The Electric Forces within the Compton Radii of the Proton, and the Electron are Very Strong

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Abstract The force between electric charges at distance r is proportional to $\frac{1}{r^2}$. Due to the small radius of the proton, the electric force between quarks is greater than any other known force.

If we restrict the Proton **u**p and **d**own Quarks to be within the classical radius of the proton, the Electric Forces between them are billion times greater than the Electric Force between the electron and the proton in the Hydrogen Atom.

Most likely, quarks are kept within the proton by Electric attraction between their charges.

There is no need to invent a strong force to explain the attraction between quarks. The electric forces are very strong.

Similarly, The electric forces between sub-electrons within the classical electron radius are 100,000,000 times greater than the Electric Force between the electron and the proton in the Hydrogen Atom.

However, the forces within the classical radius of the proton, are only 10 times greater than the forces within the classical radius of the electron.

the electron too should not break up into subelectrons. And subelectrons with their fractional charges should not be observed out of the electrons.

This non-credible result depends on the Classical radius of the proton, and the classical radius of the electron.

By [Rivas][1],

> *"The quantum Mechanical effects of the **electron** appear at distances of the order of its Compton's wavelength* $\lambda_C = \frac{\hbar}{mc} \cong 10^{-13}\mathrm{m}$*"*

[1]Martin Rivas, "The Spinning Electron",p.62. in "What is the Electron", edited by Volodimir Simulik, Apeiron, 2005

Thus, we proceed to replace the classical radius with the Compton Radius.

Then,

1) the electric forces between the quarks within the Compton radius of the proton are over 300 times greater than the electric forces between the subelectrons within the Compton radius of the electron
2) the electric forces between quarks within the Compton Radius of the proton are million times greater than the forces within the Hydrogen Atom.
3) The electric forces between subelectrons within the Compton Radius of the electrons are 10,000 times greater than the forces within the Hydrogen atom

And the electric forces between subphotons are 10,000 times smaller than the electric force between the electron and the proton in the Hydrogen Atom.

Keywords: Electromagnetic Radiation of Accelerated Charge, Atomic Orbits, Electric Force, Electron, Proton, Atom, Nucleus Radius, Quarks.

Physics & Astronomy Classification Scheme: 41.60-m; 32; 32.10-f; 31.15.B-;

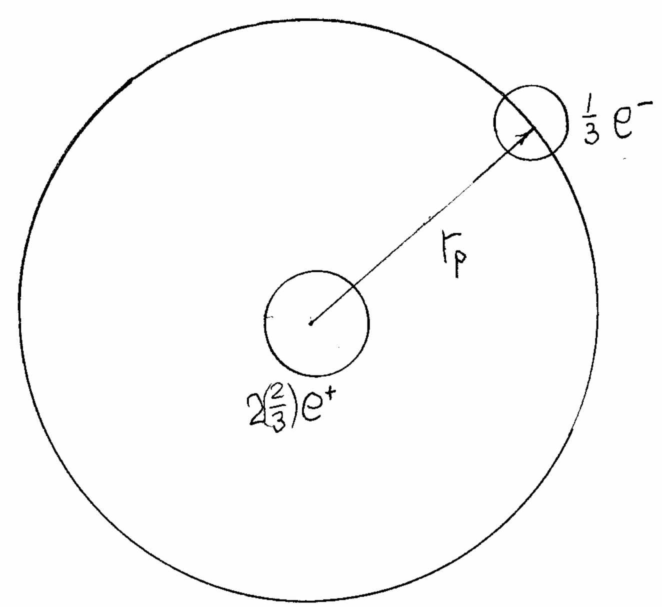
Contents

1.

