Triad Helium Nucleus

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This paper contrasts the Spinning Ring Model (Bergman/Lucas) with the Standard Model (Bohr/Einstein) of the Helium Atom. It discusses the dimensions of the electron, a redefinition of the neutron as a triad made up of two protons and one electron, the relationship of both in the nucleus, and the electric and magnetic forces that hold the nucleus together. (From Chapter 6 of **Design Vs. Chaos**, Russ McGlenn, 2004)

1. Introduction

Scientists believe that atoms are made up of smaller and smaller sub atomic particles, and classical physics should be able to explain by cause-and-effect what holds the particles together in a structured way to create matter. Three possibilities have been considered. The first two apply only to the nucleus, while the last one has possibilities for holding electrons in place around the nucleus.

1. **Strong nuclear force.** This force is assumed to bind protons and neutrons in the nucleus of an atom. It was invented to hold atoms together, but it exists only in nuclei and does not follow the inverse square law of other forces.
2. **Weak nuclear force.** This is the second force assumed to work in atoms. The weak force is supposed to break particles apart and never hold them together!
3. **Electromagnetism.** This is a combination of magnetism and electricity. It depends upon the distance and velocity of charged particles. It is a fundamental physical force that is responsible for interactions between charged particles such as electrons and protons.
   [A common misconception is that Gravity holds the atom together. This is the weakest force in the universe. Gravity cannot hold the electron in place around the nucleus and it cannot hold the proton and neutron together in the nucleus.]

2. Which Force Is the Best Candidate?

The following quotation states that, in the Bohr model, electrical charge is not enough to hold the atom together. This quote is a challenge to Newton's laws of motion, Maxwell's electromagnetic theory, and the spinning-ring model of the atom.

> The mass of a nucleus has been observed to be less than the sum of its constituent neutron and proton masses by a small amount that is known as the binding energy. *This mass difference is impossible to understand if only the action of electrical forces between nucleons (protons and neutrons) is considered. Such forces, which cause particles of the same charge to repel each other, would drive the protons apart. Some attractive force must also exist to bind the nucleus together.* [This is where electromagnetism solves the problem.] The small size of the nucleus compared to that of the entire atom indicates that this attractive force, which is called the strong interaction, must have an extremely short range not larger than the nucleus itself." (*Compton's Encyclopedia* Version 3.00, s.v. "nuclear physics," emphasis mine)

Lucas and Bergman show that, based on Classical Physics, electromagnetic forces will hold the atom together. Everything Lucas and Bergman used to construct their model of the electron and atom has been researched and described in college physics textbooks for nearly 100 years, but was never brought together in one theory to explain the atom. It is a truth that has been hidden by the popularity of Relativity and Quantum Theory.

When the charge of the spinning ring moves at the speed of light, the electrical force on the surface of the electron increases the thickness of the ring (based upon Coulomb's law), while the magnetic force caused by the spinning of the electrical field causes a compression of the ring (based upon Ampère's law) (Figure 5.9). When the electric and magnetic forces are in perfect balance, a stable, spinning ring is created—forming the basic building block of all matter. If the Coulomb force increases, the atom explodes. If the ampere force increases, the atom collapses.

3. Scientifically Proven Properties of the Electron

Table 6.1 lists properties of the electron observed through many laboratory experiments. From these properties, found empirically, Lucas and Bergman built a model of the atom using Faraday's and Maxwell's electromagnetic-field theory (which accounts for Newton's three Laws of Motion). These properties are demonstrated to be the result of electromagnetic forces working in the spinning-ring model of the atom. The proof of a model's ability to represent the atom is whether accurate predictions can be made from it. The spinning-ring model has "correctly predicted features of the periodic table of elements and the spins of all 1,500 nuclides that have been measured" (Bergman, Physical Models, 1997, p. 3).

Table 6.1, though technical, is presented to show that the electron is now a well researched and described, three-dimensional particle. The spinning-ring model takes all the data and builds a visual picture based on known laws of science and mathematical equations. This is a derived model, calculated mathematically and based upon laboratory observations. Every feature of the model is consistent with every other feature. The model is logical, self-consistent, and consistent with experimental measurements of the electron's properties.

The Bohr model and others put forth in the past made up mathematical equations and tried to force the data into the equation instead of the model. This did not work well, and even more complex theories and assumptions had to be made to make the

Bohr model work. We end up with theories to explain why the theories don't work.

Occam's Razor is a philosophical principle that says the simplest explanation is probably the correct explanation. The spinning-ring model of the atom is much simpler than the Bohr model and fits Occam's Razor very well.

