

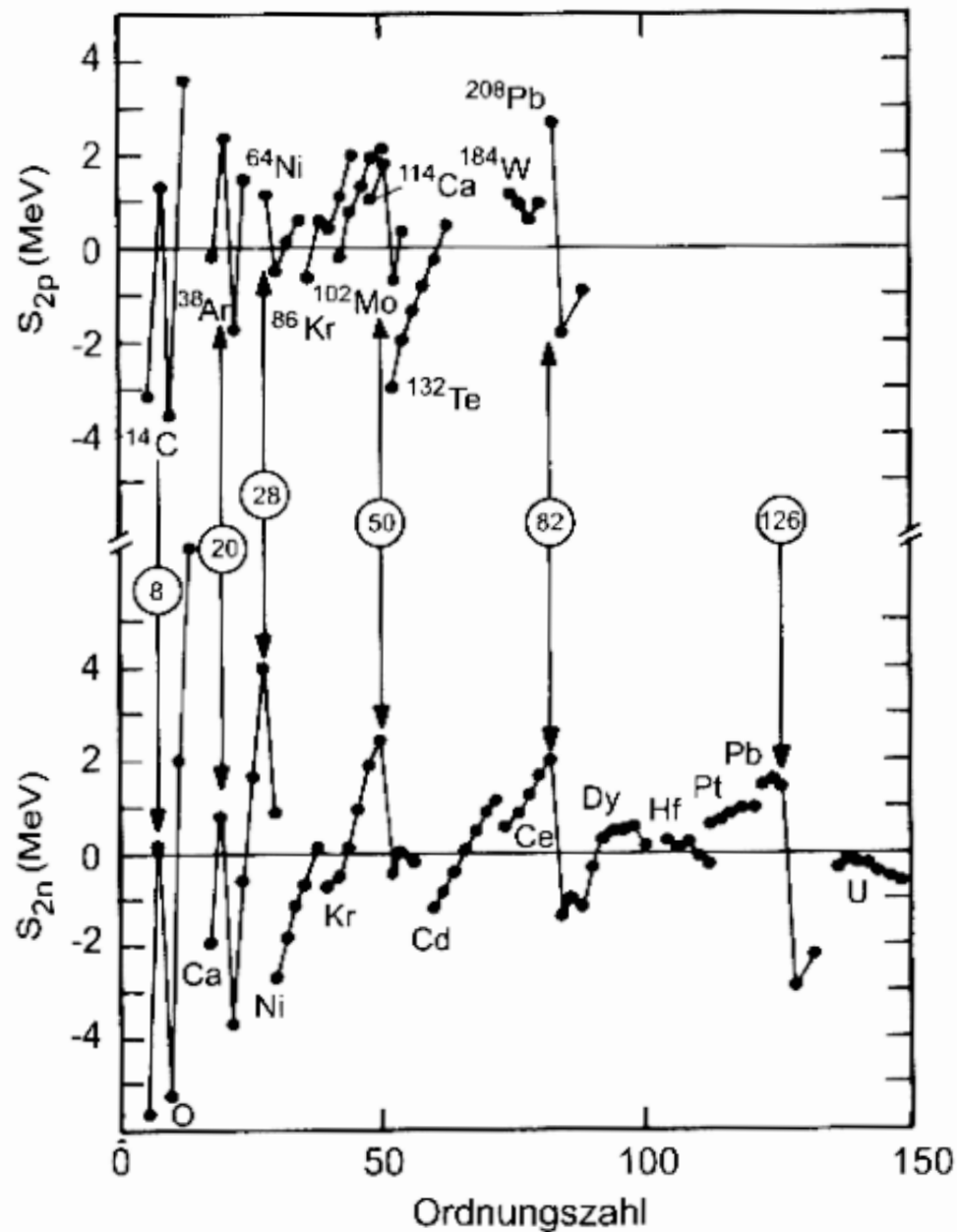
# Fortgeschrittene Experimentalphysik für Lehramtsstudierende Teil II: Kern- und Teilchenphysik