The Electric Forces between Quarks within the Classical Proton Radius

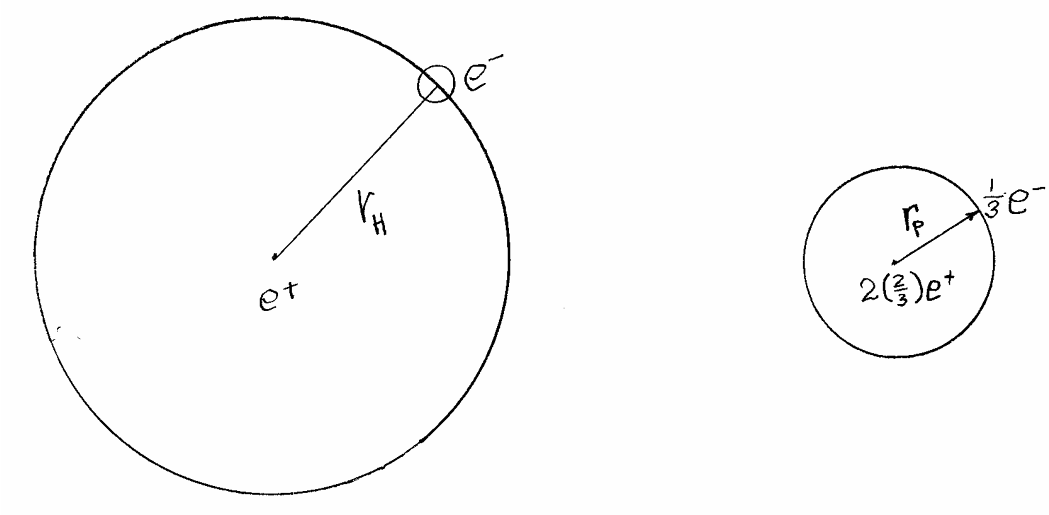
It is believed that the proton is two **u**p quarks each with electric charge $\frac{2}{3}e^{+}$, and **d**own quark with charge $\frac{1}{3}e^{-}$.

We assume that the **d** quark with $\frac{1}{3}e^{-}$ charge orbits the **u** quarks with charge of $2\frac{2}{3}e^{+}$.



The total charge of the three quarks is positive e at the center of the proton.

Denote r_H = the Hydrogen radius; r_p = the proton radius



$$\frac{F_{2u \leftrightarrow d}}{F_{e \leftrightarrow p}} = \frac{\dfrac{1}{4\pi\varepsilon_0}\dfrac{(-\frac{1}{3}e)(\frac{4}{3}e)}{r_p^2}}{\dfrac{1}{4\pi\varepsilon_0}\dfrac{(-e)(e)}{r_H^2}}$$

$$= \frac{4}{9}\frac{r_H^2}{r_p^2}$$

$$\approx \frac{4}{9}\frac{(5.29177210544 \times 10^{-11}\,\mathrm{m})^2}{(0.8414 \times 10^{-15})^2}$$

$$\approx 1.75798 \times 10^9$$

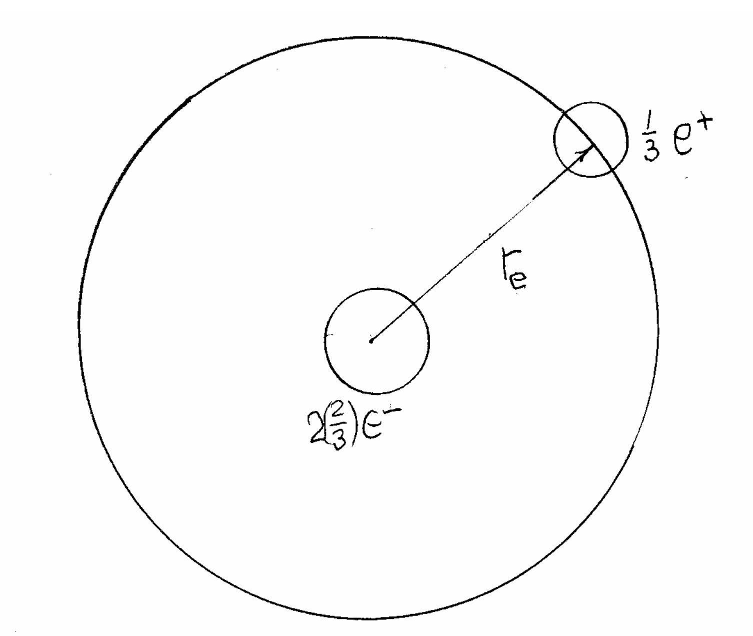
Thus, the proton is stable with mean lifetime $> 3.6\times 10^{29}$ years

2.

