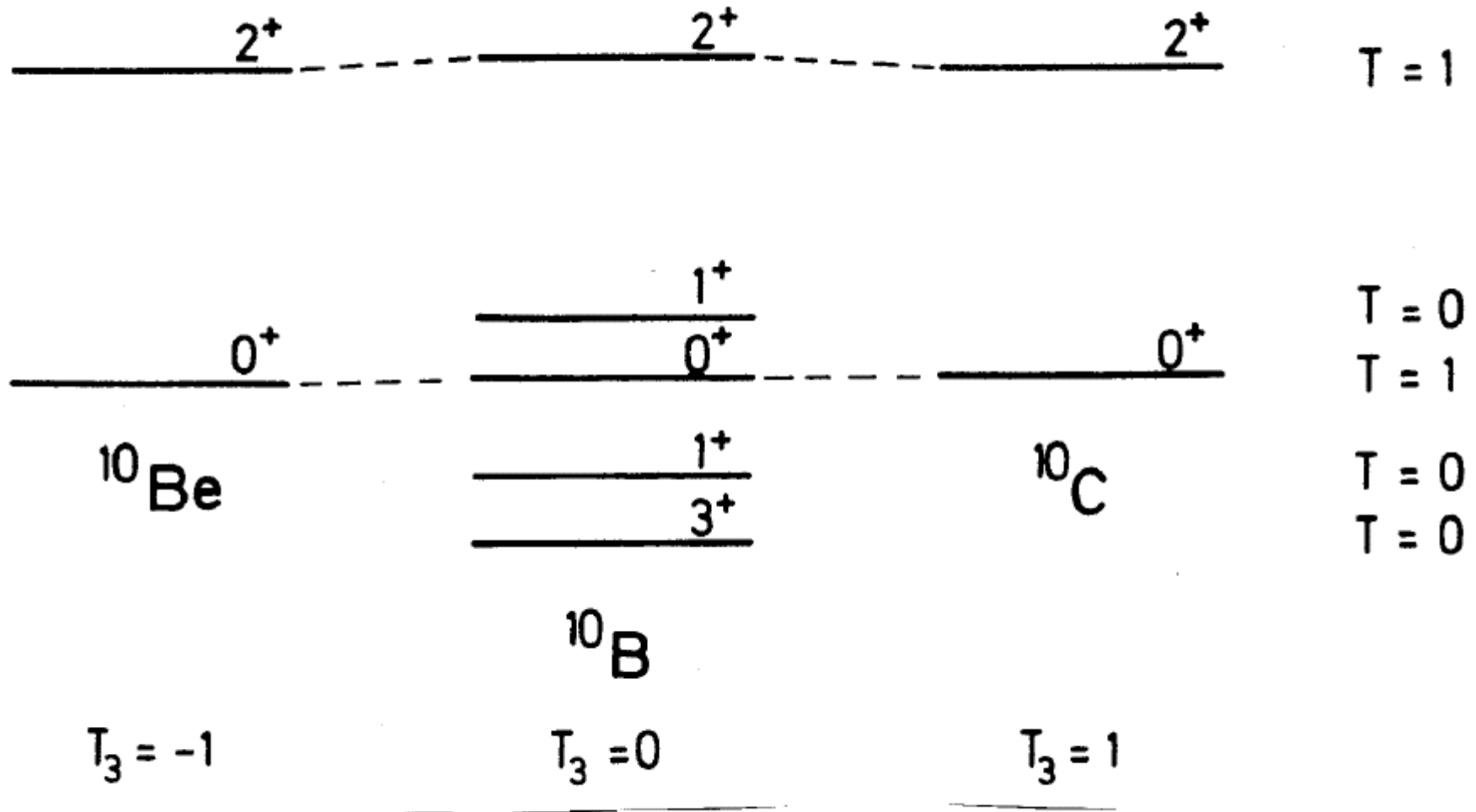
# Einteilchenspektren in Transferreaktionen