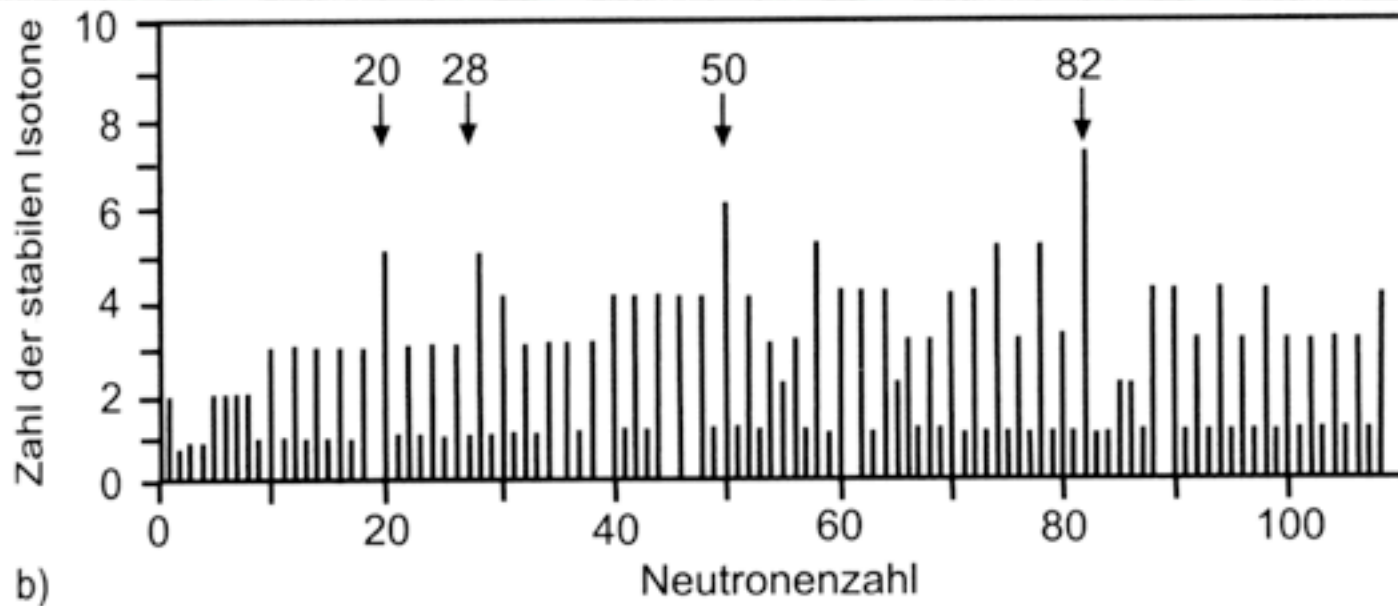
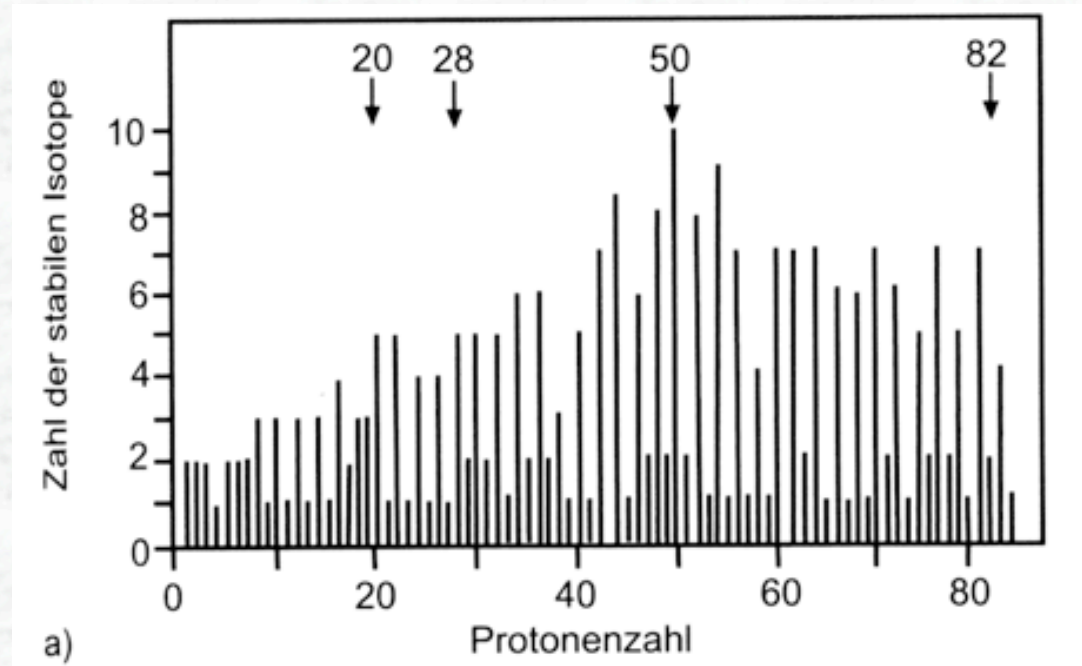
Prof. Markus Schumacher  
Sommersemester 2013

