Title: Konstantin's Group

Date: Aug 27, 2004 08:45 AM

URL: http://pirsa.org/04080007

Abstract:

Electro-magnetic force

$E_{photon} \cdot \lambda_{photon}$

$$= \frac{e^2}{4\pi\varepsilon_0} \cdot \frac{1}{hc}$$

$$\alpha = \frac{e^2}{} \approx \frac{1}{137}$$

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$$E_n = \frac{m_e c^2 \alpha^2}{2n^2}$$

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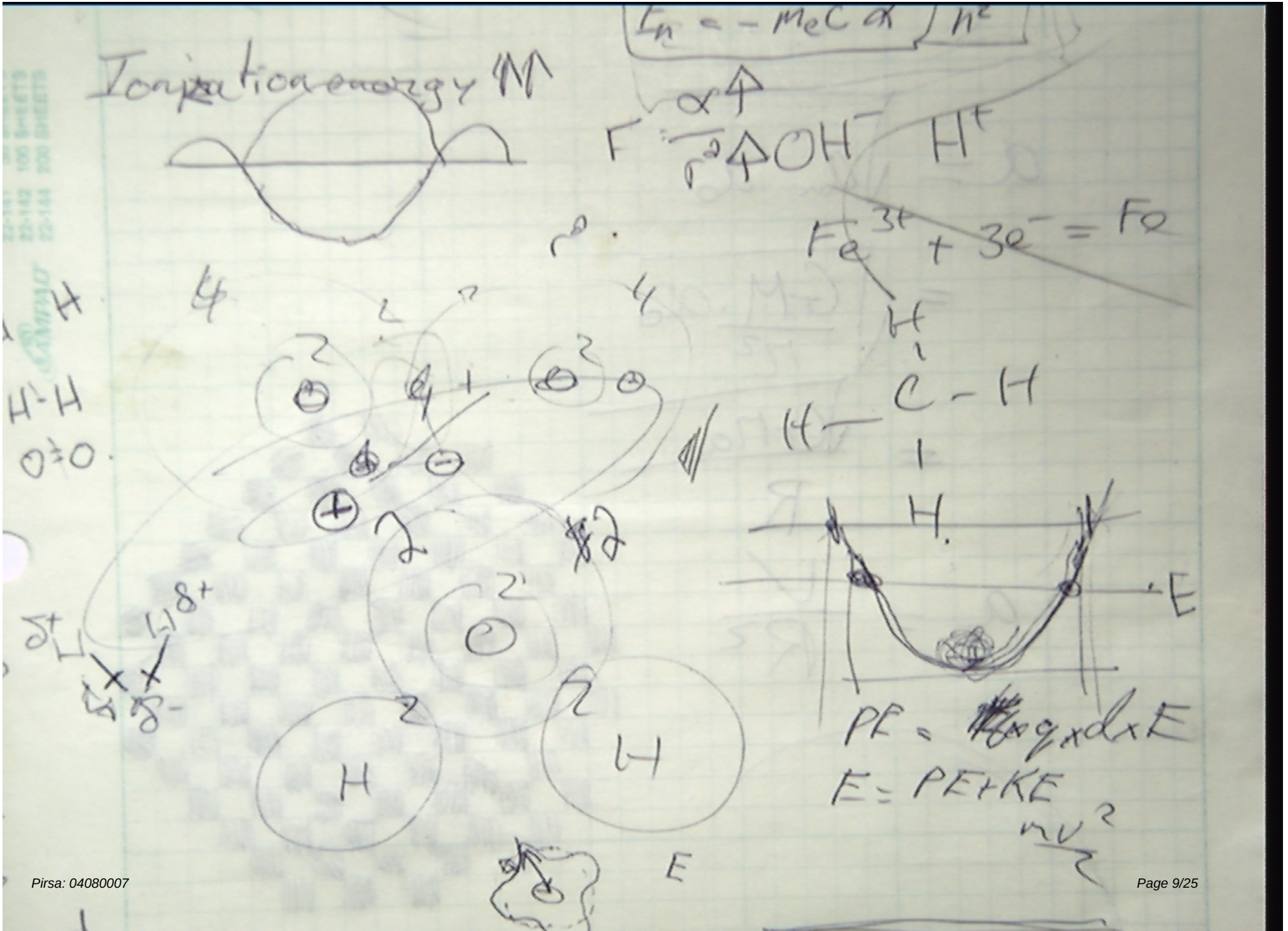
