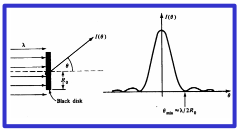
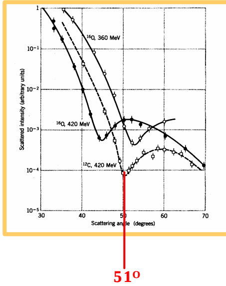
Fig. 3.1

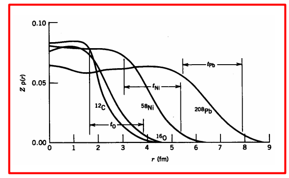




$$\Theta_{\min} = \arcsin\left(\frac{1.22\,\lambda}{D}\right)$$

R = D/2 = 2.3 fm

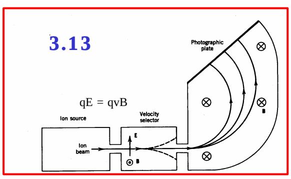
Fig. 3.4



$$\rho(r) \approx const.$$

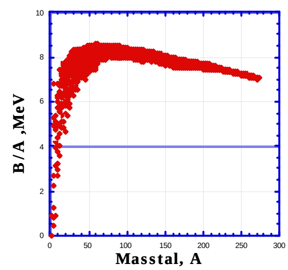
$$\frac{A}{\frac{4}{3}\pi \cdot R^3} \approx const$$

$\rightarrow$ $\mathbf{R = R_0 A^{1/3}}$



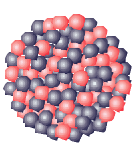
$$v = \frac{E}{B} \qquad r = \frac{mv}{qB}$$

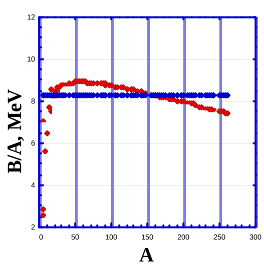
$\rightarrow$ $m = \frac{qrB^2}{E}$



$\mathbf{B = [Z\, m(^1H) + N\, m_n - m(^AX)]c^2}$

Volume term

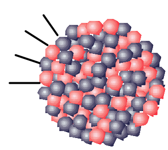


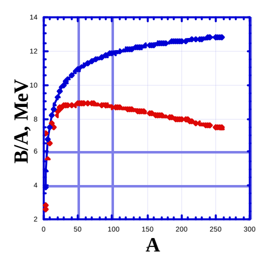


B ~ A

$\mathbf{B/A = a_V}$
= 8.3 MeV

Surface term

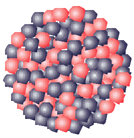


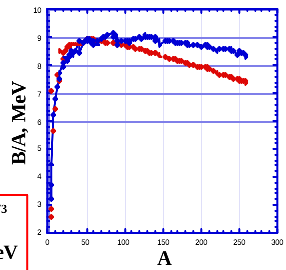


$\mathbf{B/A = a_V - a_S\, A^{-1/3}}$

$\mathbf{a_V = 15.5\ MeV}$
$\mathbf{a_S = 16.8\ MeV}$

Coulomb repulsion

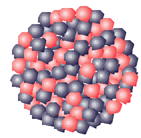


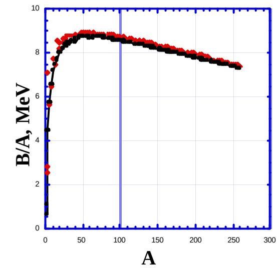


$B/A = a_V - a_S A^{-1/3} - a_C Z^2 A^{-4/3}$

$a_V = 15.5$ MeV, $a_S = 16.8$ MeV
$a_C = 0.72$ MeV

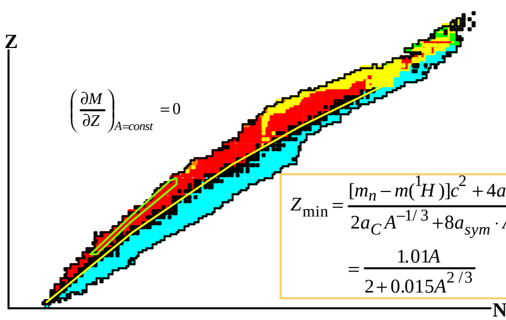
Symmetry term





$B/A = a_V - a_S A^{-1/3} - a_C Z^2 A^{-4/3} - a_{sym}(A-2Z)^2/A^2$

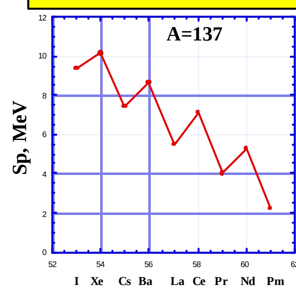
$a_V = 15.5$ MeV, $a_S = 16.8$ MeV
$a_C = 0.72$ MeV, $a_{sym} = 23$ MeV