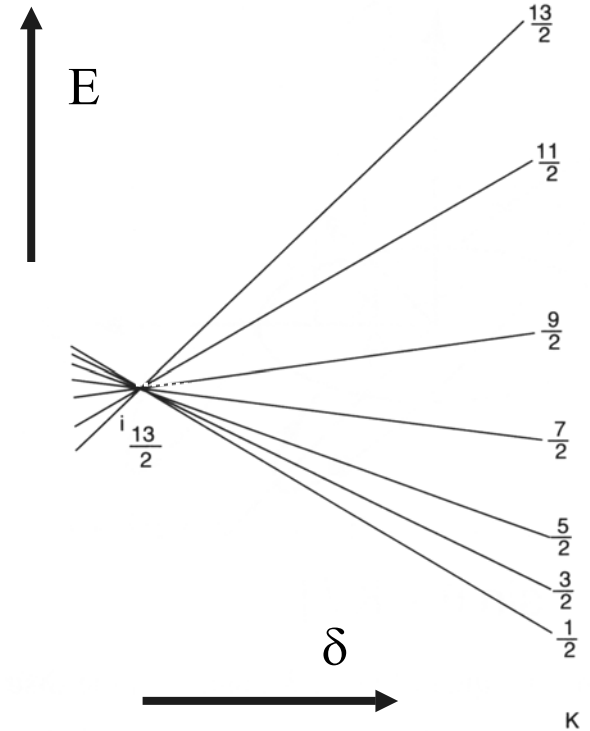
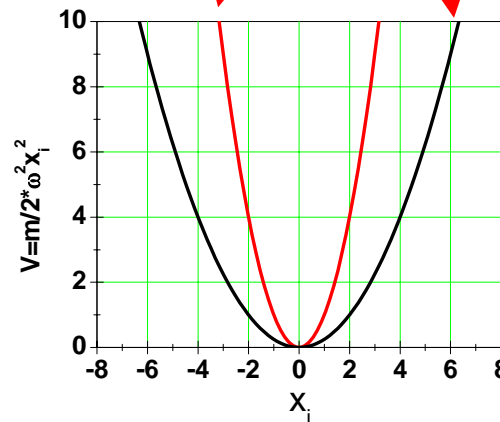
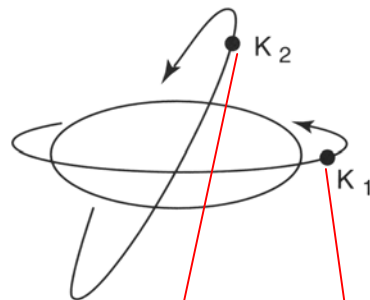
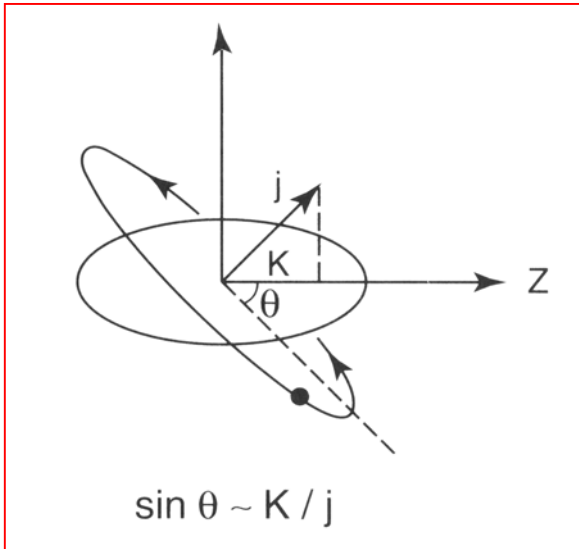
# Einteilchenzustände in Theorie und Experiment