	Characteristic	Dimensions	SI Units
1	Charge, *e*	1.60218×10^{-19}	Coulomb (Ch.deCoulomb)
2	Mass, *m*	9.10953×10^{-31}	Kilogram
3	Magnetic mom.	-9.2848×10^{-24}	Current ampere meter
4	Radius, *R*	3.86607×10^{-13}	Meter
5	Shape, Ln (*R*/*r*)	429.931	–
6	Rim speed, *c*	Speed of light	Meters/second
7	Rotation, ω	7.75445×10^{20}	Rad/second
8	Current, *I*	-19.773	Amp (Andre M. Ampère)
9	Capacitance, *C*	3.1281×10^{-25}	Farad (Michael Faraday)
10	Inductance, *L*	2.0891×10^{-19}	Henry (Joseph Henry)
11	Magnetic flux, Φ	-4.1309×10^{-15}	Weber (Wilhelm Weber)
12	Static energy	4.10312×10^{-14}	Joule (James Joule)
13	Magnetic energ	4.08412×10^{-14}	Joule (James Joule)

Table 6.1—Properties of the Free Electron

4. How the Electron is Held in Place Around the Nucleus

We have already seen that electromagnetism is the best candidate for the binding force within the atom. The charge making up each electron and proton rotates at high speed, creating a corresponding magnetic field. This field, called magnetic flux, is non-moving static energy (called magnetostatic by James Clerk Maxwell). The electron's magnetic flux either links with or opposes the proton's flux. North poles couple with south poles—like two bar magnets that pull together when opposites attract—or push apart when similar poles are brought together. (Figures 6.1 and 6.2).

Hydrogen provides a simple example of this mechanism (Figure 6.3). The hydrogen molecule is a balanced combination of electric attraction (electron attracted to the proton), electric repulsion (electron repelling electron, proton repelling proton) and magnetic attraction (north poles coupling with south poles), and magnetic repulsion (north against north, south repelling south). This combination of forces determines the allowable stable positions of each electron and proton in any atom, whether within the nucleus or around it.

In the spinning-ring model, the dominating force holding particles in their relative positions is the magnetic force. In his model, Joseph Lucas ignores the electric force assuming it does not contribute significantly to the positioning of the particles within the atom. The coupling of magnetic lines of force is what dominates positioning.

The Common Sense Science Team developed a computer simulation of the hydrogen molecule and showed that the molecule is stable. All the forces combine to place both electrons and both protons in their positions in the molecule and keep them there. Another simulation is being developed to discover the exact geometries for other atoms and molecules.

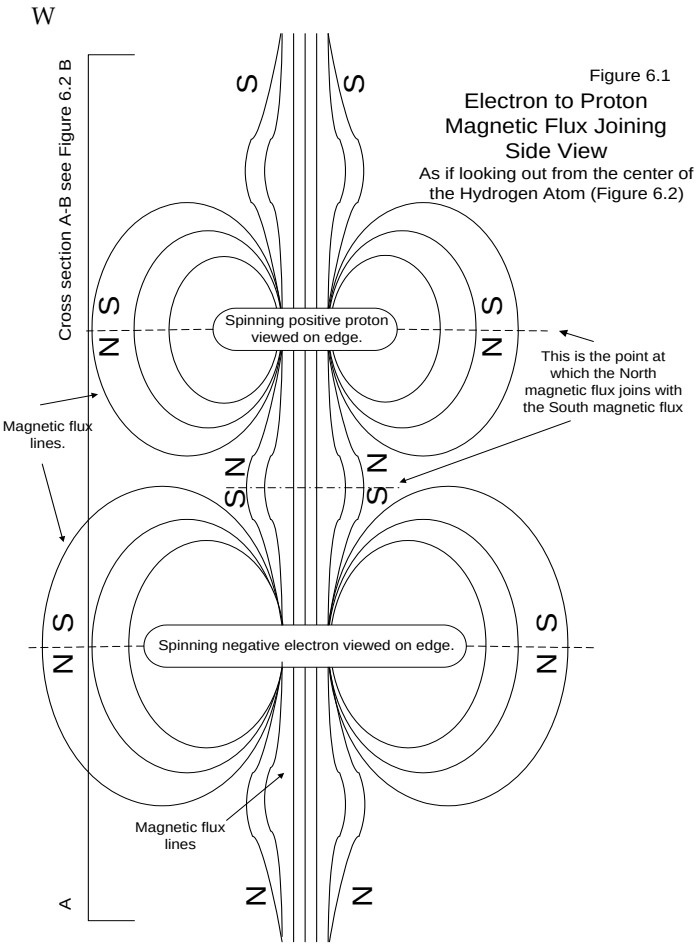
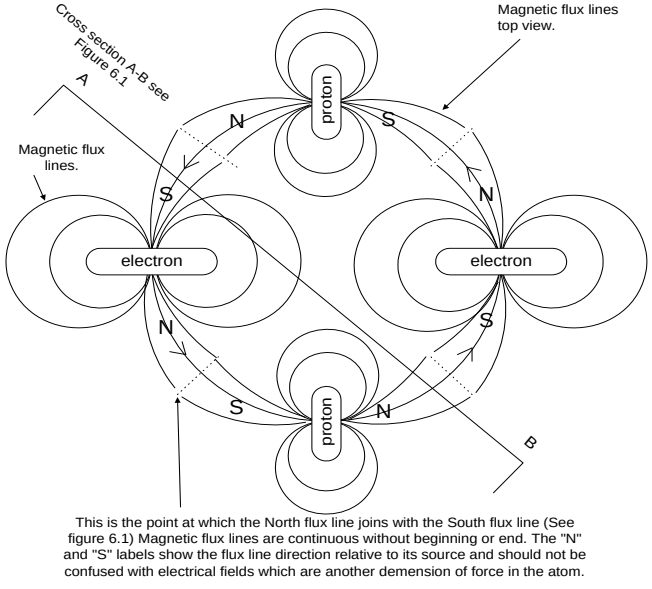


