# A New Proton Structure Model

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Proton is one of the most important particles. Though the precise values of the mass and the radius of proton have been figured out, the quark model of proton fails to connect these two values. However, we discover that a new proton structure model may realize this goal, which may help us know the internal structure of proton in a better way. The new model is different from the quark model which has been used to explain proton structure, it may have influence on the current particle standard model system.

**The mathematic relation between the mass and the radius of proton**

By calculating the wavelength of photon corresponding to the resting energy of proton and comparing it with the radius of proton, we can discover the definite quantitative relation between them:

1 The calculation of wavelength of photon corresponding to the resting energy of proton is indicated as below:

The mass of proton is：$1.67262171552456 * 10^{-27}\mathrm{kg}$

In terms of the mass-energy formula （$\mathrm{E} = \mathrm{mC}^2$）and the velocity of light （$\mathrm{C} = 299792458\mathrm{m/s}$）, we can calculate the resting energy contained in the proton, which is

$\mathrm{E} = \mathrm{mC}^2 = 1.67262171552456 * 10^{-27} * （299792458）^2 = 1.50327742889536 * 10^{-10}$ J

According to the energy formula（$\mathrm{E} = \mathrm{hv}$）, h refers to the Planck constant （$\mathrm{h} = 6.62607015 * 10^{-34}\mathrm{J.s}$）and v indicates the frequency of photon. In case that we can acquire a photon p which has the same energy with the resting energy of proton, the frequency of this photon p can be calculated as:

$$\mathrm{v} = \frac{\mathrm{E}}{\mathrm{h}} = 0.226873153296658 * 10^{24}$$

When taking into consideration the velocity of light, we may calculate the wavelength of this photon:
$\lambda = \mathrm{C/v} = 1.32141001984485 * 10^{-15}$ m

2 The calculation of circumference of proton:

According to the latest measurement made in 2013, the radius of proton is $\mathrm{r} = 0.84087 * 10^{-15}\mathrm{m}$.

Based on that, we calculate the circumference of proton:
$\text{Circumference} = 2\pi = 5.283341939124$ m

3 Comparing these two figures, we find out that

$$\frac{\lambda}{\text{Circumference}} = 0.250108744629908$$

In case that we calculate the wavelength of a photon with energy of only 1/4 of the resting energy of proton, we may find that it is equal to the circumference of the proton. If this photon moves circularly in a head-to-tail way, the radius of this circular ring is:

$\text{R} = \frac{\lambda}{2\pi} * 4 = 0.841235760387805 * 10^{-15}$ m

The radius of proton measured by us is $\text{r} = 0.84087 * 10^{-15}$m.
These two figures are basically the same.

**A new proton structure model:**

According to the calculation mentioned above, in case that there are 4 photons, each of which has the identical energy with 1/4 of the resting energy of proton, and each photon moves circularly and forms a head-to-trail photonic ring. In addition, these four photonic rings constitute a homocentric structure. Then, they may form a sphere in the space, the energy and radius of which are identical with those of proton.
Can we say that this is the real structure of proton?

We make explanation for the mass and radius of proton in this model, while the electric charge of proton is not reflected in it.
Can we make further speculation that the photon doesn't move along the circular orbit in the space actively, instead, it impacts the particle wall of proton along the tangential direction and is reflected by it over and over again before forming the photonic ring structure and moving along the circular orbit? And can we say that the particle wall of proton may reflect photon because of the electric charge it carries?

**Contradiction with quark model:**

Though this new model may explain the relation between the mass and the radius of proton in a better way, it doesn't need quark because that all the mass or energy has been allocated.
Therefore, we may need to rethink the model related to particle structure.

**References and Notes:**


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