Παρασκευή
10/10/2025
ΠΦ - Θμ

—*—

Έναρξη 12:15

Ab initio (p)(n)

— Ελκτική N-N

— ∃ μικρή εμβέλεια

— Απωστική για r << R

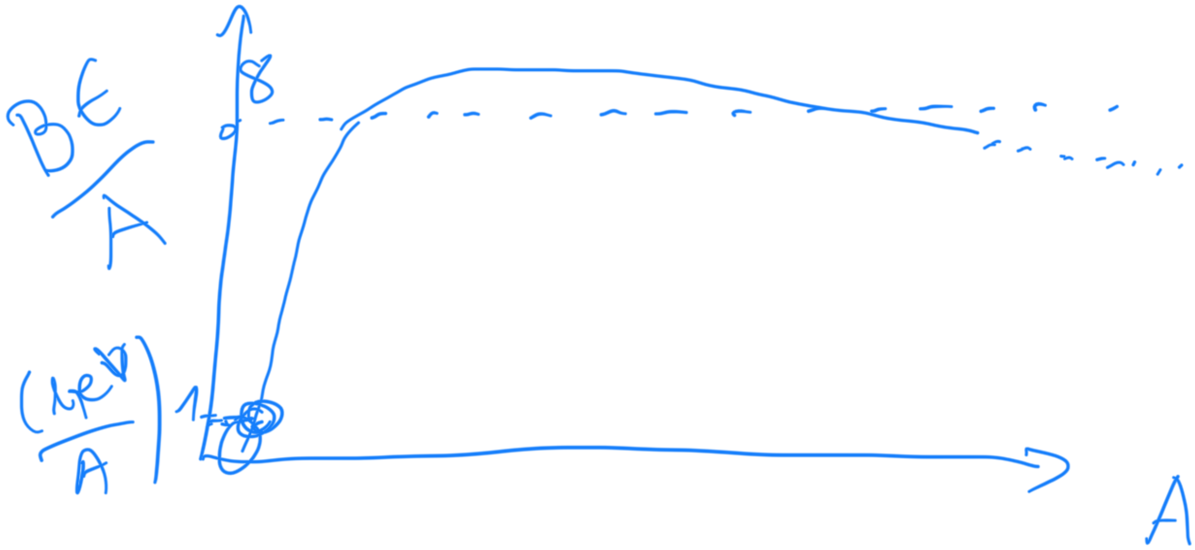
— Αδιάφορη για p-n.

(N-N)

p-p , n-n , p-n

— $\nexists$ εξάρτηση από spin

— 8 MeV/u Κορεσμός



N – N   N – N – N

$$Z \longleftrightarrow N$$

$$A = Z + N$$

$${}^{A}_{Z}X^{N} \longleftrightarrow {}^{A}_{N}Y^{Z}$$

$$^{7}_{3}Li^{4} \longleftrightarrow {}^{7}_{4}Be^{3}$$

$$^{11}_{4}Be^{7} \quad {}^{11}_{5}B^{6} \quad {}^{11}_{6}B^{5} \quad ,,,$$

$$,,, \quad {}^{11}_{3}Li^{8} \qquad \beta^{-}, \beta^{+}$$

→ Yukawa $\quad$ n $\cdots\cdots$ p

$$n - p \qquad V_{NN}$$

$$\underbrace{\Delta E}\cdot\underbrace{\Delta t} \simeq \hbar$$

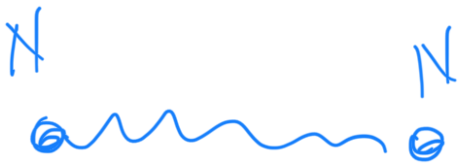
πιόνιο) $\Delta m \sim 200 \ \frac{MeV}{c^2}$?