Figure 6.1
Electron to Proton Magnetic Flux Joining Side View
As if looking out from the center of the Hydrogen Atom (Figure 6.2)



Magnetic Flux Lines Top View
Hydrogen Molecule
Figure 6.2

Hydrogen Molecule
spinning-ring model

Figure 6.3

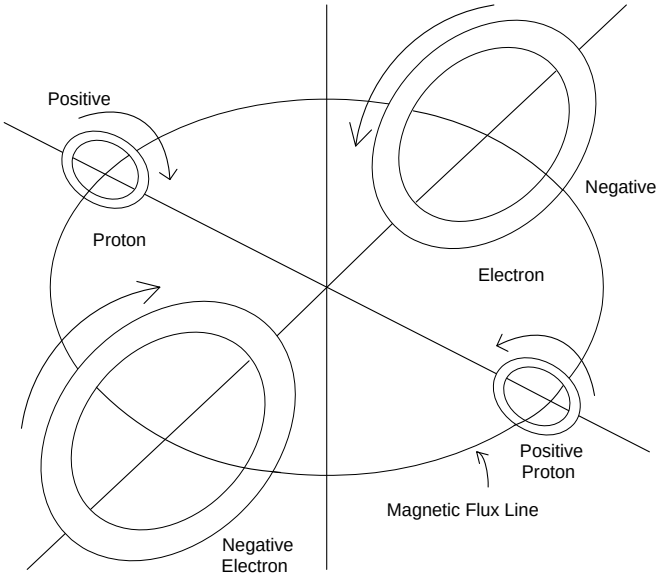
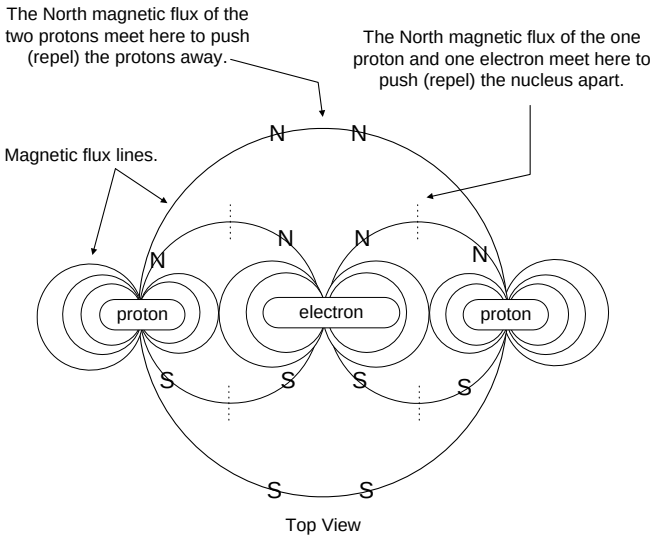


Figure 6.4

The nucleus is made up of one or more triads of 1 electron and 2 protons. One triad is shown here. The electron is in the center and the two protons are around the outside. Not shown here, but the negative electric charge on the electron is a force of attraction to the positive charge of the protons which compensates for the pushing apart by the magnetic flux. The magnetic flux generates an equally strong force of repulsion.