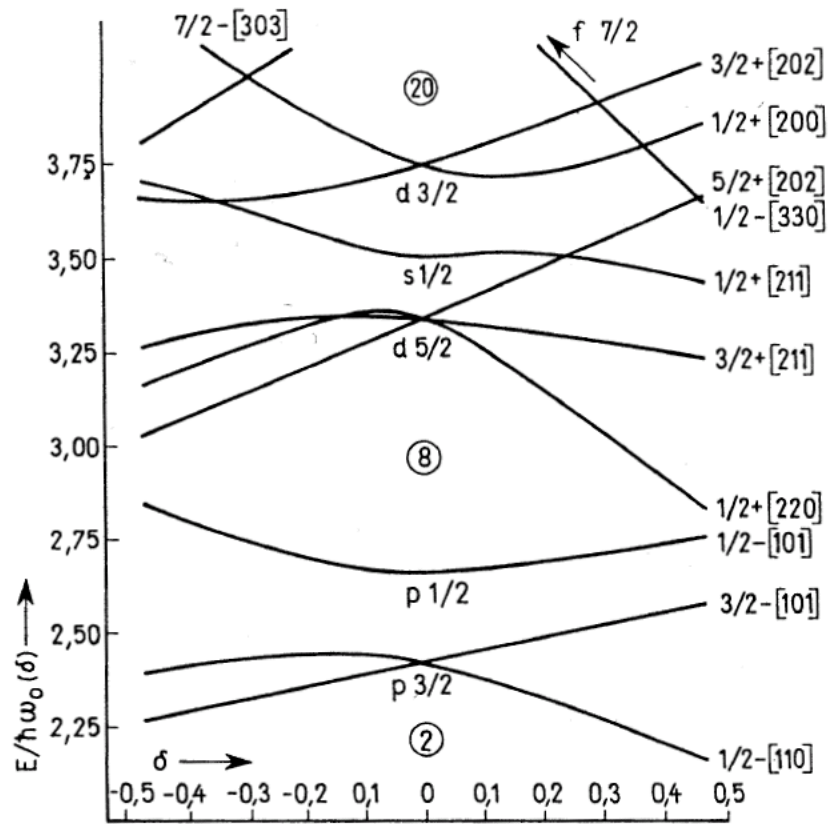
# Isospin-Triplett



# Deformiertes Schalenmodell



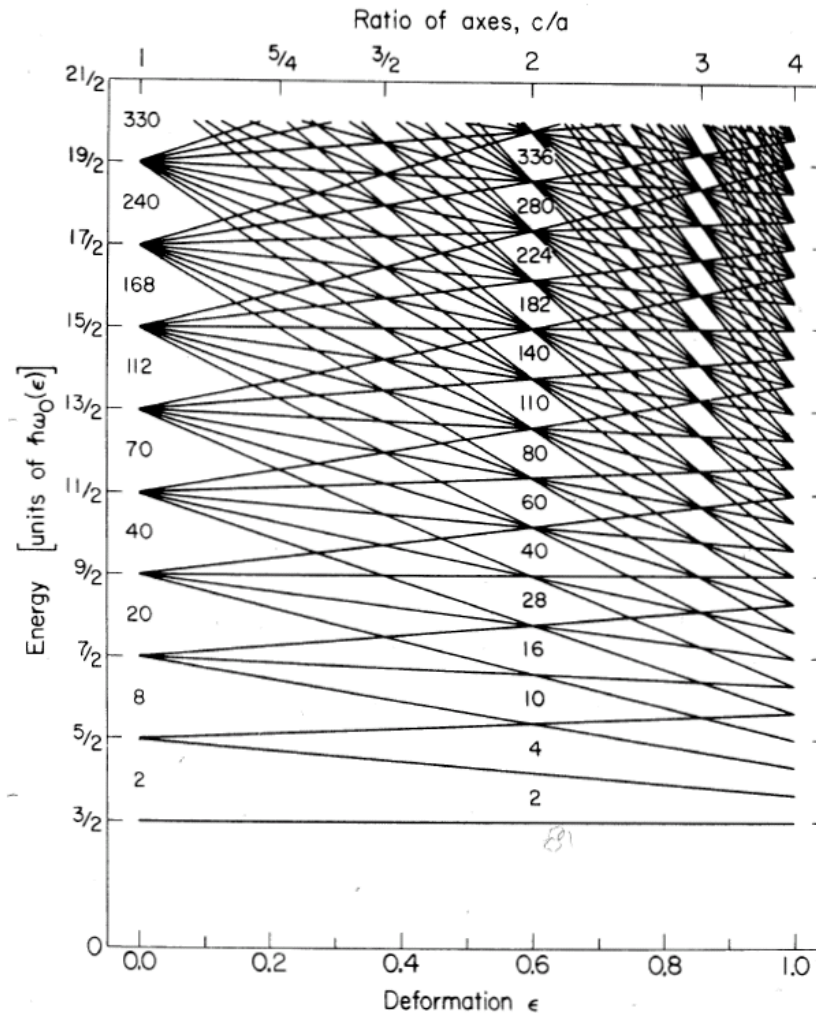
