Perspectives on the Atom
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Introduction

The workings of atoms can be described by "classical" and "modern" models. The classical model, originated by William Thomson (Lord Kelvin), considered that atoms were knots of swirling vortices in a fluid that was the æther. The swirling vortices were what we recognize today as electron motion. This classical model is seen as inadequate by contemporary mainstream physics, which has vanquished the aether and replaced the classical model with a modern "Standard Model of Particle Physics" (SMPP) theory, which addresses not only electrons (quantum electrodynamics QED) but also the contents of the atomic nucleus (quantum chromodynamics QCD) in terms of "particles".

There is still some basis of support for the classical (vortex) model.

This paper looks briefly at different perspectives on the electron and atom.

Classical Theory: The Vortex Particle Model

"Vortex" ideas of particles in natural philosophy were explored in the 17th century by Kepler, Descartes, Leibniz, and Huygens, in the 18th by Swedenborg and Boeković, and in the 19th by Ampere, Fresnel, Kelvin, Rankine, Tait, and many others.

Ampere visualized the ultimate particles as tiny electrical circuits. [1]

In 1867, after observing Scottish physicist Peter Tait's experiments involving smoke rings, William Thomson (Lord Kelvin) concluded that atoms were knots of swirling vortices in a fluid that was the æther, and developed a vortex theory of atoms.

Tait subsequently began listing unique knots in the belief that he was creating a table of elements. He formulated what are now known as the Tait conjectures on alternating knots, which were proved in the 1990s. Tait's knot tables were subsequently improved upon by C. N. Little and Thomas Kirkman.

Tait's experiments were inspired by Helmholtz's work on vortex-rings in incompressible fluids.

When the *luminiferous æther* fluid was not detected in the Michelson–Morley experiment of 1887, vortex theory went out of vogue. [2]

In 1915, an English visiting graduate student at Harvard, Alfred L. Parson, presented a model of the electron, the "magneton", as a toroidal magnetic circuit. Parson intended to improve on Bohr's famous 1913 model of the atom, which depicted electrons as circulating point charges, by "smearing" the charge around the entire circuit. [3]

Since "Classical" atomic theory did not concern itself with the contents of the atomic nucleus, in essence, Parson's Magneton theory of an electron was a theory in support of a vortex theory of atoms.

Modern Electron Theory: The Particle Wave Model: our experience or reality?

Quantum mechanics shows that small particles also exhibit wave characteristics.[4]

De Broglie's explanation of the Bohr atom quantization rules, together with the accidental discovery of electron diffraction scattering by Davisson and Germer, make a very convincing case for the wave nature of the electron.

Yet the electron certainly behaves at times like a particle.

It appears to have a definite mass, is associated with a definite charge, and can travel through a piece of apparatus from a gun to a screen where its effects can be observed.

Experiments suggest that the electron "is" a particle. In 1920, Otto Stern and Walter Gerlach designed an experiment, which unintentionally led to the discovery that electrons have their own individual, continuous spin even as they move along their orbital of an atom. Silver was put in an oven and vaporized. The result was that silver atoms formed a beam that passed through a magnetic field in which it split in two. An explanation of this is that an electron has a magnetic field due to its spin. [5]

However, the electron is certainly not a particle in the traditional sense, as it cannot be restricted to a geometric point in space. It cannot be directly observed [6] and is best defined spatially as most likely being in certain regions of space called orbitals,[7] around the central nucleus. [8]

The atomic orbital model is also known as the electron cloud or wave mechanics model.
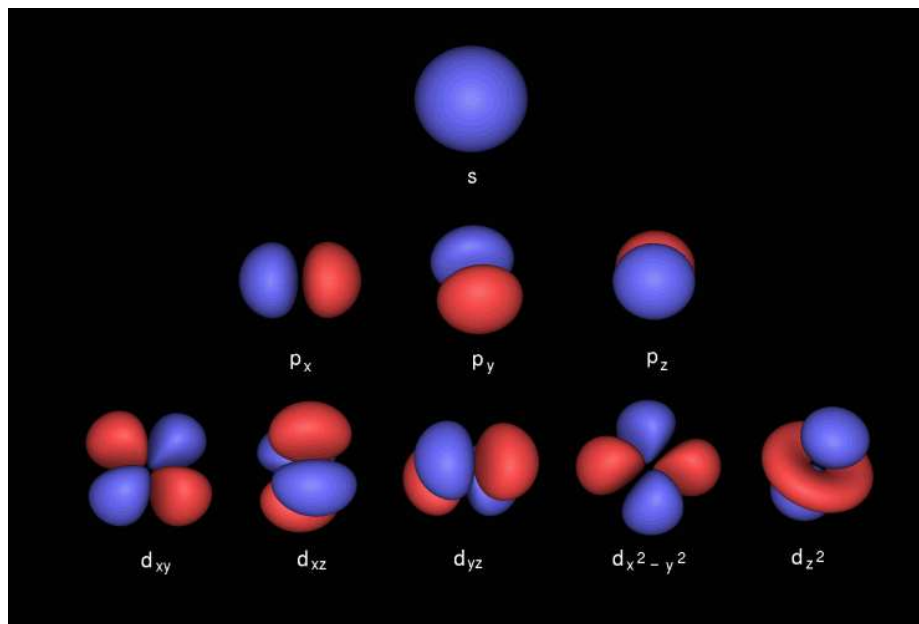
The fundamental orbitals
Image from:

Where a quantum mechanical particle is bound, it must be localized as a wave packet, and the existence of the packet and its minimum size implies a spread and minimal value in particle wavelength, and thus also momentum and energy. [9]

The founders of quantum mechanics cautioned against thinking of the electron as either a particle or wave. Bohr argued that wave particle duality is conceptual; that it reflects a fundamental feature of human thinking, a limit of our conceptual ability.