When the electron and proton's spin velocity is at the speed of light, the triad remains in stable electromagnetic balance to maintain the structure of the nucleus. (not to scale see Figure 5.1)

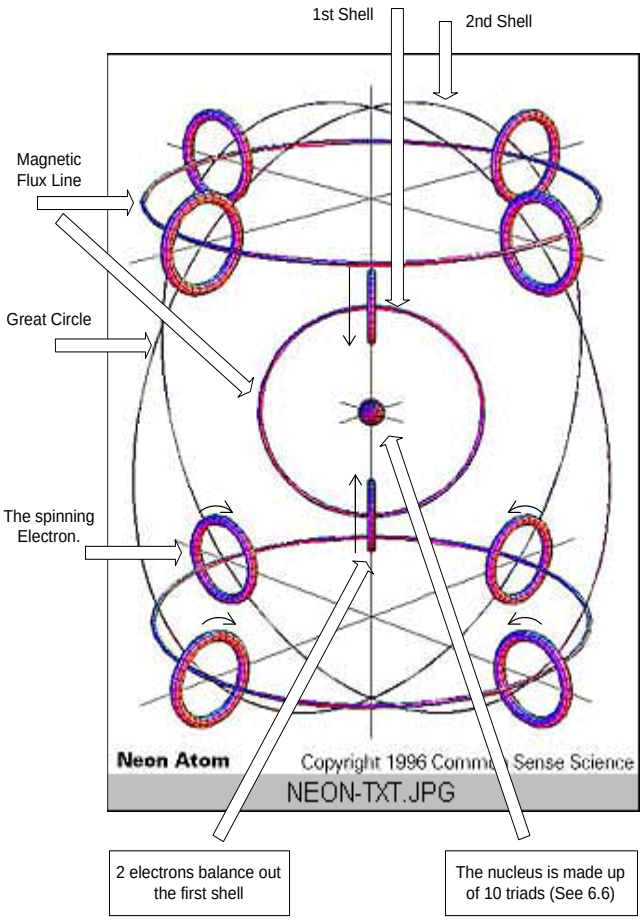
5. Inside the Nucleus

The Bohr model says that the nucleus is comprised of protons and neutrons. When the neutron is knocked out of the atom in a collider chamber, it always breaks up into one proton and one electron.

This led the Common Sense Science Team to propose that so-called neutrons are simply one proton and one electron. The spinning-ring model eliminates the neutron as a separate particle in favor of recognizing that the nucleus is composed of groupings of two protons and one electron bound in place by their electromagnetic fields. These groupings are called triads (Figure 6.4).

Neon Atom

Figure 6.5



6. Which Force Is the Best Candidate?

The nucleus of each atom is surrounded by layers of electrons, called shells (Figure 6.5). These shells are held in specific positions around the nucleus by a combination of electrical attraction (toward the protons collected in the nucleus) and magnetic coupling. The number of electrons in each shell varies with the atomic number of the element.

The number of shells is largely determined by simple geometric packing, similar to the problem of fitting suitcases in the trunk of your car. The electrons "pack" around the nucleus wherever they will fit in most easily. This is the same concept that is

involved when we see water flow downhill until it cannot go down anymore and pools in a lake or ocean.

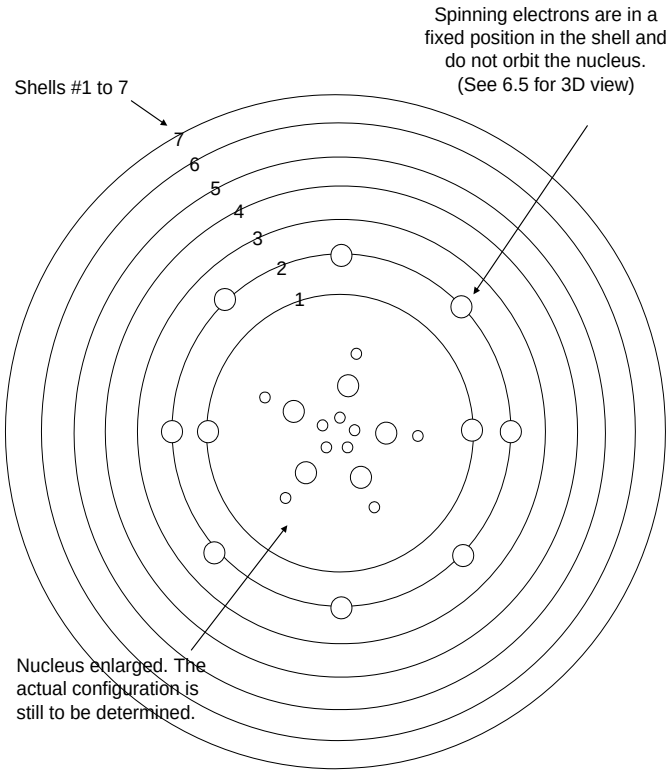
There can be up to seven shells in the largest atom (Figure 6.6). After the seventh shell, the binding power of the electromagnetic fields is too weak to hold further shells. Common Sense Science gives a causal explanation for the limit of seven shells, based on Maxwell's use of Newton's inverse square law of gravity applied to magnetic force (Bergman, Physical Models, 1997, pp. 14–15). This means that the electromagnetic force of the nucleus can only reach out and hold electrons as far away as the seventh shell.