## Kapitel 5: Schalenmodell des Kerns

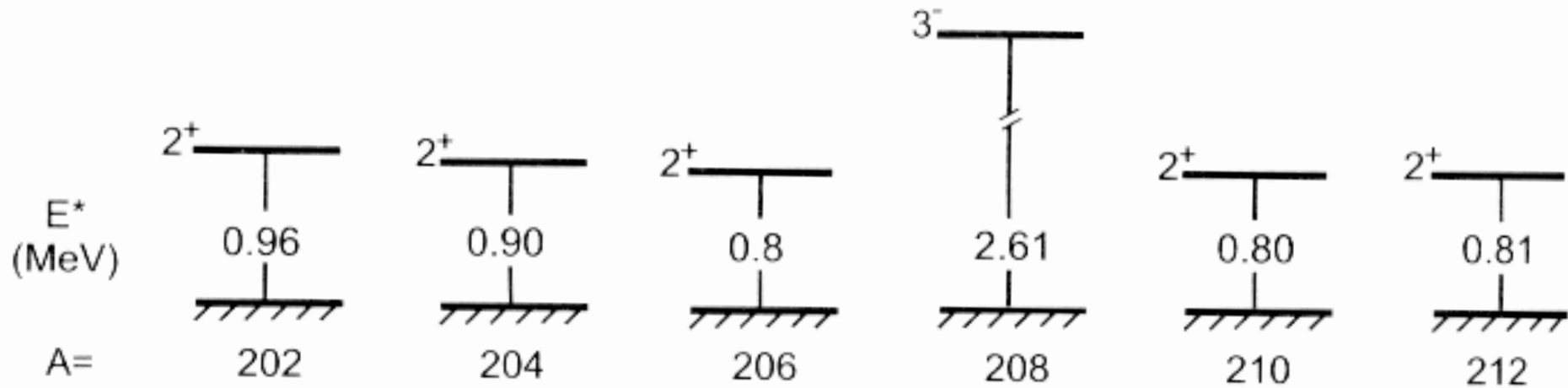
# Separationsenergien



# Häufigkeit stabiler Isotope/Isotone

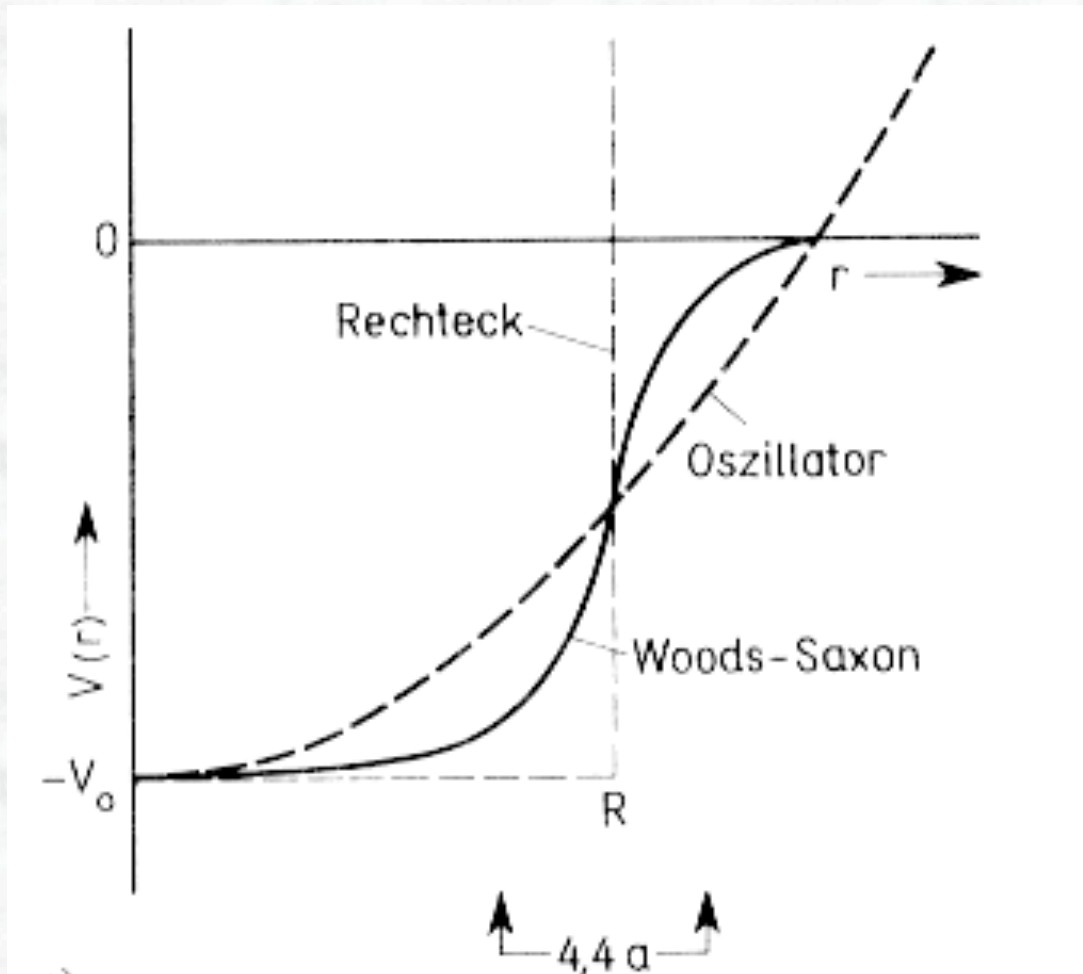