The Electric Forces between Subelectrons within the Classical Electron Radius

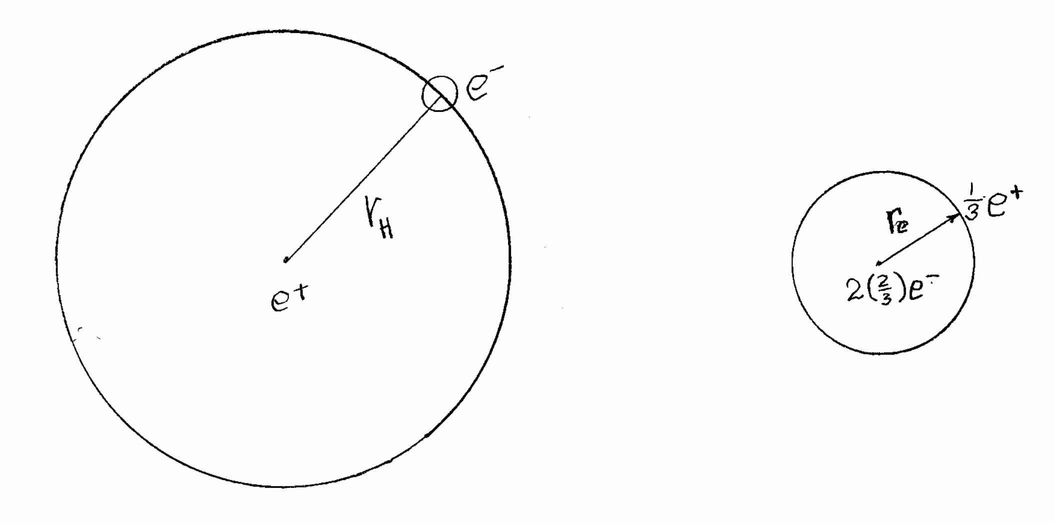
Following the observation of partial charges, subprotons were assumed. Similarly, assume that the electron is two u_e subelectrons each with electric charge $\frac{2}{3}e^-$, and d_e subelectron with charge $\frac{1}{3}e^+$.

We assume that d_e with $\frac{1}{3}e^+$ charge orbits u_e with $2\frac{2}{3}e^+$.



The total charge of the three subelectrons is e^- at the center of the electron.

Denote r_H = the Hydrogen radius; r_e = the electron radius



$$\frac{F_{2u_e \leftrightarrow d_e}}{F_{e \leftrightarrow p}} = \frac{\frac{1}{4\pi\varepsilon_0}\frac{(\frac{1}{3}e)(-\frac{4}{3}e)}{r_e^2}}{\frac{1}{4\pi\varepsilon_0}\frac{(-e)(e)}{r_H^2}}$$

$$= \frac{4}{9}\frac{r_H^2}{r_p^2}$$

By Wikipedia[2], $r_{\mathrm{e}} = \frac{1}{4\pi\varepsilon_0}\frac{e^2}{m_{\mathrm{e}}c^2} = 2.8179403227 \times 10^{-15}\ \mathrm{m}$,

[2] https://en.wikipedia.org/wiki/Classical_electron_radius

$$\approx \frac{4}{9}\frac{(5.29177210544\times 10^{-11}\,\text{m})^2}{(2.8179403227\times 10^{-15}\ \text{m})^2}$$

$$\approx 1.567314546\times 10^{8}$$

$$> 10^{8}$$

Thus, the electron is stable with mean lifetime $> 6.6\times 10^{28}$ years

3. Quarks Attraction within the Classical Proton Radius Versus Subelectrons Attraction within the Classical Electron Radius

$$\frac{F_{2u\leftrightarrow d}}{F_{2u_e\leftrightarrow d_e}} = \frac{\frac{1}{4\pi\varepsilon_0}\frac{(-\frac{1}{3}e)(\frac{4}{3}e)}{r_p^2}}{\frac{1}{4\pi\varepsilon_0}\frac{(\frac{1}{3}e)(-\frac{4}{3}e)}{r_e^2}}$$

$$= \frac{r_e^2}{r_p^2}$$

$$= \frac{(2.8179403227\times 10^{-15}\ \text{m})^2}{(0.8414\times 10^{-15}\text{m})^2}$$

$$= 11.217\,.$$

This ratio is too small to keep the quarks in the proton, while allowing the electron to break up into subelectrons. The Classical radius of the proton, and the electron do not give a credible result here.