7. What Holds the Nucleus Inside the First Shell?

According to Bergman's derivations, free protons are more than 1,836 times smaller than free electrons in diameter (Figure 5.1). If the proton were the size of a golf ball, the electron would be the size of a Ferris wheel. The proton has the same quantity of charge as the electron, but it is squeezed into a much smaller volume. This gives the proton a greater charge density, which in turn gives it more mass.

Atomic Shells Figure 6.6

The atom can have up to seven shells. The first two shells and nucleus below represent the neon atom. There are 10 electrons in the shells and 10 triads in the nucleus with a possible arrangement of two groups of five one group stacked above the other.



Higher charge density yields higher magnetic and electrical field density in the area close to the charge itself. Moving the charged energy around results in higher feedback forces, which we sense physically as being more massive, or harder to move. Remember, mass is not weight, but is the tendency of an object to remain either at rest or in motion. The higher the magnetic energy, the more the object will resist being moved. Once moving, the more it will resist being stopped.

The principle of geometric packing applies to the nucleus also. Electrons in the nucleus are compressed by forces from nearby particles. Electrons are still larger than protons even when this occurs (See Figure 5.1). The smaller size and greater mass of the proton allows it to not only pack closer together, but also creates a stronger magnetic force. This is what binds protons and electrons together to form a nucleus.

Depending on the arrangement of electrons and protons in the nucleus, certain forces of attraction and repulsion occur. These magnetic and electrical forces work together to form a stable, though "springy" arrangement. The characteristic of "springiness" is important, as it allows the atom to absorb and store energy. If the atom's parts were rigidly fixed, it could not do this.

In the same way, atoms need to expand or contract to receive or give off energy. As more particles (protons in particular) are added to form heavier and heavier elements, the protons will pack as closely as their field strengths and geometries will permit.

Electrons outside of the nucleus are attracted to the protons because of their opposite charge, and pack as closely as possible around the nucleus. Here, around the nucleus, electrons are much bigger and so cannot pack as tightly. Because of lack of room, some electrons remain on the outside and form groupings that we recognize as shells. In order to balance the electric and magnetic forces in the atom, the number of electrons around the outside shells is equal to one-half the number of protons packed in the nucleus.

An example of this mechanism is like trying to pack four girls and four boys into a Volkswagen. First we pack four girls (representing positively charged protons) and two boys (representing larger, negatively charged electrons) into the car. The last two boys would not fit inside the car. Because of their attraction to two of the girls inside, they would ride the front and back bumpers outside the car (representing the electrons in the first outer shell). This is an example of how the packing principle works in the helium atom. (Figure 6.8)