# Anregungsenergien



**Bild 4.6.** Energien der ersten angeregten Zustände in der Umgebung von  $^{208}\text{Pb}$

# Radialsymmetrische Potentiale



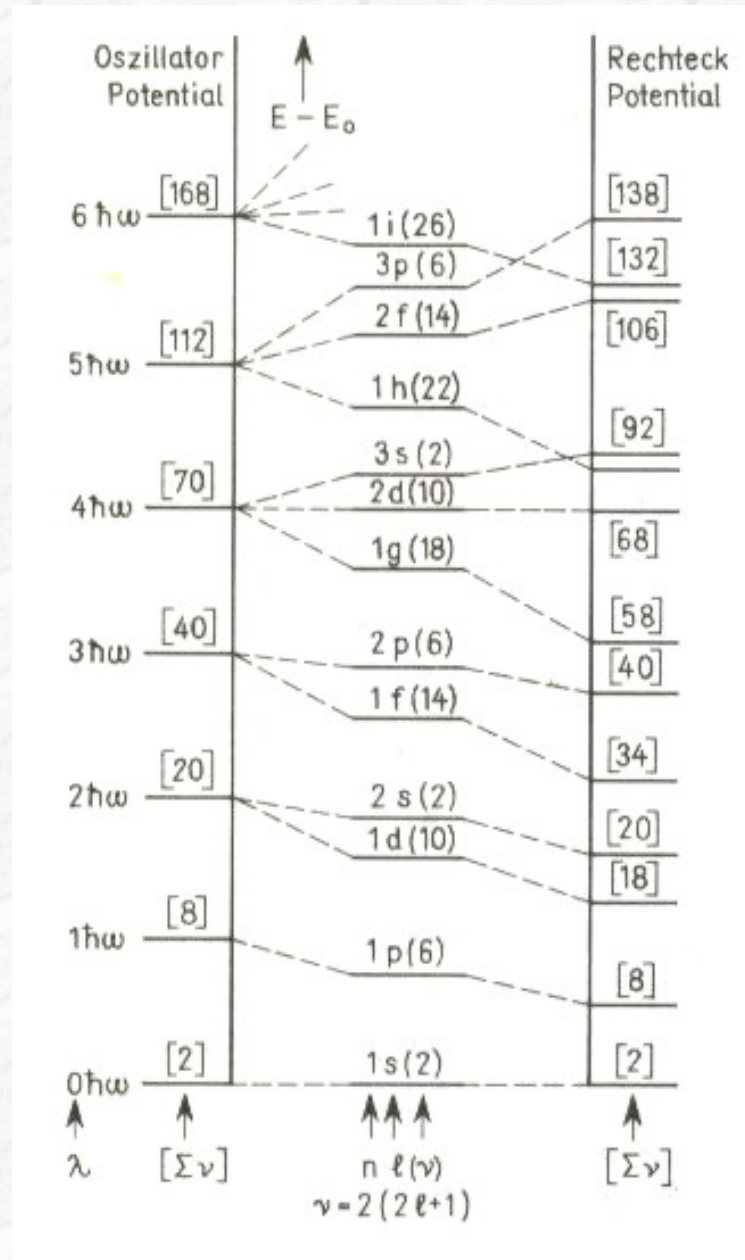
Oszillator-Potential:

