

The Real Proton

David L. Bergman

Close to half of all particles in the universe are protons, and life as we know it would be impossible without them. “To most researchers, the proton is a workaday particle: the stuff that gives every atomic nucleus its positive charge, and the heart of the ubiquitous hydrogen atom.”¹

At the close of the Twentieth Century, two very different models of the proton are contending for validation by the scientific community. The question is, “Which of these models of the proton is *the real proton*?” Figure 1 illustrates the Spinning Charged Ring Model developed by Common Sense Science (CSS), and Figure 2 shows the Quantum Model of the proton that is part of the Standard Model of Elementary Particles.

Figure 1
*Spinning Charged Ring
Model of Proton, Spin ½*

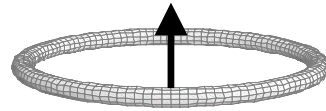
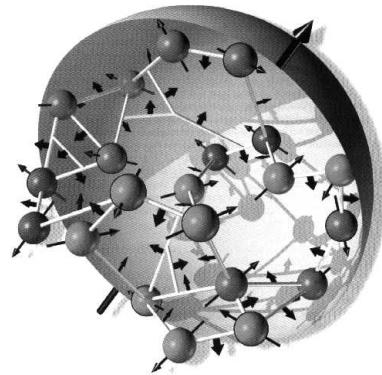


Figure 2.
Standard Model of Proton
Quantum Model of Proton showing Up Quarks, Down Quark, Strange Quarks, Antiquarks, Gluons, and associated spin ½ or spin 1.



from SCIENTIFIC AMERICAN
p. 59, July 1999

Protons in the Middle of the Atom. In 1911, Lord Rutherford proposed “an atomic model whose essential features have stood the test of time: ...the solar... model of the atom. The central element of this model is an atomic nucleus smaller than the atom itself, within which both the positive charge [protons] and virtually all the mass are concentrated.”²

Early Model of the Proton. “When the proton was discovered by Ernest Rutherford in 1919, it was thought to be an indivisible basic building block of matter.... Early proton-proton collision experiments in the 1930s revealed that the proton was more than an infinitesimally small ‘point-charge’: it had a finite size and presumably some kind of structure.”¹

Hofstadter’s highly-acclaimed scattering experiments in the 1950s measured charge distribution in a proton, showing that charge is distributed in a particle of finite size (see Figure 3).

Examination of Protons. Two approaches have dominated the search for knowledge on the nature of the proton: making measurements of the electrical properties of its magnetic moment and

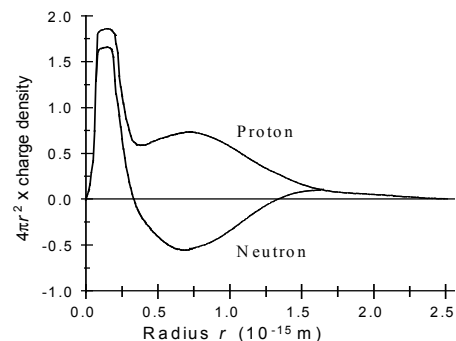


Figure 3
Distribution of Charge in Proton

electromagnetic energy, and drawing inferences from the scattering angles or debris of smashed protons on collision courses.

Massive experimentation efforts attempted to quantify four properties considered to be fundamental: charge, mass, spin, and magnetic moment. However, as briefly described below, this approach relied heavily upon assumptions, inferences, and rare events.

Using the meager information available to them, physicists developed and modified models of the proton five times in the last eight decades.

Proton Spin. As understood by the Ring Model, circulation of the internal charge produces two fundamental properties of the proton. First, charge circulation produces a *magnetic moment*, much like the magnetic moment from current in a circular loop of wire. Second, the magnetic field, which contains about one-half of the proton's energy, takes up the characteristic shape shown in the Figure 4. The spatial distribution of this field energy establishes the proton's *angular momentum*. For a single charged ring proton, the CSS model predicts a *spin* of one-half unit, in agreement with measurements. Considering that the two most abundant particles (protons and electrons) always have the same amount of spin, *spin appears to be invariant*.