# Nielsen-Modell



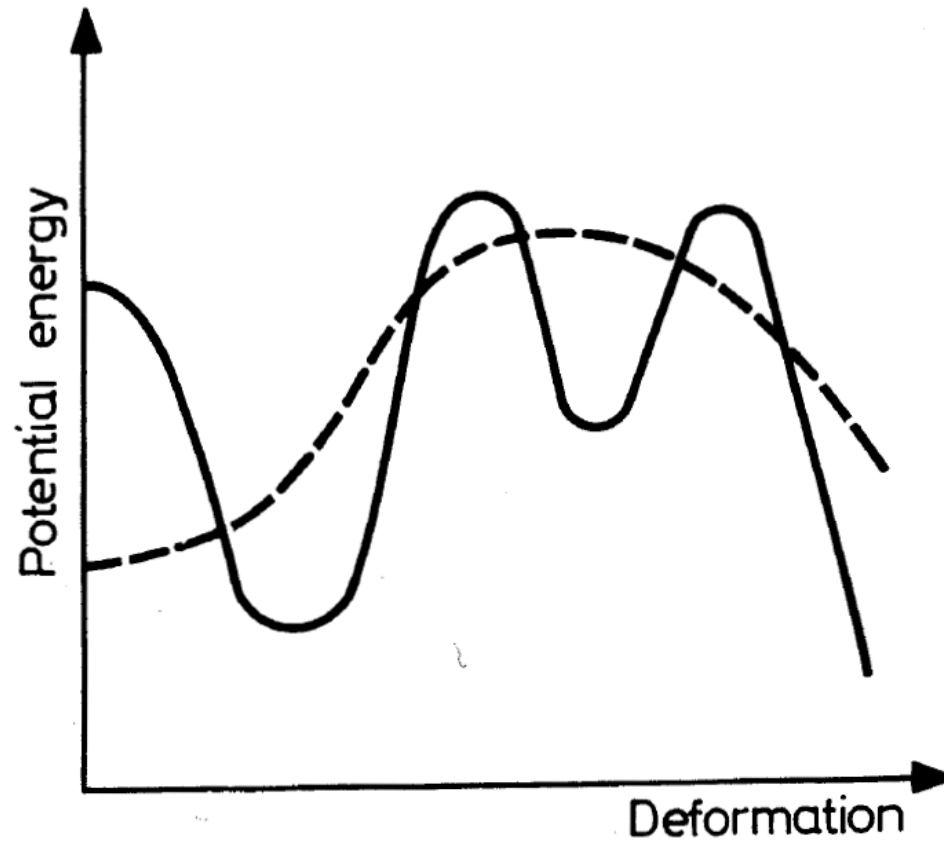
Deformation



# Schalenabschlüsse bei großen Deformationen