By [Rivas][3],

“The quantum Mechanical effects of the ***electron*** *appear at distances of the order of its Compton’s wavelength* $\lambda_C = \dfrac{\hbar}{mc} \cong 10^{-13}\mathrm{m}$*”*

Thus, we proceed to replace the classical radius with the Compton Radius.

[3]Martin Rivas, “The Spinning Electron”,p.62. in “What is the Electron”, edited by Volodimir Simulik, Apeiron, 2005

4.
The Compton Radius of the Proton, and the Compton Radius of the Electron

If the proton is replaced with a photon with equal energy,

$$h\nu = m_p c^2,$$

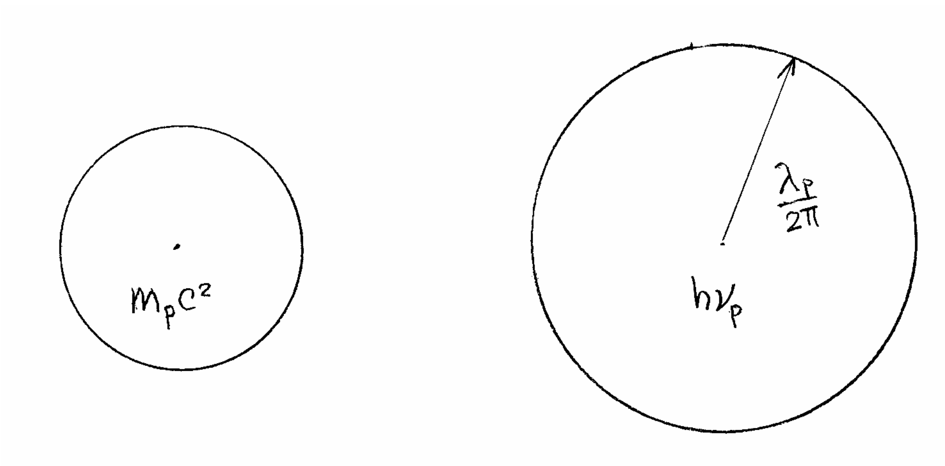
$$h\frac{c}{\lambda_p} = m_p c^2$$

The wavelength of that photon is

$$\lambda_p = \frac{h}{m_p c}$$

Hence, the photon radius is

$$\frac{\lambda_p}{2\pi} = \frac{h}{2\pi m_p c}$$

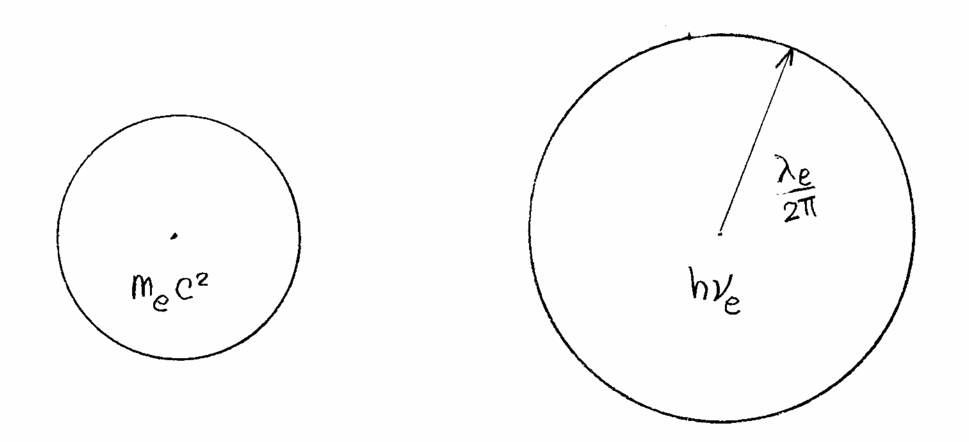


The Compton Radius of the proton is

$$= \frac{6.62607015 \times 10^{-34}}{2\pi(1.67262192595 \times 10^{-27})3 \cdot 10^{8}}$$

$$= (2.10163417)10^{-14}$$

The Compton Radius of the electron is



$$\frac{\lambda_e}{2\pi} = \frac{h}{2\pi m_e c}$$

$$= \frac{6.62607015 \times 10^{-34}}{2\pi(9.1093837139 \times 10^{-31})3 \cdot 10^{8}}$$

$$= (3.85892)10^{-13}$$

Replacing the Classical Radii with the Compton Radii,

$$\frac{(\frac{\lambda_e}{2\pi})^2}{(\frac{\lambda_p}{2\pi})^2} = \frac{((3.85892)10^{-13})^2}{((2.10163417)10^{-14})^2}$$

$$= (3.371454544) \times 10^{2}$$

That is, the electric force between the quarks within the Compton radius of the proton is over 300 times greater than the electric force between the subelectrons within the Compton Radius of the electron.