Modern Theory: The SMPP
Bohr, Heisenberg and Pauli argued against Einstein, de Broglio and Viennese physicist Schroedinger, insisting that the object of scientific knowledge is not reality, which is a metaphysical concept, but experience. Ernst Mach is the recognized founder of this view, and especially attacked the idea that the atomic theory meant that atoms were "real." Mainstream physics enthusiastically ignored Mach as well as the founders of quantum mechanics in embracing the SMPP as "reality". [10]

Looking inside the atomic nucleus, the current SMPP finds many "fundamental particles", including various quarks, leptons, and gluons. The exact number appears to depend upon who is consulted,[11] and when.

Classification is an issue in science in general and in particle physics in particular. In the 1960s, particle accelerators had created in their collisions 200 "elementary particles". [12]

How do you classify them? Murray Gell-Mann and Yuval Ne'eman: organized particles into 8 families (the 8 fold way). This was replaced by quantum chromo-dynamics, where all particles are described by assuming six quarks and anti-quarks. Is the 8 fold way artificial or natural? Are quarks artificial or natural, or are they both just a way to classify? [13]

One instructor at the University of Oregon quotes the Encyclopedia Britannica: "The hypothesis of the existence of immutable elementary particles has been abandoned: elementary particles can be transformed into radiation and vice versa. And when they combine into greater units, the particles do not necessarily preserve their identity; they can be absorbed into a greater whole." [14]

It was already recognized in the 1930s that if we make an observation of an elementary particle at Fermilab, using special highly technical equipment [made for seeing particles], and we are making a scientific observation that will go towards making a scientific explanation, that explanation is infected by the theory we are using to generate the observation. [put anther way: we have a theory that matter is particles, so we construct a machine that can see particles, which goes a long way towards confirming our theory that we will see particles] [15]

Andrew Pickering [16] is a very knowledgeable PhD in Physics, who followed the history of elementary particle physics since World War II. In his book *Constructing Quarks: A Sociological History of Particle Physics (1984)*[17] he argues that the experimental data supporting the notion of "quarks" is intrinsically equivocal, and that theory dominates the data. When you look at the outcome of an experiment with a particle accelerator to get data on which to build your theory of elementary particles, you are already using a theory that tells you what the data means, so there is a kind of circularity associated with the experiment.

When researchers at Fermilab particle accelerator at Batavia Illinois finally identified the top quarks after 12 years, they looked at millions of interactions and announced "these are the top 6 quarks". How did they know that? How did they distinguish between signal and noise? You have to use the theory you are trying to confirm to make sense of the data. To do this you need to make non logical judgments. In a complex instrument, how do you know the results are due to nature rather than the instrument itself? [18] A similar argument might be made regarding the July 4 2012 announcement of the "discovery" of Higgs Boson type particles.

Further, since it has been experimentally proven that the observer's consciousness necessarily effects the results of an experimental outcome, one cannot dis-prove that the "discovered" particles, Quarks, Higgs, etc were created by multiple observers consciousness.

D.L. Hotson argues against the credibility of the SMPP: [19]

According to him, the principle criteria for a successful scientific theory would seem to include:
It should embody as few "entities" as possible;
It should have few adjustable parameters;
It should be mathematically consistent;
It should satisfy all of the known data;
It should obey causality: every effect should have a *proximate* cause, with no "action at a distance.";
It should be falsifiable, making testable predictions;

The author holds that all 6 criteria are violated by the current SMPP. The major problems are that:

SMPP is not simple: by the end of the 20th century, the SMPP called for around thirty-six "fundamental" particles, most with an antiparticle, and each with its very own "field": again almost one hundred separate entities, to generate three entities; the electron, proton, and neutron, which are the building blocks of the 92 elements. (ibid)

SMPP requires 19 adjustable parameters (ibid)

SMPP is not mathematically consistent: (ibid)

The SM calculations of many ordinary values come out to be infinite. To get rid of this "impossible result, "renormalization" is invoked: the positive infinity is, in effect, divided by a negative infinity. Richard Feynman, who originated the "renormalization" process (with Schwinger and Tomonaga), himself called it a ". . . a dippy process!" [20]Asked for

what he had won the Nobel Prize, Feynman replied, "For sweeping them [the infinities] under the rug." [21](ibid)