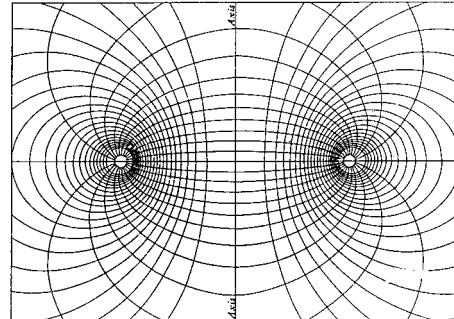


Figure 4
*Magnetostatic Field of Spinning
Charged Ring Model of Proton*
Lines of Force and
Equipotential Surfaces

Variance of Properties. Isolated elementary particles—those detached from atoms—appear to be completely stable, and to many physicists it seemed reasonable to assume that the properties of free protons and electrons would not be different when they were a part of an atom.³ Additional experimentation proved this idea to be false. Many measurements of fundamental properties were made from 1945-1955 on *bound* protons in specimens of water, hydrogen gas, and mineral oils, and a few measurements were even made on *free* protons. For *bound* protons, the differences of specimen materials usually made only minor differences of measured properties, and various “corrections” were applied to explain away the discrepancies.

Magnetic Moment. The false assumption of invariant properties³ was so deeply embedded in the atomistic philosophy of Quantum Theory (an essential underpinning of the Standard Model) that *researchers failed to recognize what they had measured*. The magnetic moment of a proton bound within an atom appeared to be “anomalous,” its measured value being 2.79 times higher than expected.⁴

Measuring the Proton Moment. The *magnetic moment* of a spinning charged particle (not to be confused with *magnetic flux*) is the product of the current produced by its circulating charge and the area enclosed by the current: $\mu = I\pi R^2$. For a spinning charged ring, the magnetic moment is $\mu = ceR/2$, such that the magnetic moment is proportional to the particle's radius R and inversely proportional to the particle's mass.⁴

Thus, the magnetic moment of an electron is about 1836 times larger than the moment of the smaller proton. Although the magnetic moment of a proton is widely reported to be “anomalous,” sound experimental data show that the moment of a *free* proton has the value predicted by the Ring Model.⁴ Research by Common Sense Science shows that the Ring Model also predicts the correct values measured for the moments of *bound* protons.

Modern physicists remain in confusion over the magnetic moment of a free proton. As noted earlier, experimenters assumed, incorrectly, that the proton bound inside an atom would have the same magnetic moment as a free isolated proton. However, experiments performed by Hipple, Sommer and Thomas in 1950 and Jeffries in 1951 measured the moments of both bound and free protons. These experiments showed that the *bound* proton has a larger magnetic moment than the free proton. The experiments also showed that *free* protons are *not anomalous* and have the magnetic moment predicted by classical and Ring Model theory.⁴

Charged Ring Model. The spinning charged ring was first presented as a model of the proton in 1991. The development and several descriptions of the ring model have been published^{4,5,6,7,8} and will not be repeated here.

Scientific credibility of the proton Ring Model is greatly increased by successful use of the same model for all elementary particles. Science is supposed to be a search for order in the universe, and the simplicity of a *common model* is preferred to multiple, unrelated models. The Ring Model provides a common structure for both the proton and electron. Their properties are shown in the following Table, including little known properties of the proton shown in the bottom two rows of the Table.

Property	Electron	Proton	Unit
Charge , $e = 1.6021892 \times 10^{-19}$	$-e$	$+e$	Coulomb
Magnetic Flux , $\phi = 4.13089 \times 10^{-15}$	$-\phi$	$+\phi$	Weber
Mass , $m = 9.109534 \times 10^{-31}$	m	km	Kilogram
Magnetic Moment , $\mu = 9.284832 \times 10^{-24}$	$-\mu$	$+\mu/k$	J/T
Spin , $p_s = \nabla/2 = 1.0545887 \times 10^{-34}$	$\nabla/2$	$\nabla/2$	Joule-sec
Radius , $R = 3.86607 \times 10^{-13}$	R	R/k	meter
Half-Thickness , $r = 7.42214 \times 10^{-200}$	r	r/k	meter
Shape , $S = \ln(R/r) = 429.931$	S	S	—
Rim Velocity , $v = c = 2.99792458$	c	c	meter/sec
Rotation , $\omega = c/R = 7.75445 \times 10^{20}$	ω	$k\omega$	radian/sec
Inductance , $L = 2.0891 \times 10^{-16}$	L	L/k	Henry
Capacitance , $C = 3.12812 \times 10^{-25}$	C	C/k	Farad
Spectral Wavelength of Line n , λ_n	λ_n	λ_n/k	meter
Energy of Line n , $E_n = nh\nu$	E_n	$k \times E_n$	Joule