$$V(r) = \begin{cases} -V_0 \left(1 - \left(\frac{V}{R}\right)^2\right) & r < R \\ 0 & r > R \end{cases}$$

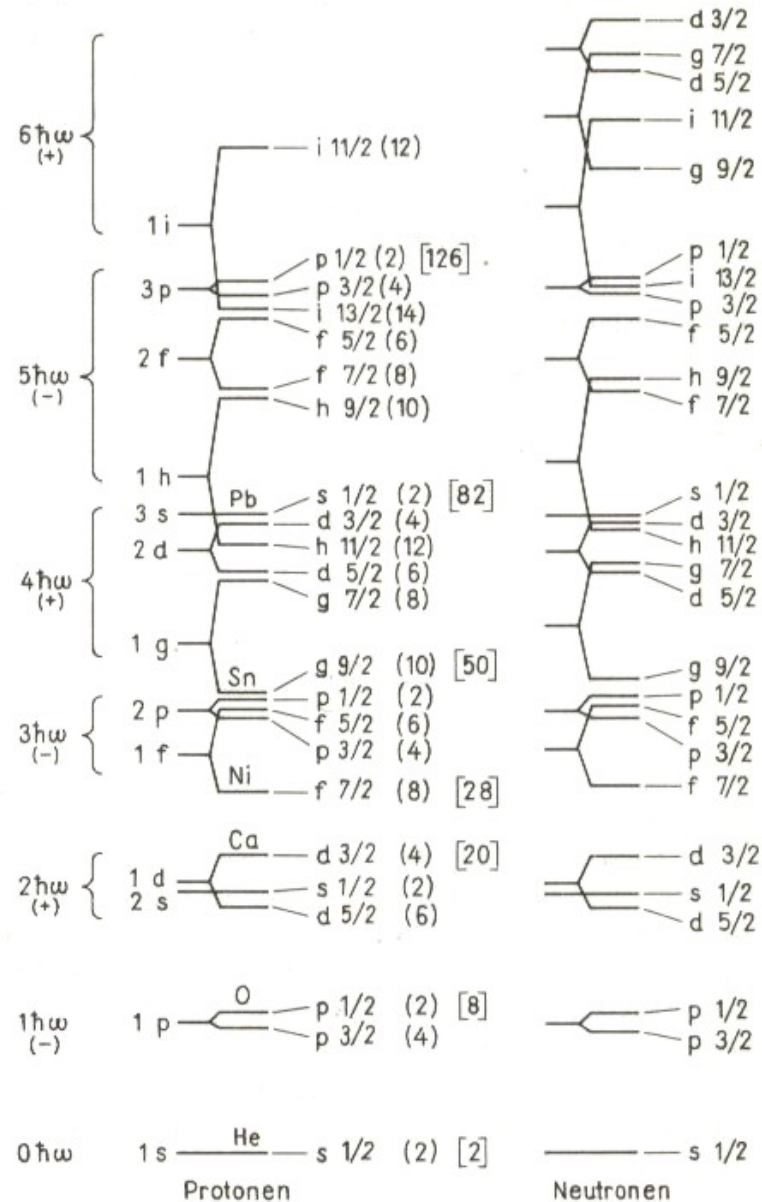
Woods-Saxon Potenzial:

