

# The Structure of the Proton

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**Abstract:** shows the fundamental structure of the proton as an elementary particle

## Main Viewpoints and Conclusions:

The proton is a subatomic particle, symbol P or P<sup>+</sup>, with a unit positive charge and mass slightly less than that of a neutron. Protons and neutrons are collectively referred to as "nucleons". One or more protons are present in the nucleus of an atom. The word *proton* is Greek for "first", and this name was given to the hydrogen nucleus by E. Rutherford in 1920. In previous years E. Rutherford had discovered that the hydrogen nucleus (known to be the lightest nucleus) could be extracted from the nucleus of nitrogen by collision. The proton was therefore a candidate to be an elementary particle and a building block of nitrogen and all other heavier atomic nucleus.<sup>[1]</sup>

The free proton is a stable particle that has not been observed to break down spontaneously to other particles, an experimental data also has been showed and proved the proton is stable,<sup>[2]</sup> and an experiment at the Super-Kamiokande detector in Japan gave lower limits for protons mean lifetime of  $6.6 \times 10^{33}$  years.<sup>[1]</sup> So, the proton is an elementary particle.

Simultaneously, deep inelastic scattering experiments at the Stanford Linear Accelerator Center (SLAC) showed that the proton contained much smaller, point-like objects and was therefore with most fundamental ingredients and a further internal spatial structure.<sup>[3]</sup>

Based on the above, obtained the following conclusions:

The proton is an elementary particle with a unit positive electronic-charge; with the same and consistent fundamental ingredients; with the different spatial ingredient density and the corresponding volume charge density distribution; and, it without the further and smaller basic unit assembly (or called basic unit module).

## References

[1] *Proton* <https://en.wikipedia.org/wiki/Proton>

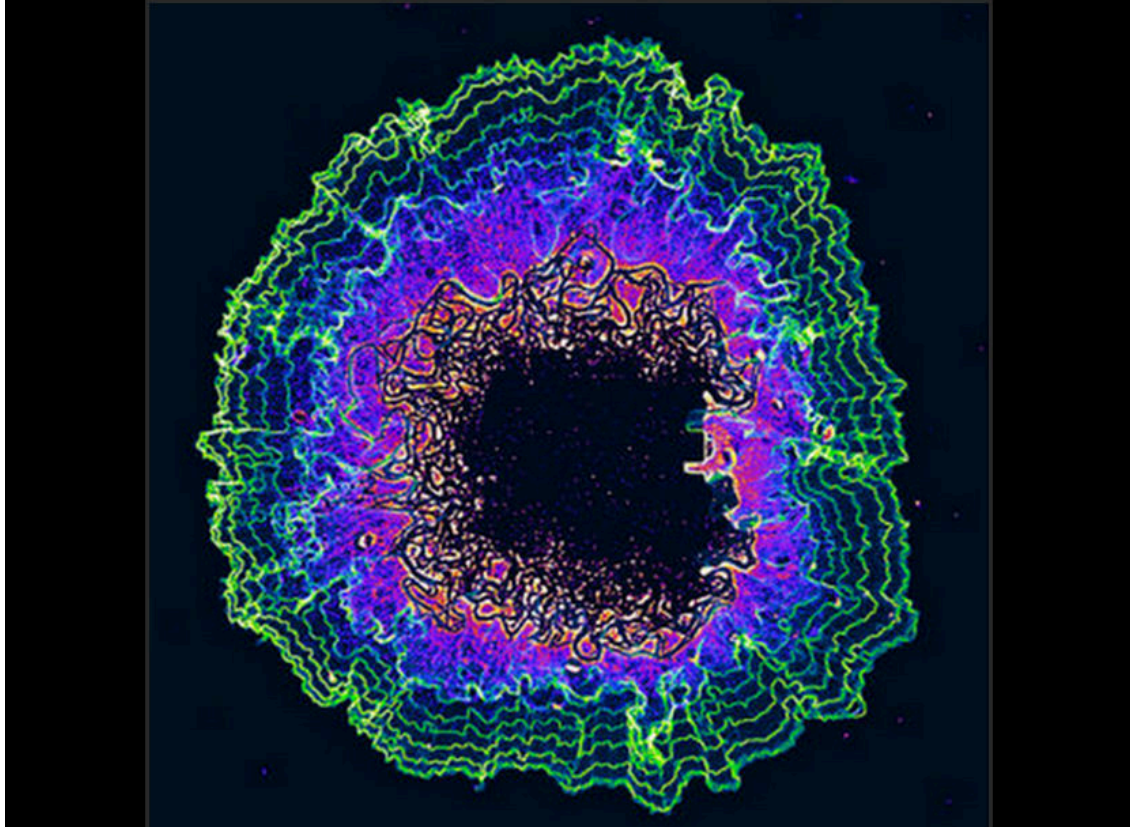
[2] *Constraint on a Varying Proton-Electron Mass Ratio 1.5 Billion Years after the Big Bang* <http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.114.071301>

[3] *Quark* <https://en.wikipedia.org/wiki/Quark>

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## Appendix

*A cross-sectional schematic view of the proton*



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<http://www.sciencedaily.com/releases/2015/07/150722141424.htm>