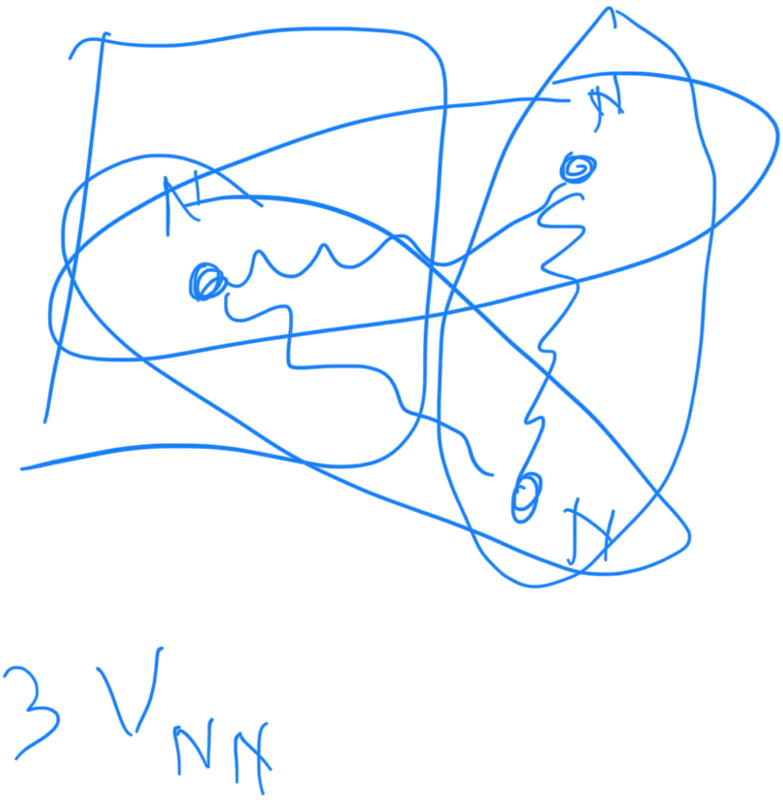
$$140 \frac{MeV}{c^2}$$

$$V_{Yu} \sim -\underset{=}{V_0} \frac{e^{-\alpha r}}{r}$$

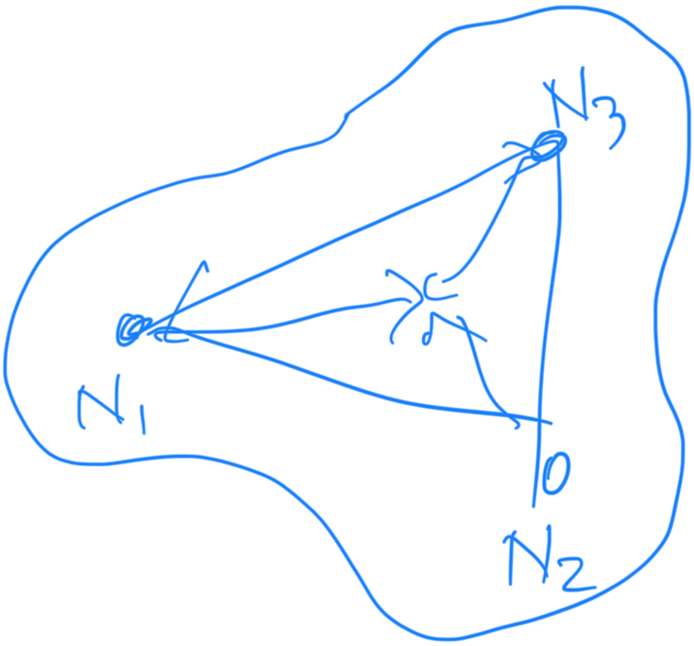
$$H = T + V$$

3





$3 V_{NN}$



$$V_{NNN} \neq 3V_{NN}$$

$$\left[-g\,\underbrace{\vec{S}_{N_1}\cdot\vec{S}_{N_2}}\right]$$

$$-g' f(S_{N_1}, S_{N_2}, S_{N_3})$$

$$3(g\,\vec{S}_i\cdot\vec{S}_j) \neq f(S_i, S_j, S_k)$$

— * —

$$B.E.(^2D) = BE(d)$$

$$= 2.226\ MeV$$

$$\vec{\frac{1}{2}}_{p} + \vec{\frac{1}{2}}_{n} \to \boxed{1},\ 0$$

$$\boxed{S^P_{o\lambda} = 1^+}$$

σπιν
του
πυρήνα

$$I^P = 1^+ \text{ για } {}^2D$$

T

ι̇νιτα

$$(\vec{F}) = \vec{I} + \vec{J}$$

$$\mu = 0.8573\ \mu_N$$