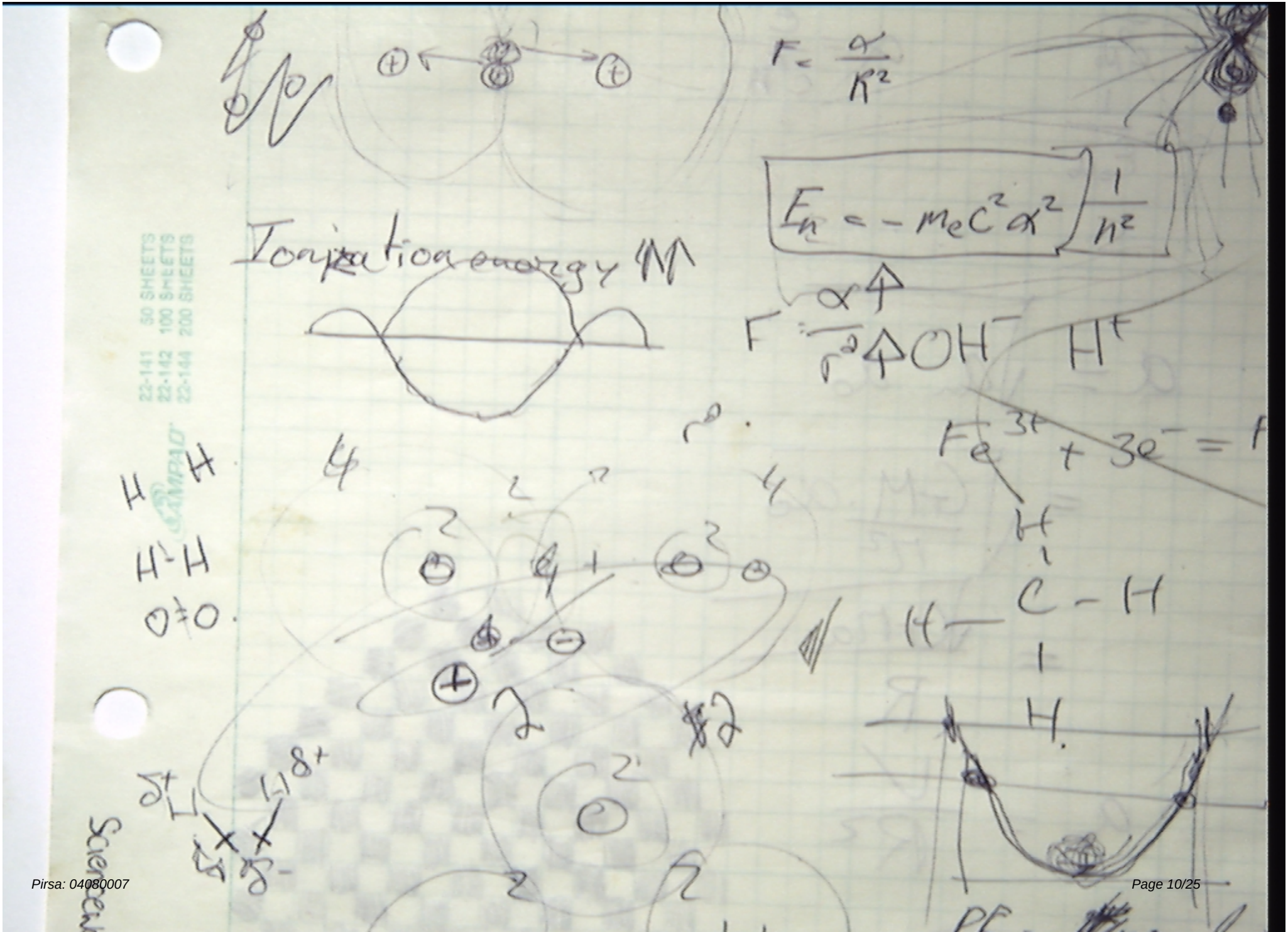

Ionization energy
$E_n = -m_e c \alpha / n^2$
α
$Fe^{3+} + 3e^- = Fe$
H
H-H
O=O
PE = q x d x E
E = PE + KE
mv^2
E


$F = \frac{\alpha}{R^2}$
$E_n = -m_e c^2 \alpha^2 \frac{1}{n^2}$
Ionization energy
$\alpha \uparrow$
$F \propto r^2 \uparrow$ OH⁻ H⁺
$Fe^{3+} + 3e^- =$
H
H-H
O=O
H—C—H
H
H.

the de Broglie wavelength of an electron.