Table
Comparison of Properties of Free Particles
Ratio of Free Proton Mass to Free Electron Mass, k = 1836.15

Comparison of Protons and Electrons. Nuclei of atoms are the normal environments of *protons*. In contrast, the most common environment of *electrons* is the outer shells of atoms where electrons are more loosely bound to the atom.

These environment differences for protons and electrons in atoms lead to important differences in events, processes, and properties associated with each particle. Thus, protons are especially important for *nuclear concepts*, while electrons are important for *atomic and molecular concepts*.

Quantum Model of the Proton. The Standard Model of Elementary Particles depicts protons in a very different way. A “News Focus” article in Science¹ describes a sequence of five proton models beginning “with the proton discovered by Ernest Rutherford in 1919.”

- 1. 1919 Elementary Particle.** “an indivisible basic building block of matter.” “Experiments in the 1930s revealed that the proton was more than an infinitesimally small ‘point-charge’: it had a finite size and presumably some kind of structure.”
- 2. 1960s Quark Model.** “a bewildering array of particles related to the proton, whose properties cried out for an explanation in terms of more fundamental building blocks.... Murray Gell-Mann and George Zweig... proposed that fundamental particles called quarks make up protons, neutrons, and the short-lived mesons. Protons and neutrons contain three quarks each, and mesons a quark and an anti-quark....”
- 3. 1970s Gluons and QCD.** By the 1970s, there were more “particles” (tracks and bursts of energy) created in collider experiments. Some of these particles, called *bosons*, were thought suitable to serve as force carriers that traveled between quarks in order to bind the quarks in protons and neutrons. “The theory later found to govern these quarks and their interactions was dubbed quantum chromodynamics (QCD), now part of the Standard Model by which physicists understand [sic] the subnuclear world.”
- 4. 1990s Quark Sea.** “Experiments at CERN in the early 1970s probing protons with ghostly particles called neutrinos revealed the presence of antiquarks along with the three valence quarks.... The gluons exchanged by the valence quarks have a tendency to split spontaneously into more

Standard Model

“Proton puzzle puts physicists in a whirl”

“The more deeply particle physicists probe the proton’s structure, the more complicated it seems to get. The latest experimental result to spur theorists into a flurry of speculation concerns the proton’s spin, which is the source of its magnetism. This experiment suggests that very little—perhaps none—of the proton’s spin comes from the spins of the quarks that are thought to make up a proton. The result raises serious questions about how the proton is put together....”

“The proton has a very well-defined value for spin, but its got a lot of internal structure.... The question is how the individual bits and pieces of that structure add up to the proton’s spin.”
[Science News, p. 215, 4/8/89]

gluons or quark-antiquark pairs, creating a lively ‘soup’ made up of a seemingly infinite number of particles. ‘The valence quarks excite from the neighboring vacuum a dynamic ‘sea’ of short-lived gluons and quark-antiquark pairs....’ ‘Past experiments have shown that a major part of the proton’s momentum is carried by sea quarks and gluons....’”

- 5. 1990s Proposed Meson Cloud Model.** This model expands the *power of particles* to create other particles: “...valence quarks naturally throw off gluons having a smaller momentum than themselves, and these gluons in turn spark quark-antiquark pairs having still smaller momenta, and so on down the line....” “[Gluons] just prefer to split into each other,’ says Stirling. With each split sharing the parent’s momentum between the daughters, the result according to QCD is a burgeoning population of low-momentum gluons....” “...there are more antidown than antiup quarks in the proton.... The antidown-antiup imbalance ‘is telling us something vitally important about the... structure of the [proton]....’ Thomas has proposed an explanation for this imbalance, called the meson cloud model, in which the proton fluctuates between being a pure proton and a mixture of a neutron plus a positively charged pi meson, and several other overlapping particle combinations allowed by quantum theory....”¹