$$\left(\frac{\partial M}{\partial Z}\right)_{A=const} = 0$$

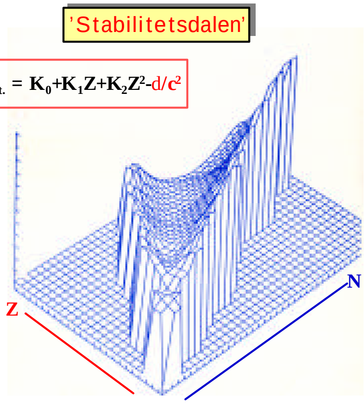
$$Z_{\min} = \frac{[m_n - m(^1H)]c^2 + 4a_{sym}}{2a_C A^{-1/3} + 8a_{sym} \cdot A^{-1}} = \frac{1.01A}{2 + 0.015A^{2/3}}$$

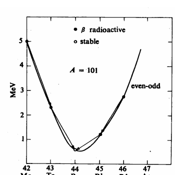
$$S_p = B(^A_Z X_N) - B(^{A-1}_{Z-1} X_N) = [m(^{A-1}_{Z-1} X_N) - m(^A_Z X_N) + m(^1H)]c^2$$

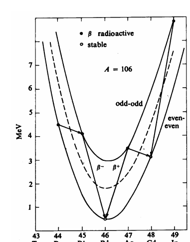


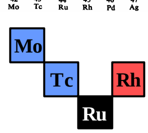
'Stabilitetsdalen'

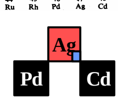
$M(Z)_{A=konst.} = K_0 + K_1 Z + K_2 Z^2 - d/c^2$





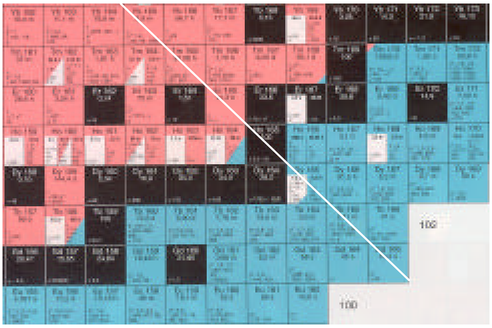


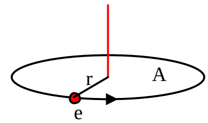




$M(Z)_{A=konst.} = K_0 + K_1 Z + K_2 Z^2 - d/c^2$

$$\delta = \begin{cases} +a_p A^{-3/4} & \text{if Z,N even} \\ -a_p A^{-3/4} & \text{if Z,N odd} \\ 0 & \text{if Z or N odd} \end{cases}$$





$|\mu| = Ai$

$i = ev/2p \cdot r$

$A = pr^2$

$\vec{l} = m\vec{r} \times \vec{v}$

$|\mu| = \frac{e}{2m}|\vec{\ell}|$

Nuclear magnetron

$\mu = \frac{e\hbar}{2m}\ell$

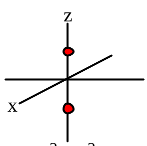
$\mu_N = \frac{e\hbar}{2m_p} = 3.1525 \times 10^{-5}\, eV/T$

$\mu = g_s s \mu_N$ (3.35)

Elektron:	$g_s = 2.0023$
Proton:	$g_s = 5.58$
Neutron:	$g_s = -3.82$

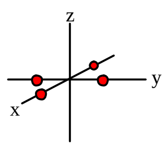
Electric quadrupole moment

$$eQ = e\int ?^*\left(3z^2 - r^2\right)?d?$$



$r^2 = z^2$

$eQ \sim \langle 2r^2 \rangle$



$z = 0$

$eQ \sim -\langle r^2 \rangle$

Figur 3.19