$$V(r) = -\frac{V_0}{1 + e^{\frac{r-R}{a}}}$$

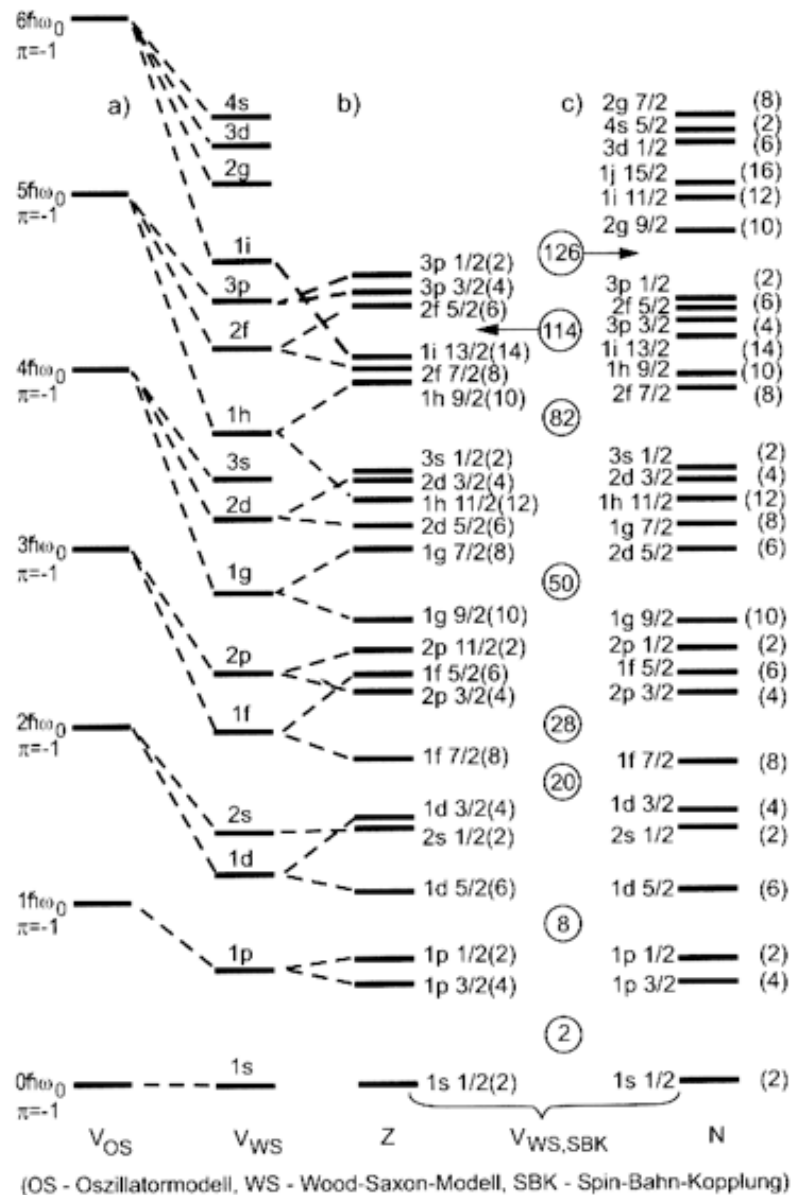
# Energieniveaus und Entartung



# Energieniveaus und Entartung mit $V(l_s)$

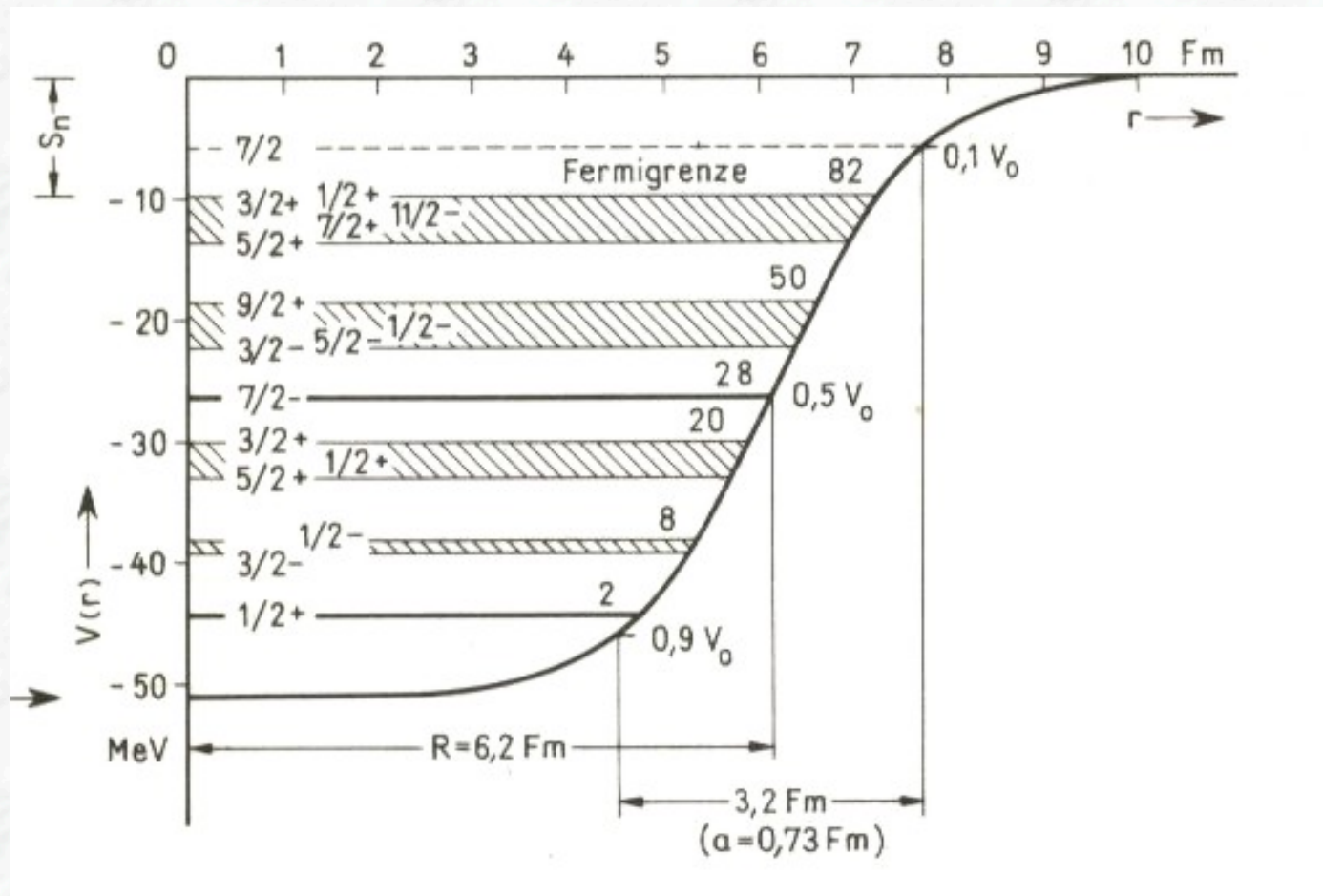


# Energieniveaus im Woods-Saxon-Potential