Following its discovery, the straightforward classical proton model—a simple particle with uncomplicated structure—has been changed into a *quantum particle with power to create a plethora of material particles and force-carrying particles with little regard for causality, conservation of energy, or conservation of momentum* (atomists embrace the hypothesis that massless bosons, such as photons, can exchange momentum):

“Studies in recent years have shown that the proton does not consist merely of three valence quarks, but is stocked with a myriad of gluons plus virtual particles that momentarily pop into and out of existence.”⁹

Validating A Proton Model. Using the Validation Criteria printed in this issue, CSS scientists accept the Spinning Charged Ring Model and reject the Quantum Model of the proton. Agreement with atomists with respect to the proton is impossible, because atomists use a vastly different validation criterion known as *naturalism*. *Atomists insist that their theory and models don’t need to be understood or even be self-consistent* as long as Quantum Theory agrees with experiments. They say, “This is just the way Nature is. We don’t make up these things.”

Richard Feynman urged us to accept the atomists’ theory with (misleading) claims that it “agrees fully with experiment” (as if errors-in-logic are allowed, and some data and validation criteria can be ignored):

“I’m going to describe to you how Nature is—and if you don’t like it, that’s going to get in the way of your understanding it. It’s a problem that physicists have learned to deal with: They’ve learned to realize that whether they like a theory or they don’t like a theory is *not* the essential question. Rather, it is whether or not a theory gives predictions that agree with experiment. It is not a question of

whether a theory is philosophically delightful, or easy to understand, or perfectly reasonable from the point of view of common sense. The theory of quantum electrodynamics describes Nature as absurd from the point of view of common sense. And it agrees fully with experiment. So I hope you can accept Nature as She is—absurd.”¹⁰

[Feynman, who is widely recognized by his peers as the most skilled physicist of the Twentieth Century, was eager to elevate Nature to the level of Sovereign of the Universe with a (Cosmic) Mind of Her own. Modern atomists embrace the natural, materialistic philosophy of ancient atomists who “used the atomic philosophy mainly to combat religion, not to extend man’s understanding and control of nature.”¹¹]

But neither the recently proposed model of the proton nor its predecessor can be validated by applying the weak criterion of *naturalism* to the debris of smashed particles. As every electronics repairman knows, transient, intermittent events are notoriously difficult to analyze. Even worse, as Thomas states, “We know of no theoretical mechanism which could explain these data.” According to Shaevitz, however, forthcoming data from two Fermilab experiments may contest Thomas’s ideas.¹ Shaevitz has the same attitude as most atomists who insist that more experiments will validate their basic theory, while at the same time insisting that their current theory “agrees fully with experiment.”¹⁰

The Standard Model is built upon many unsupportable *assumptions* and *interpretations* of data collected when particles are smashed together. As the Science article reports, “Stirling feels that, because some physicists cannot count quarks directly but must rely on the debris of collisions, there may be some bias in the way debris from certain collisions rearranges into observable particles.”¹

Those atomists¹² who may now wish to distance themselves from the prevailing popular-consensus approach to particle physics and return to genuine science should abandon the weak assumptions underlying their two basic principles:¹

- **Atomist Principle of Creation.** Nature creates all things. Atomists insist that many things are created by Nature:
 1. the Cosmic Egg that caused the Big Bang;
 2. evolution of elementary particles and force laws;
 3. “virtual particles [in protons and neutrons] that momentarily pop into and out of existence”;⁹
 4. virtual particles in empty space that momentarily pop into and out of existence (“zero-point energy fluctuations”); and,
 5. an ever-increasing number of invisible parallel universes.

None of these “creations” have been observed, and serious scientists should not claim these predictions of their theory “agree fully with experiment.”

- **Atomist Principle of Processes.** Nature controls all things. Atomists see the self-energizing universe of their creation principle as governed by a fundamental *law of chance* formally known as the Heisenberg Uncertainty Principle (a false principle that disagrees with empirical data in numerous cases¹³). Without verifiable evidence, atomists offer examples of spontaneous atomic events such as:
 1. random and spontaneous emission of force-carrying photons by electrons;
 2. force-carrying gluons that randomly travel between quarks;
 3. a “dynamic sea of short-lived gluons and quark-antiquark pairs”¹ inside protons; and,
 4. the short lifetime of hundreds of “particles” created in collider experiments.