θ = orbit diameter

$\theta = n\lambda \; ; \; n \in N \rightarrow \lambda = \frac{h}{p}$.

$\theta = \frac{nh}{p} \longrightarrow p = mv$.

$$\boxed{\theta = \frac{nh}{mv}}$$

$$\boxed{E_n = -m_e c^2 \alpha^2 \frac{1}{n^2}}$$

$$E = \frac{1}{2}mv^2 - k\frac{e^2}{r}$$

in an orbital $F_c = F_e$

$$\frac{mv^2}{r} = k\frac{e^2}{r^2}$$

$$mv^2 = k\frac{e^2}{r}$$

$$-\cancel{m_e} c^2 \alpha^2 \frac{1}{n^2} = -\frac{1}{2}\cancel{m}v^2$$

$$v^2 = \frac{2c^2\alpha^2}{n^2}$$

$$\boxed{v = \pm\sqrt{2}\frac{c\alpha}{n}}$$

we know $\theta \propto \frac{1}{v}$

$v \propto \alpha$

$\therefore \theta \propto \frac{1}{\alpha}$

$\alpha \propto e^2$

How fundamental charge effects atomic radii

orbit diameters are whole number multiples of the de broglie wavelength of an electron.

$\mathcal{O}$ = orbit diameter

$\mathcal{O} = n\lambda : n \in N \rightarrow \lambda = \frac{h}{p}$.

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$\alpha \propto e^2$

$\theta \propto e^{-2}$

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we know $\theta \propto \frac{1}{v}$

$v \propto \alpha$

$\therefore \theta \propto \frac{1}{\alpha}$

to electrostatic forces between quarks (r^2)

- Since the charge of protons (quarks) varies with α, this changes mass of proton and neutron

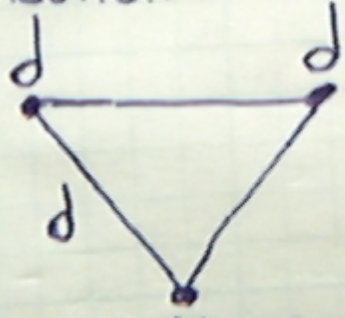
because $\alpha = \frac{e^2}{\hbar c} = e^2$

proton: two up quarks and a down

up $= -\frac{2}{3}$

down $= \frac{1}{3}$

neutron: two down quarks and an up



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Alpha and the nucleon

- A great deal of the mass of nucleons is due to electrostatic forces between quarks ($F = k\frac{Qq}{r^2}$)

- Since the charge of protons (quarks) varies with α, this changes mass of proton and neutron

because $\alpha = \frac{e^2}{\hbar c} = e^2$

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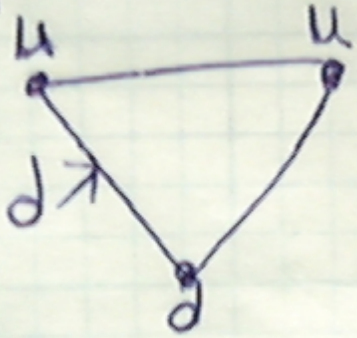
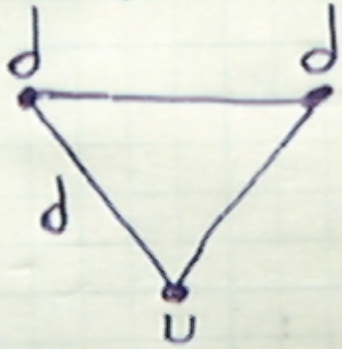


neutron: two down quarks and an up



$E = \frac{e^2}{3d}$ related to alpha $\alpha = e^2$

Bigger alpha = higher E, higher nucleon mass

because $\alpha = \frac{e^2}{\hbar c} = e^2$

proton: two up quarks and a down

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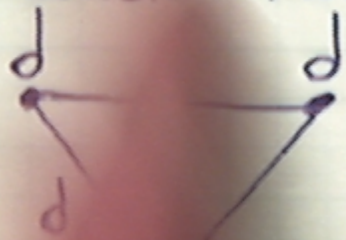