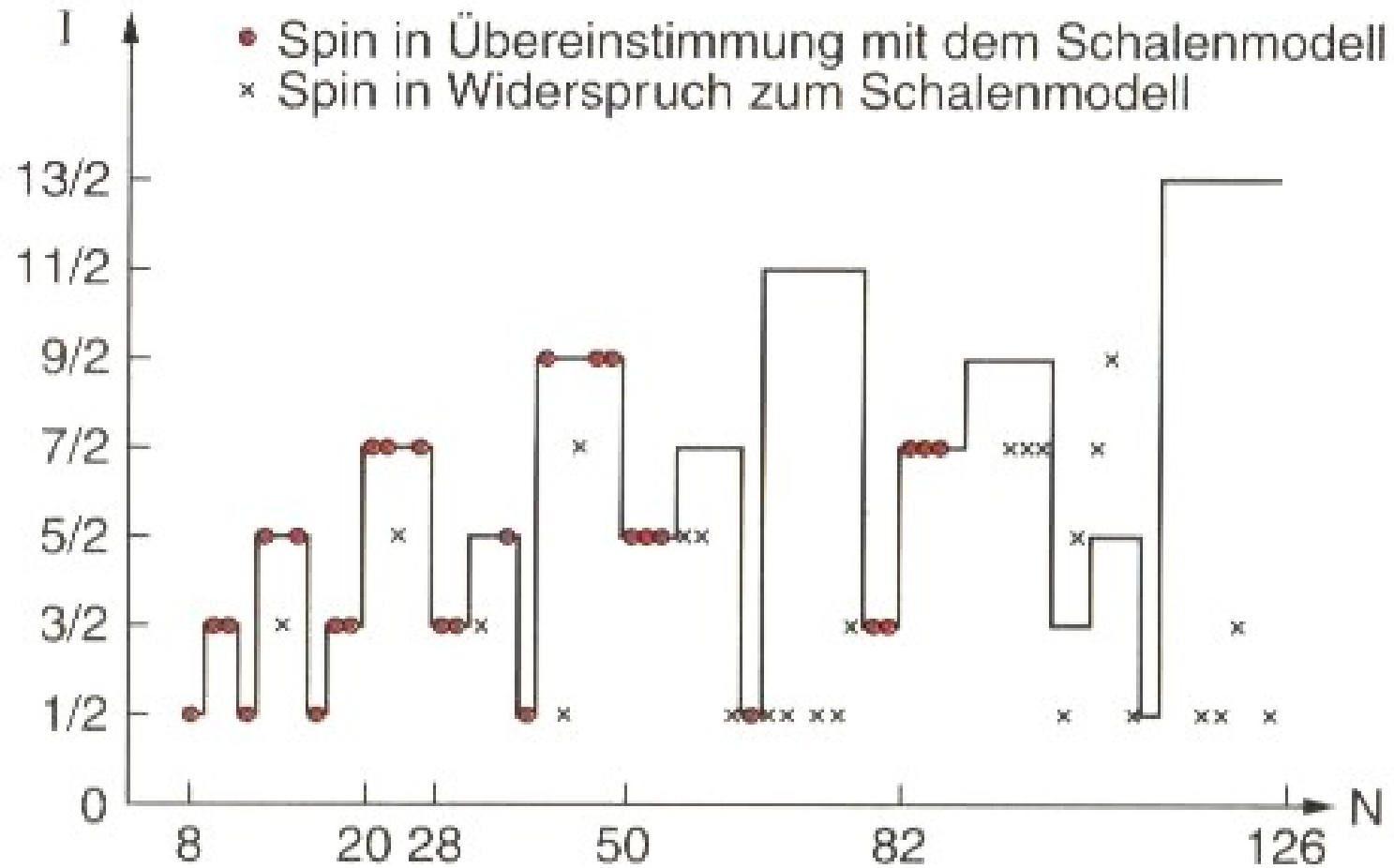


# Energieniveaus im Woods-Saxon-Potential



$n \ell j$	$1s 1/2$	$1p 3/2$	$1p 1/2$	$1d 5/2$	$2s 1/2$	$1d 3/2$	$1f 7/2$
$\nu = 2j + 1$	2	4	2	6	2	4	8
$\Sigma \nu$	2	6	8	14	16	20	28
	${}^4_2\text{He}_2$		${}^{16}_8\text{O}_8$			${}^{40}_{20}\text{Ca}_{20}$	${}^{48}_{20}\text{Ca}_{28}$ ( ${}^{56}_{28}\text{Ni}_{28}$ )

# Vorhersage der Kernspins



Experimentelle Werte der Kernspins als Funktion der Neutronenzahl. Aus P. Marmier, E. Sheldon: *Physics*