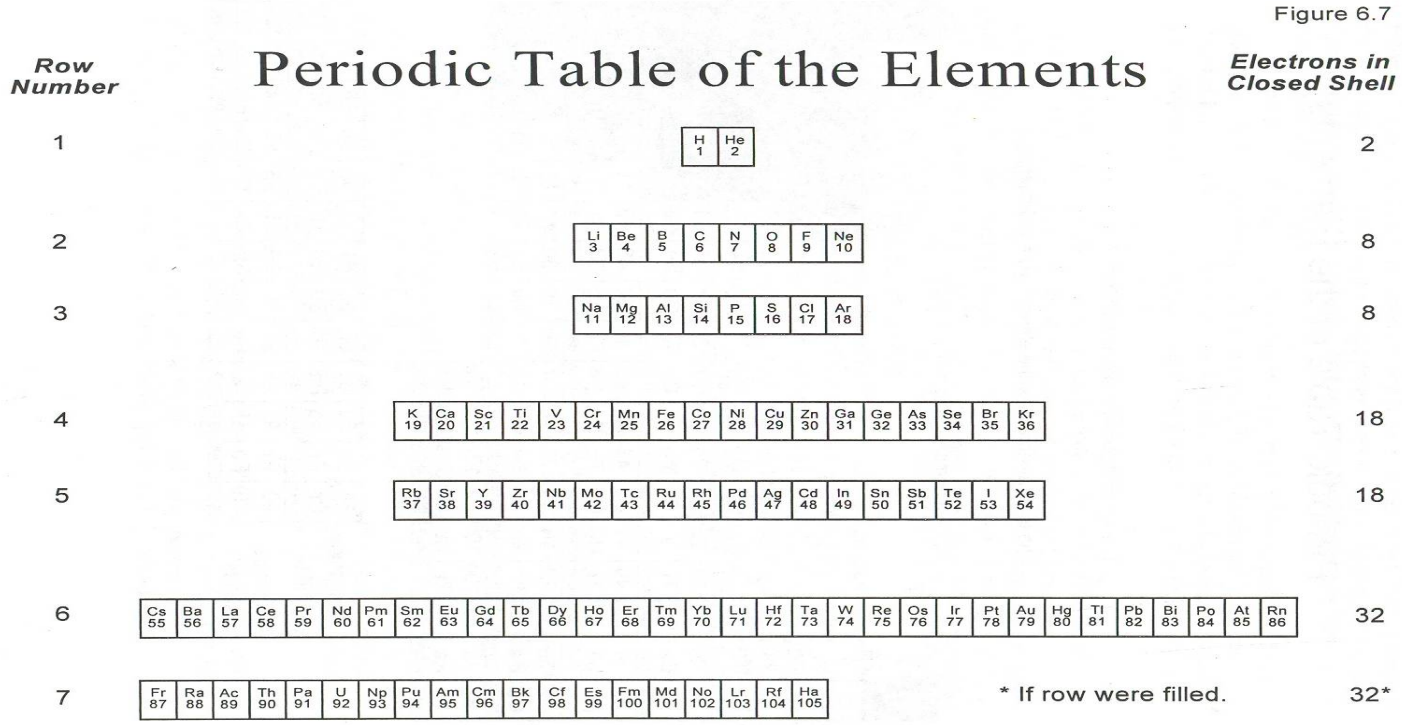
8. Atomic Numbers

In the past, the atomic number for any element was defined as the number of protons in the nucleus. This was based on the assumption of the existence of separate particles called neutrons. With the exception of hydrogen which has no nucleus, the spinning-ring model shows that all nuclei are made up of triads containing one electron and two protons each. This gives the new model twice as many protons as was earlier assumed.

We have already learned that the total number of electrons in all shells for a given element is equal to the total number of triads in the nucleus (Bergman, pers. com., February 23, 2000). Therefore, the definition of the atomic number under the spinning-ring model is the number of electrons in the outer shells. The Bohr model only recognized half the protons in the nucleus (a number equal to the number of electrons in the outer shells). Thus, the actual *atomic number* does not change with the new model.

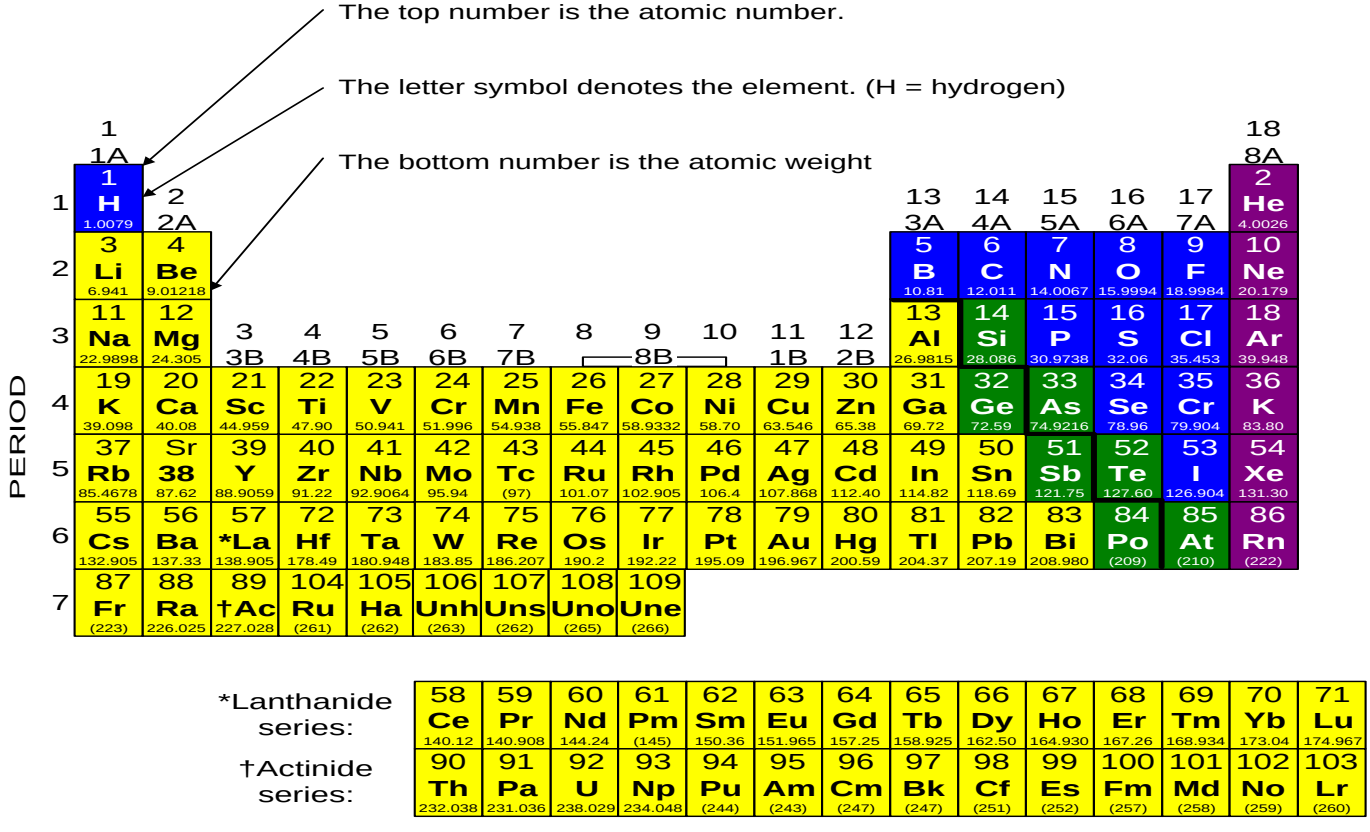
Elementary atoms range from helium (He) with the atomic number 2 (two shell electrons and two triads in the nucleus) to uranium, with the atomic number 92 (92 shell electrons and 92 triads in the nucleus). Some scientists claim to have made heavier atoms, but these man-made atoms only last a few seconds and they are beyond the scope of this book.