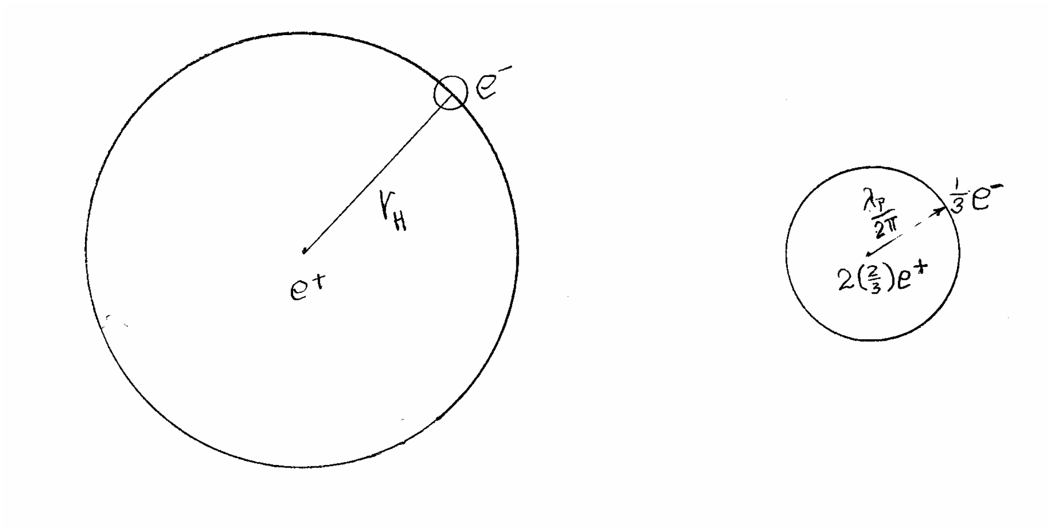
This explains why subelectrons have been observed, while quarks have not been observed.

Then, ignorance of electrodynamics[4], led to the re-invention of the electric forces within the quarks, naming them the "strong force". It is a wonder why the electron with likely same structure, and impressive stability escaped having "strong force" between its components.

[4] H. Vic Dannon, Radiation Equilibrium, Inertia Moments, and the Nucleus Radius in the Electron-Proton Atom Gauge Institute Journal, Vol. 10, No. 3, August 2014.

5.

The Electric Forces between Quarks within the Compton Radius of the Proton



$$\frac{F_{2u\leftrightarrow d}}{F_{e\leftrightarrow p}} = \frac{\frac{1}{4\pi\varepsilon_0}\frac{(-\frac{1}{3}e)(\frac{4}{3}e)}{\left(\frac{\lambda_p}{2\pi}\right)^2}}{\frac{1}{4\pi\varepsilon_0}\frac{(-e)(e)}{r_H^2}}$$