$$\vec{\mu} = g\vec{I}$$

↳ g - factor

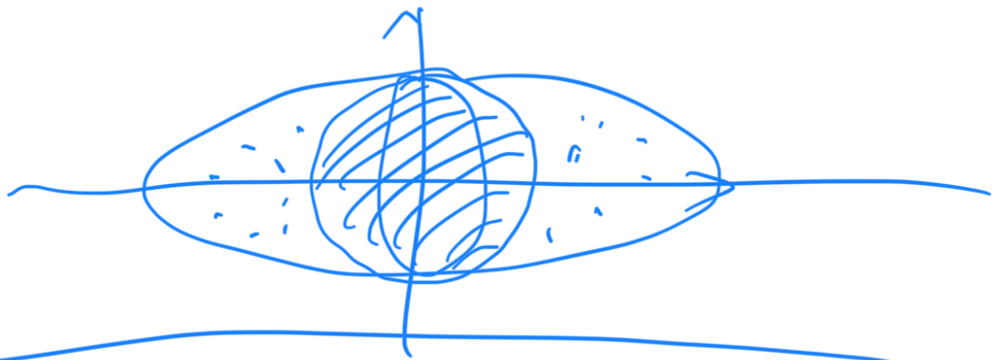
γυρομαγνητικός λόγος,

$$\vec{\mu} = g_\ell \vec{\ell} + g_s \vec{s}$$

p:	$g_\ell = 1$	$g_s = +5.58\,\mu_N$
n	$g_\ell = 0$	$g_s = -3.78$

$$Q = 0.2859\ e \cdot fm^2$$

$\frac{1}{e}$

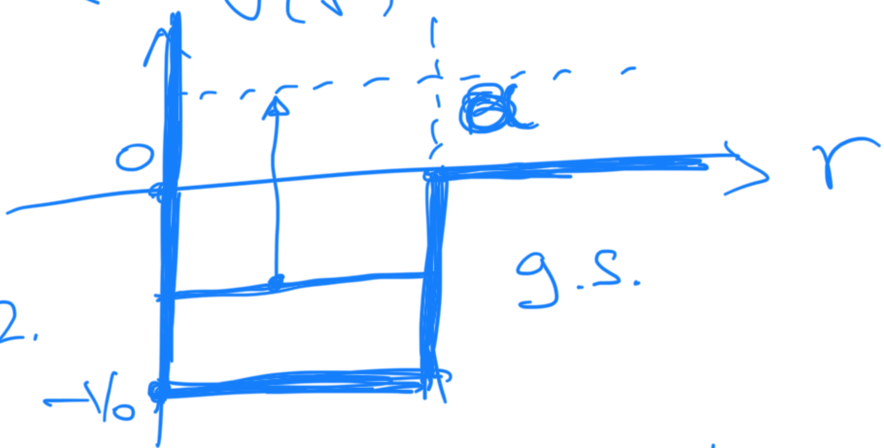


$$\boxed{R = 2.127 \text{ fm}}$$

$$R = R_0 A^{1/3}$$

$$A = 2 \Leftrightarrow R_0 = 1.25 \text{ fm}$$

$$\left(\begin{array}{ll} 1 \quad H & 10^{-5} \; {}^2H \\ & 10^{-14} \; t. \end{array} \right)$$



2.2.

$= -V_0 \quad r < a$

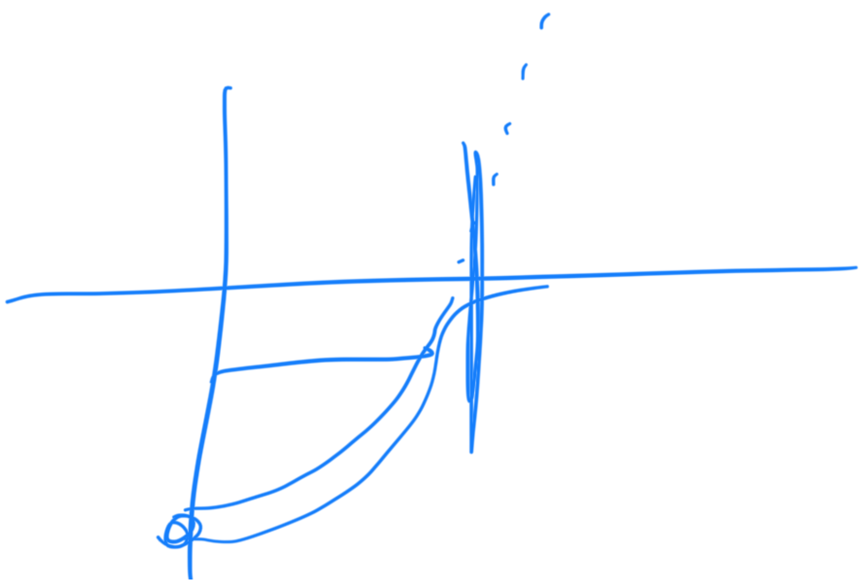
$$V = \begin{cases} -V_0 & r < a \\ 0 & r > a \end{cases}$$