$\frac{e^2}{d}$ related to alpha $\alpha = e^2$

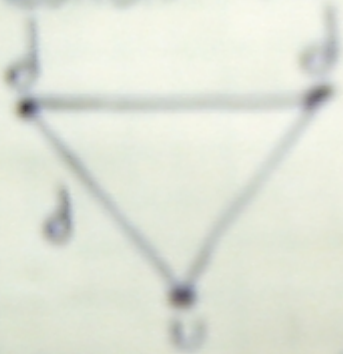
ha = higher E, higher nucleon mass

α, this changes mass of proton and neutron

because $\alpha \propto \frac{e^2}{\hbar c} \propto e^2$

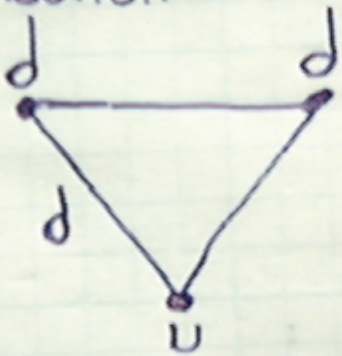
proton: two up quarks and a down up $= -\frac{2}{3}$, down $= \frac{1}{3}$

neutron: two down quarks and an up



$E = \frac{e^2}{kd}$ related to alpha $\alpha \propto e^2$

neutron: two down quarks and an up

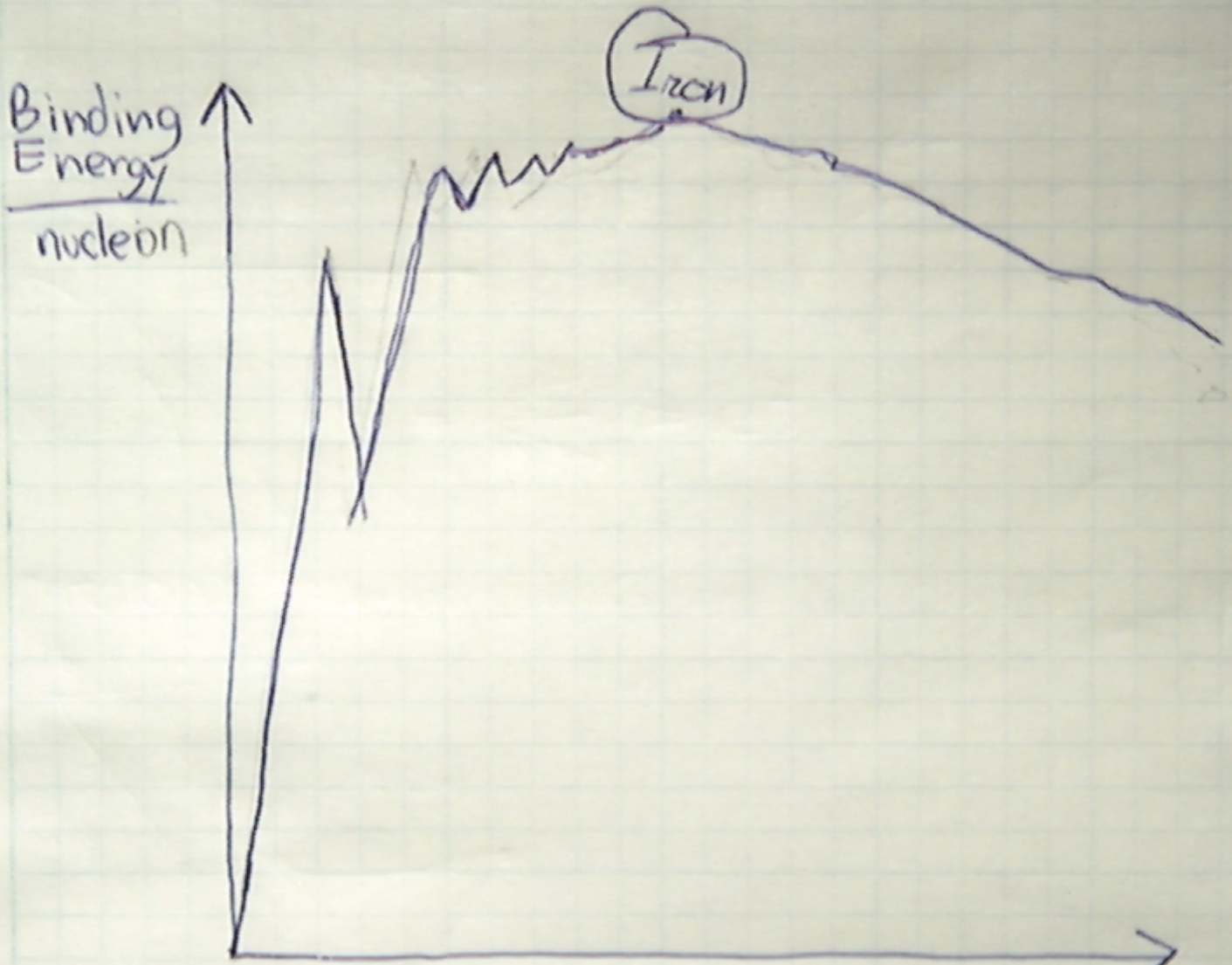


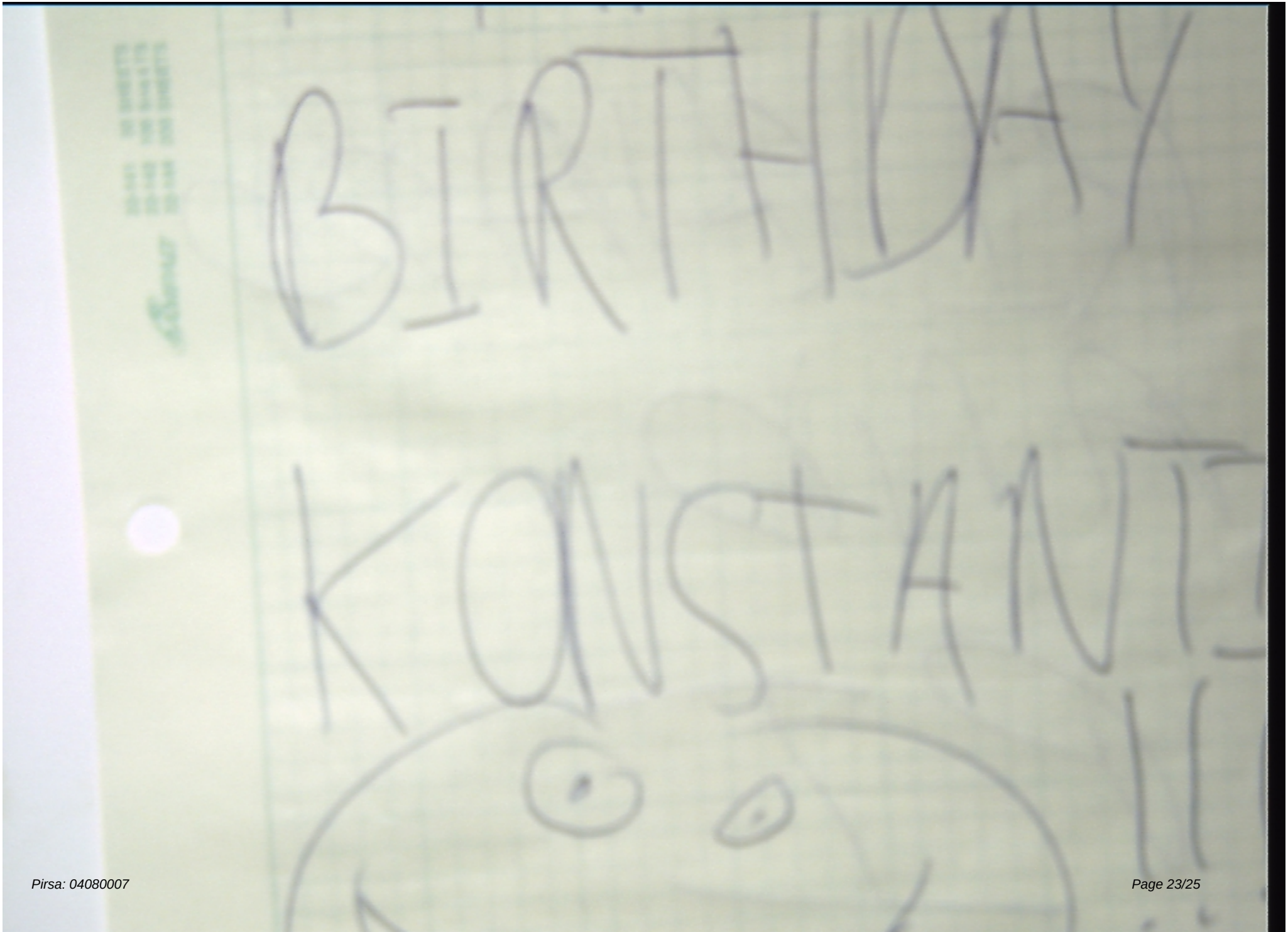
$E = \frac{e^2}{3d}$ related to alpha $\alpha = e^2$