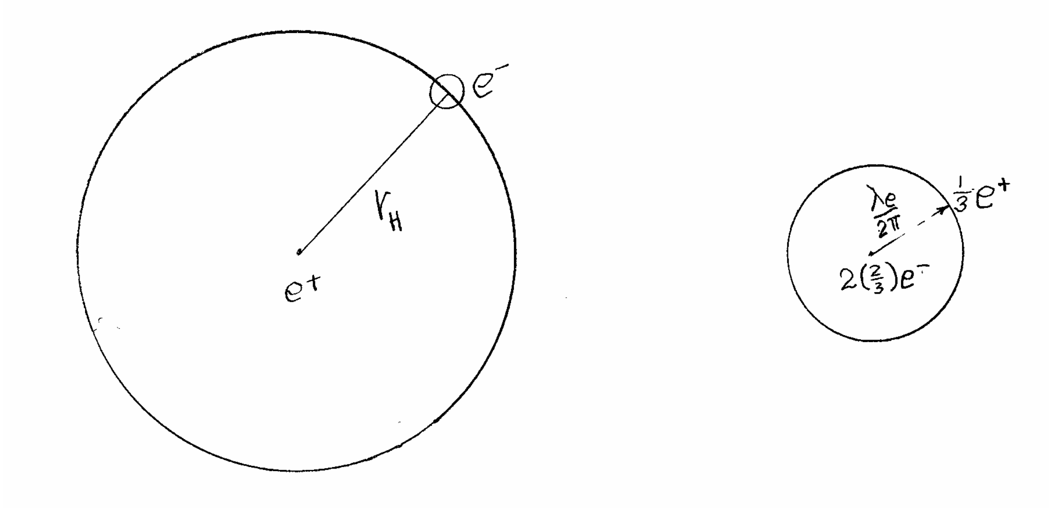
$$= \frac{4}{9}\frac{r_H^2}{\left(\frac{\lambda_p}{2\pi}\right)^2}$$

$$\approx \frac{4}{9}\frac{(5.29177210544 \times 10^{-11}\,\mathrm{m})^2}{((2.10163417)10^{-14})^2}$$

$$\approx 2.89776 \times 10^6$$

6.

The Electric Forces between Subelectrons within the Compton Radius of the Electron



$$\frac{F_{2u_e \leftrightarrow d_e}}{F_{e \leftrightarrow p}} = \frac{\frac{1}{4\pi\varepsilon_0}\frac{(-\frac{1}{3}e)(\frac{4}{3}e)}{\left(\frac{\lambda_e}{2\pi}\right)^2}}{\frac{1}{4\pi\varepsilon_0}\frac{(-e)(e)}{r_H^2}}$$

$$= \frac{4}{9}\frac{r_H^2}{\left(\dfrac{\lambda_e}{2\pi}\right)^2}$$

$$\approx \frac{4}{9}\frac{(5.29177210544\times 10^{-11}\,\mathrm{m})^2}{((3.85892)10^{-13})^2}$$

$$\approx (8.3577)10^3$$

7.

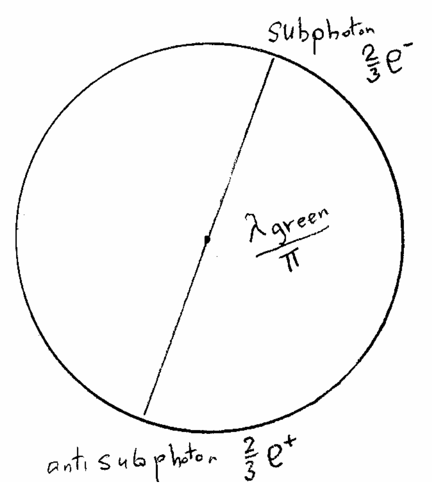
The Electric Forces between Sub-photons in a Green Photon

Denote $r_H =$ the Hydrogen radius

$$= 5.29177210544 \times 10^{-11}\,\text{m}$$

$$D_{green} = \text{Green photon Diameter } \frac{\lambda_{green}}{\pi}$$

We assume that the photon is subphoton with charge $\frac{2}{3}e^-$, and its antimatter subphoton with charge $\frac{2}{3}e^+$ separated by the diameter of the photon, circling the photon's center:



$$\frac{F_{e\leftrightarrow p}}{F_{green}} = \frac{\frac{1}{4\pi\varepsilon_0}\frac{(-e)(e)}{r_H^2}}{\frac{1}{4\pi\varepsilon_0}\frac{(-\frac{2}{3}e)(\frac{2}{3}e)}{\left(\frac{\lambda_{green}}{\pi}\right)^2}}$$

$$= \frac{9}{4\pi^2}\frac{\lambda_{green}^2}{r_H^2}$$

$$\approx \frac{9}{4\pi^2}\frac{(5\times 10^{-7}\,\text{m})^2}{(5.29177210544\times 10^{-11}\,\text{m})^2}$$

$$\approx 2.035\times 10^7$$

The electric forces between the subphotons are millions times smaller than the electric forces between the electron and proton in the Hydrogen Atom. Thus, the photon can be broken up easier.

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