A.T. $$V = -V_0\left(1 - \frac{r^2}{\alpha^2}\right)$$

Gauss $$V = -V_0\, e^{-\frac{r^2}{\alpha^2}}$$

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

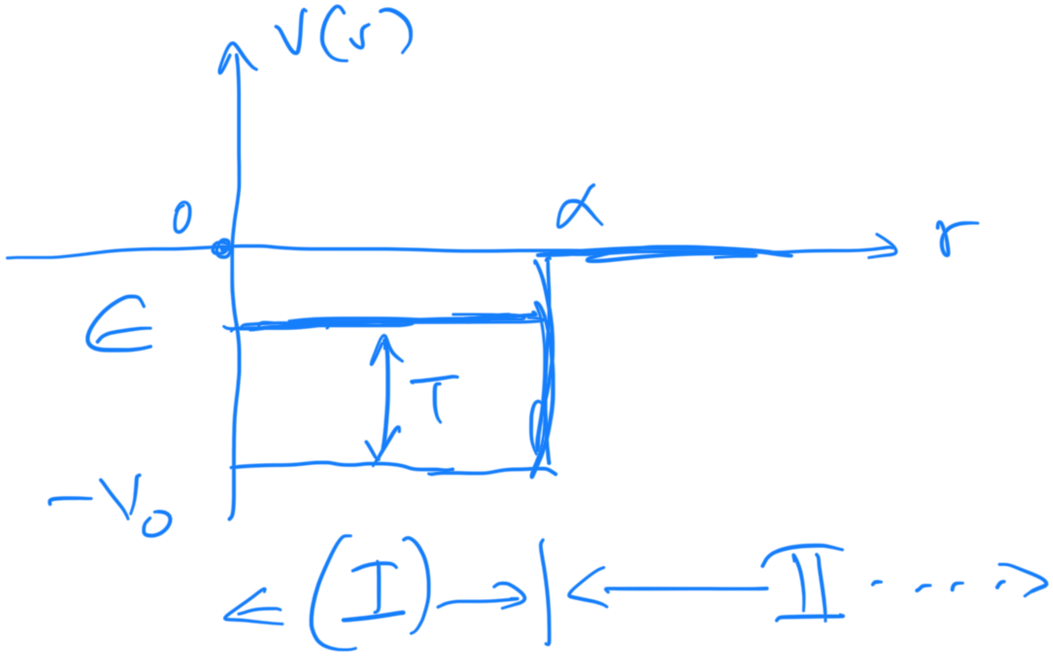
$$\hat{H} = \hat{T} + \hat{V}$$



Τετραγωνικό πηγάδι.

$$\left(-\frac{\hbar^2}{2m}\vec{\nabla}^2 + V(r)\right)\Psi = E\Psi$$

$$V = \begin{cases} -V_0 & r \leq \alpha \\ 0 & r > \alpha \end{cases}$$



$$\Psi_I(r) \qquad \Psi_{II}(r)$$

$$\nabla^2 = \frac{\partial^2}{\partial r^2} + \frac{2}{r}\frac{\partial}{\partial r} + \frac{1}{r^2}\hat{\Lambda}(\theta,\varphi)$$

$$\hat{\Lambda}(\theta,\varphi) = \cot\theta \frac{\partial}{\partial\theta} + \frac{\partial^2}{\partial\theta^2} + \frac{1}{\sin^2\theta}\frac{\partial^2}{\partial\varphi^2}$$

$$\Psi_{n\ell m}(r,\theta,\varphi) = \underbrace{f_{n\ell}(r)}\,\underbrace{Y_{\ell m}(\theta,\varphi)}$$

$$\frac{r^2}{f}\left(\frac{\partial^2}{\partial r^2} + \frac{2}{r}\frac{\partial}{\partial r}\right) f + \frac{2M\left(E - V(r)\right) r^2}{\hbar^2} = -\frac{1}{Y}\hat{\Lambda} Y = \ell(\ell+1)$$

$$\frac{\partial^2 f}{\partial r^2} + \frac{2}{r}\frac{\partial f}{\partial r} + \left(\frac{2M\left(E - V(r)\right)}{\hbar^2} - \frac{\ell(\ell+1)}{}\right) f = 0$$

$$\frac{\quad}{r^2} \Big)$$

$$n = 1, 2, \ldots$$

$$\ell = 0, 1, \ldots, n-1$$

$$\psi_I(\alpha) = \psi_{II}(\alpha)$$

$$|\psi_I(0)| \leq \infty$$

$$\left.\frac{\partial \psi_I}{\partial r}\right|_\alpha = \left.\frac{\partial \psi_{II}}{\partial r}\right|_\alpha$$

$$\psi_{II}(\infty) = 0$$