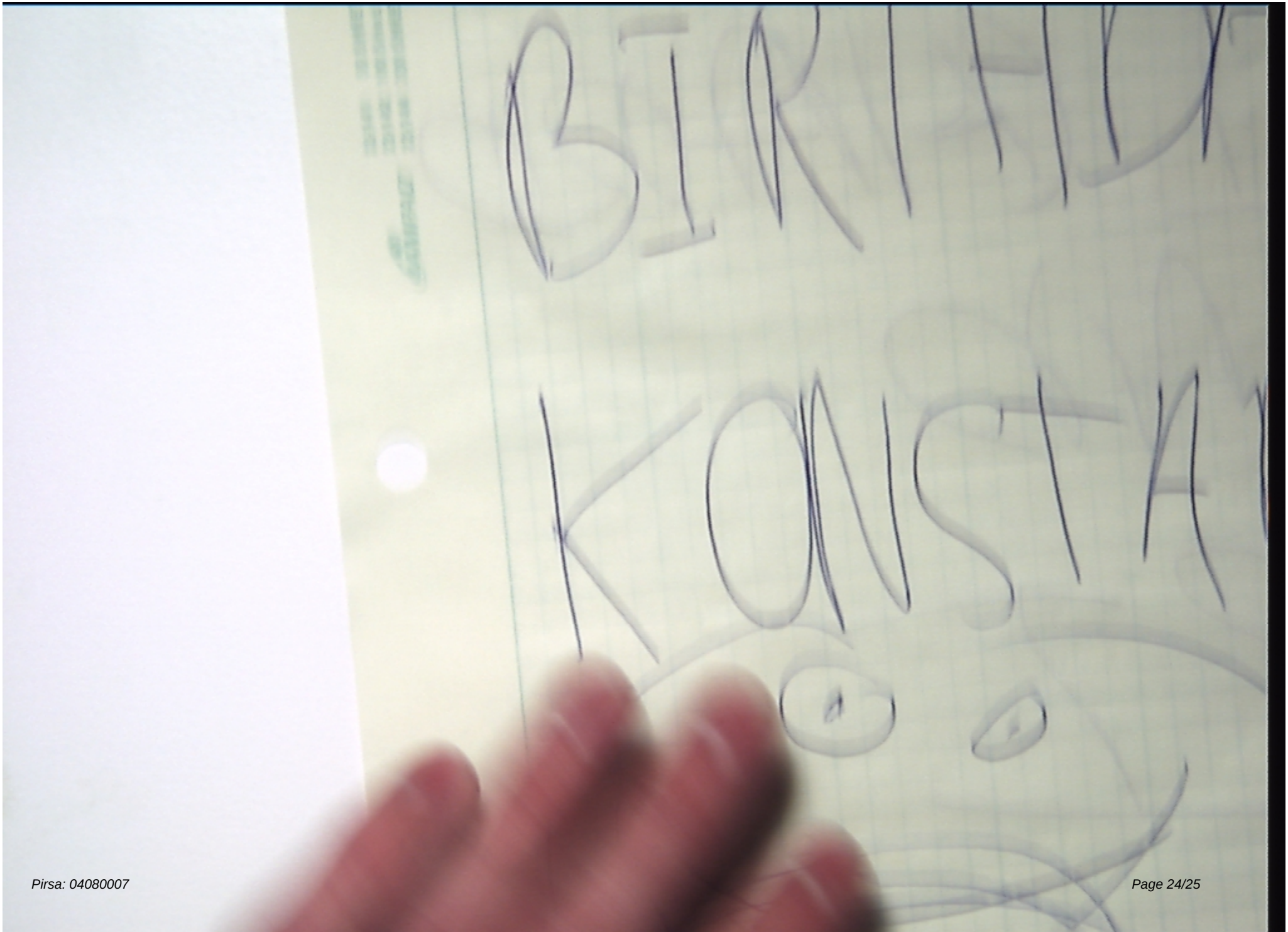
Bigger alpha = higher E, higher nucleon mass

Smaller alpha = smaller E, lower nucleon mass


Iron
Binding Energy
nuclei
Element #


Iron
Binding Energy / nucleon
Element #


BIRTHDAY
KONSTANTI


BIRTHD
KONSTA