Figure 6.7



Periodic Table of the Elements

Figure 6.7b



9. The Periodic Table

In the early 1800s, scientists began to see that some elements had similar characteristics which formed groups based on their chemical properties. About 1870, scientists in Germany and Russia discovered that similarities tended to be greatest between elements whose atomic numbers were close together.

This tendency is called the Periodic Law, and its discovery led to the development of the Periodic Table (Figure 6.7b). The Periodic Table lists all the known elements grouped according to their atomic numbers and chemical properties. The Periodic Table was derived primarily by experimental observations and measurements. It represents a descriptive layout for convenience, primarily with respect to chemical reactions.

At this time the spinning-ring model of the atom does not change the Periodic Table. What the spinning-ring model does is give a cause-and-effect explanation for the arrangement of the periodic table. The revised Periodic Table shows the relationship of the seven possible shells for the elements in Figure 6.7. (Bergman, *Physical Models*, 1998, p. 15).

10. Magic Numbers

The number of electrons that can fit into a closed shell is shown in Figure 6.7. "Magic numbers" are the sum of electrons of complete shell sizes and the atomic magic numbers are 2, 10, 18, 36, 54, 86, and 118. Note that "magic numbers" are different from shell sizes. Quantum theorists know the "magic numbers" exist, but have no explanation for them. The Common Sense scientists have provided a logical, classical-physics answer for why there is this arrangement of numbers, based on the geometrical packing mechanism described earlier.

Even the term "magic number" is based on the incorrect Bohr model and the random-chance factor of the Heisenberg Uncertainty Principle. There is a logical reason for these numbers and I propose that these numbers be called "design numbers" to show there is a cause for their existence.

11. Why Hydrogen is Unique

Each element consists of a specific number of atomic particles—normally protons or electrons in the nucleus and electrons in outer atomic shells. Bohr-model theorists believe that the hydrogen atom is made of one electron and one proton—but such an atom does not exist in nature. Hydrogen molecules, which are found in nature, each have two electrons and two protons. And not one of these particles is in the center of the molecule. *Hydrogen is the only element that has no nucleus.*

Hydrogen only exists in structures made of two protons and two electrons, which they believe is a group of two hydrogen atoms. However, when these two atoms are separated, they immediately ionize (lose their electrons). This is because the combination of one electron and one proton does not have the proper magnetic force to create a stable structure, and is why so-called single hydrogen "atoms" cannot exist alone in nature.

This is also the reason why a nucleus, made of one electron and two protons must be a triad. The minimum stable atomic structure is two protons and two electrons—in other words, a *hydrogen molecule*. This combination creates the magnetic fields necessary to hold the hydrogen molecule together.

12. A Need for Further Research

Helium, the next stable structure in the periodic table, consists of eight particles that are tightly and compactly bound together because helium is a noble gas that is chemically inert. Both of these terms mean that the element is extremely stable and does not readily deteriorate or combine with other elements. See Figures 6.8 and 6.9 for a contrast between the two models of the helium atom.