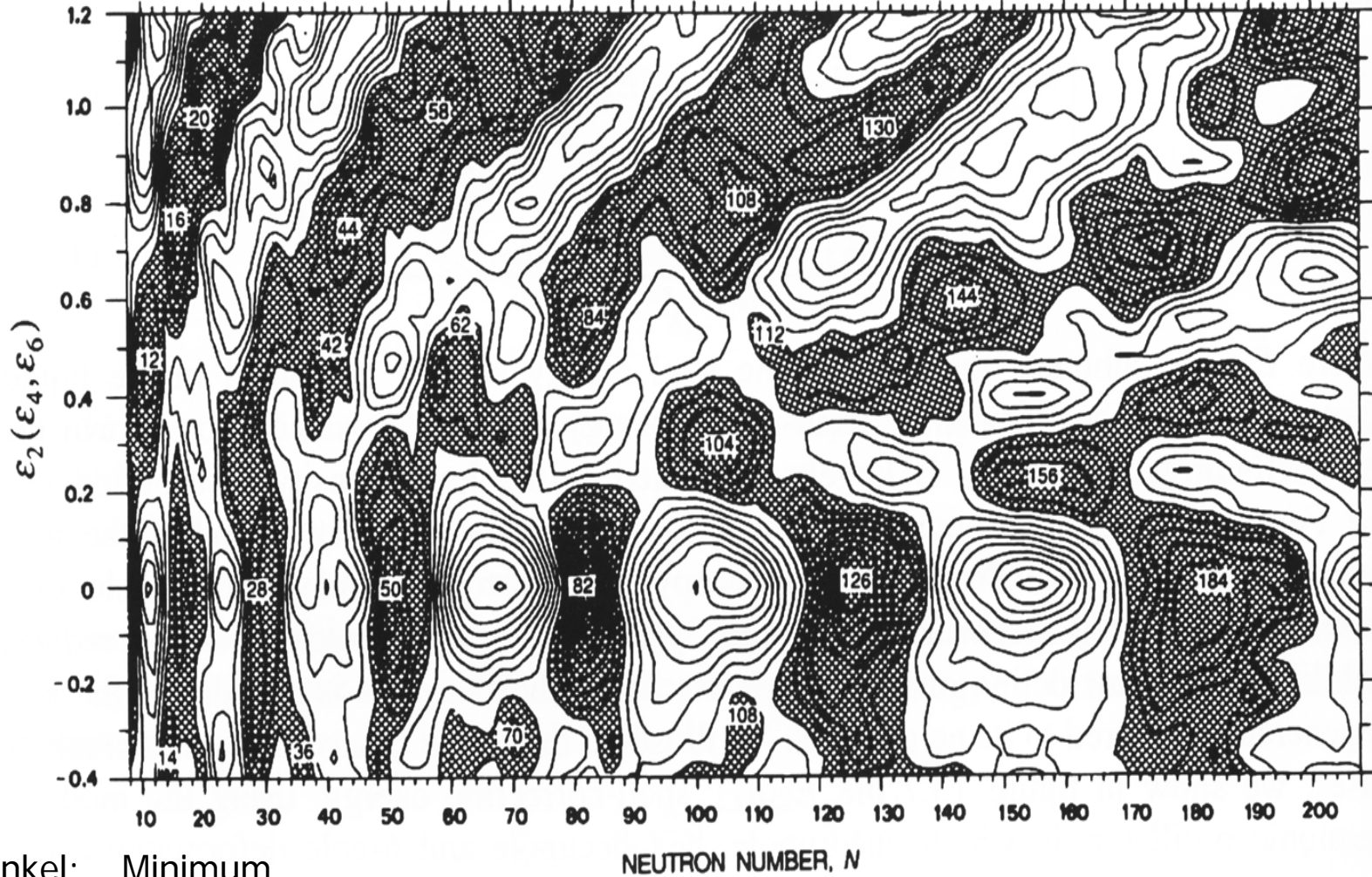


# Schaleneffekte



# Totale-Energie-Oberfläche

Deformation



Dunkel: Minimum  
Hell: Maximum