Even macroscopic effects that apply to aggregates of matter and follow the *law of cause and effect* are considered as the summation of forces—from all force-carrying particles—that are calculated using the statistics of (imagined) random events. To an atomist, the combined effect of the random motion of bosons, the force carrying particles, **only appears** to be a process in accordance with the *law of cause and effect*.

The remarkable power ascribed to Nature by modern atomists is nothing other than that power attributed to the atom by ancient atomists. The materialist philosophy is well-described by a modern student of the ancient atomists who wrote:

“Thus, the inherent **power of the atom** to move by its own weight plus its equally inherent power to swerve from its normal path, plus its power to cling together with other atoms both like and unlike itself, plus the law of chance, can and do of and by themselves, *without the intervention of any outside force or guiding intelligence*, account for every form of being that can be observed by one or another of our senses. The disciplined observation of the sensible world will reveal to us with accuracy and truth the nature of **every phenomenon** that occurs or may occur anywhere in the universe.”¹⁴ [emphasis added]

This writer does not anticipate that atomists will reform their methods for ascertaining *reality* but expects to see a continuation of the meandering debates on the inconsistencies of Quantum Theory and atomists’ confusion in understanding reality. Common Sense Science offers a comprehensive and fundamentally different approach to particle physics based on the principles of *reality, causality, and unity* that will replace the populist-based physics of the Twentieth Century. Our approach is demonstrably superior, because it proceeds by the *methods of science* and has a legitimate claim to the use of this phrase.

Summary. The Ring Model of the proton is a *scientific* model developed and evaluated by following the Scientific Method. Although the Standard Model of Elementary Particles has continually changed over the last several decades, it has never been validated by scientific criteria but retains its existence only by the proclamations of self-declared “scientists” who depend upon reputation more than science to perpetuate atomistic philosophy. ♦

References.

1. _____, "News Focus, Exploring the Proton Sea," **Science**, Vol. 283, 22 January 1999.
2. Bernard Pullman, **The Atom in the History of Human Thought**, pp. 259,260, Oxford University Press, 1998.
3. R. D. Evans, **The Atomic Nucleus**, pp. 140, 149, McGraw-Hill, NY, 1955.
4. David L. Bergman, "Spinning Charged Ring Model of Elementary Particles," **Galilean Electrodynamics**, Vol. 2, No. 2, pp. 30-32, March/April 1991.
5. David L. Bergman and J. Paul Wesley, "Spinning Charged Ring Model of Electron Yielding Anomalous Magnetic Moment," **Galilean Electrodynamics**, Vol. 1, No. 5, pp. 63-67, Sept./Oct. 1990.
6. David L. Bergman, "New Spinning Ring Model of the Electron," **Proceedings of the 1992 Twin Cities Creation Conference**, pp. 70-75, TCCSA, Minneapolis, Minnesota.
7. David L. Bergman, "The Stable Elementary Particles," **Proceedings of the 1992 Twin Cities Creation Conference**, pp. 76-79, TCCSA, Minneapolis, Minnesota.
8. David L. Bergman, "Historical Models of the Electron," **Foundations of Science**, Vol. 2, No. 4, Nov. 1999.
9. _____, "Physics News in 1996, A Supplement to APS News," The American Physical Society, Vol. 6, No. 5, May 1997.
10. Richard P. Feynman, **QED, The Strange Theory of Light and Matter**, p. 10, Princeton University Press, Princeton, NJ, 1985.
11. Stephen F. Mason, **A History of the Sciences**, p. 62, Macmillan Publishing Co., NY, 1962.
12. David L. Bergman, "Conflict of Atomism and Creationism in History," **Proceedings of the Fourth International Conference on Creationism**, pp. 53-66, Creation Science Fellowship, Inc., Pittsburgh, PA, 1998.
13. J. P. Wesley, **Classical Quantum Theory**, pp. 152-165, Benjamin Wesley – Publisher, Weiherdammstrasse 24, 78176 Blumberg, Germany, 1996.
14. Frank O. Copley, Introduction to **Lucretius, The Nature of Things**, p. xii, W. W. Norton & Company, New York, London, 1977.