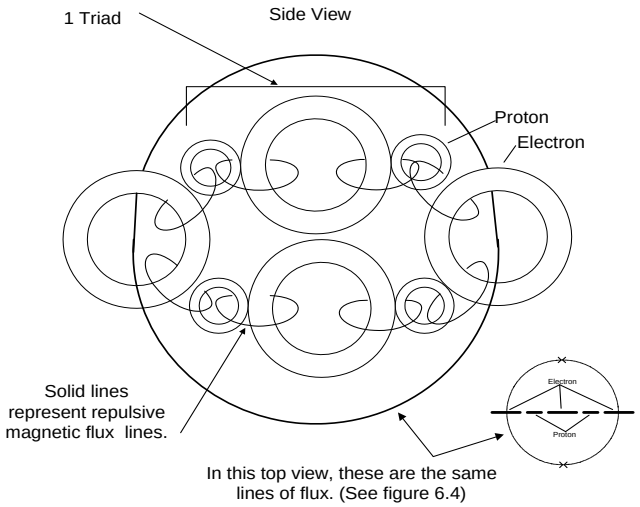
Helium — Figure 6.8

Spinning Ring Model

Assumption:

Spinning-Ring Model - There are only two basic particles in an atom: electrons and protons. The forces holding the atom together are the result of the interaction of electrical and magnetic forces. This diagram deals only with the magnetic force. The configuration of the Helium atom is shown tentatively below. The actual configuration is the subject of continuing research by the Common Sense Science team.

The Bohr Model shows Helium made up of 2 protons and 2 neutrons in the nucleus with 2 electrons in the first shell. However, when neutrons are knocked out of the nucleus they separate into 1 electron and 1 proton. In the Spinning-Ring Model, we combine these two particles with the original proton and redefine the nucleus this way: The nucleus of the helium atom is composed of 2 triads. Triads are composed of 2 protons and 1 electron bound by electromagnetism. (See figure 6.4)



As you ascend the periodic chart numerically, adding particle count, the geometries begin to develop patterns defined by the size of the particles and the possibilities for balanced electrical and magnetic repulsion and attraction. These patterns are exhibited by the formation of nuclei. The nuclei are made of triads, and the triads are made of two protons and one electron. Surrounding the nuclei are "shells" of electrons coupled together magnetically and held close to the nucleus by the electrical attraction of the protons.

13. To Be Continued

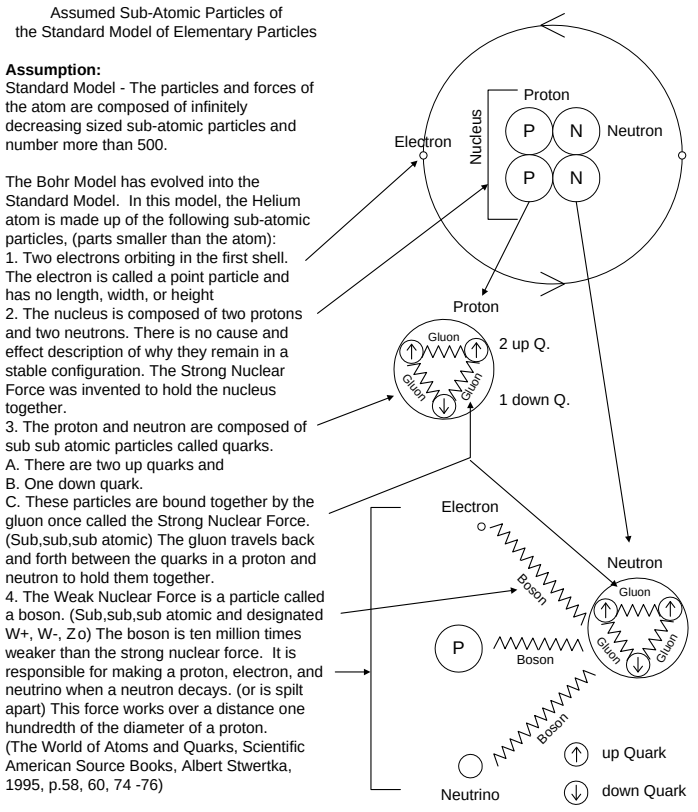
Developing a basic understanding of the electron and using it to "assemble" a model of the atom is in the early stages of research. Some of the material presented in this paper may be revised as research continues. As the work progresses, it is an exciting and open field of discovery and adventure for physics majors who would like to get involved.

In the process of development of the spinning-ring model, hypotheses must be advanced and then falsified by the research data. This takes much time, energy, and of course, money. One goal of this book is to get the information to students who will see the need for this new atomic model and turn their careers toward physics.

Helium

Figure 6.9

Bohr Model with recent additions. Contrast this with the Spinning Ring Model.



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