Gordon Kane [22] notes: "In its basic form, the Standard Theory is a theory for massless particles. All the leptons, quarks, and bosons must be particles without mass, or the mathematical consistency of the theory is destroyed. The photon and the gluons indeed have no mass, but the others do." If values for mass are just inserted into the equations, then calculations start to give infinite values for many ordinary measurements. (ibid)

Rather than account for the mass directly, the SMPP model dredges up yet another subatomic particle, the Higgs Boson, and a new "Higgs" theory, to account for the mass. [23]

The modern view to the problem of the electron mass is that pioneered by Wheeler and Feynman according to which it is not of electromagnetic origin but entirely mechanical. [24]

Cardone et al have their theory of the cause of electron mass. [25]

Alternative Physics Returns to the Vortex Electron Model
Now, in the early years of the 21st century, some physicists have developed an interest in modeling of the electron as a vortex, and returned to Tait's concept of a table of the elements based on vortices.

There appear to be several reasons for doing so. One reason is that particle electrons appear to accelerate without radiating energy. According to the known laws of physics, accelerating charge must radiate, yet in Bohr's famous 1913 model, as in all point particle models, electrons mysteriously accelerate without radiation. According to "worldsci.org/topics/structure", the non-radiation of moving point charge electrons has been swept under the rug by the entrenched authoritarian physics community, or "big physics", with the mantra that quantum physics behaves by a different set of rules than classical physics. A circular, or vortex model of electrons would explain why they normally do not radiate energy.

According to "world science.org", most structuralists now claim that the known properties of "elementary particles" can be determined by the manner in which the various circuits, or vortices, that is, electrons comprising particles, intertwine; that is, by their "knottedness". By applying a set of rules consistently, some structuralists have reproduced not only properties of particles, but hundreds of characteristics throughout the periodic table. [26]

However, according to Cardone et al, classical electron theory (represented by the work of by Abraham, Lorentz and Poincaré) considered the mass of the electron as of purely electromagnetic origin, and the basic flaw of this theory is that it violates the Ernshaw theorem, which states that it is impossible to have a stationary nonneutral charge distribution held together by purely electric forces.

Cardone also argues that a purely electromagnetic model of the electron implies the occurrence of infinities, but then points out that such infinities can be "removed" by

means of the renormalization procedure, which is what was done in Quantum Electrodynamics (QED) in support of the SMPP. [27]

Several recent 3-D vortex electron models capture some but not all of the electron's known physical characteristics:

The Spinning Charged Ring model [28] is based on classical electrodynamics, and is consistent with the electron's spin and its magnetic moment (to the second order approximation). This extremely thin charged ring (its main radius is the Compton wavelength divided by 2 pi and its ring radius is about 10 –200 meters [29] spins at the speed of light. This model is missing a major characteristic of the electron–its experimentally observed de Broglie wavelength.

The Compton Radius Vortex model [30] describes the electron as a relativistic vortex rotating at the speed of light, whose radius is the Compton wavelength. In this model there is a physically inaccessible region at a radius less than the Compton wavelength within the electron vortex where there are virtual particles traveling at superluminal velocities, while on a sphere of radius equal to the Compton wavelength there are massless 'particlets' travelling at the speed of light. The electron is considered a quantum black hole [31]. This model has the electron's spin and magnetic moment (to first order) but also does not account for the de Broglie wavelength.

The Space Resonance model [32] is also related to the Compton wavelength by incoming and outgoing spherically symmetric scalar waves to and from the electron model's center. This model has the electron's spin, 720 deg rotational symmetry and de Broglie wavelength but not its magnetic moment.

The resurgence of an interest in "knottedness" and vortex theory is based in part on a new way of thinking about potentials and the "aether".

The Dirac Model of Particle Physics
Hotson notes that the Dirac Particle Model, ie the Dirac Relativistic Wave Equation, may be interpreted such that the entire table of elements can be accounted for by four distinct types of electrons: positive energy electron-positron pairs, and negative energy electron-positron pairs. He argues that the conventional positive energy electron and positron do not collide and annihilate one another, but rather orbit one another and fall into a "sea" of *negative*-energy, neutral, spin-zero bosons.

Starting with the simplest mathematically represented quantum *field*, *particles* emerge as quanta of that field, consistent with Gribbin's comment: "In the quantum world a field *must* give rise to particles." This simplest quantum field describes as its quanta *neutral*, *spin-zero bosons*, exactly what is called for in the Dirac sea of negative energy.

Hotson states that Heisenberg rejected the idea of negative energy, on Machian grounds, and asserts that the Dirac Equation resolves all of the problems with the SMPP, and provides simple, logical, and natural models of the electromagnetic field, the "photon," the "strong nuclear" force, the Ψ wave, inertia, and gravitation. The "photon" is an electromagnetic wave, carried by electron-positron pairs, which have emerged from the sea of negative energy. [33]

Since Dirac's particle electron and positron orbit one another, It seems that Dirac's Particle Model is incompatible with the Vortex Ring Model.

The Aether
The notion of a static aether, a mechanical, jelly-like substance, finds its classical origins in Newton.

At first aether theories were attempts to explain mechanically various optical laws and optical phenomena. Later, with the development of Maxwell's electromagnetic theory of light, some scientists tried to formulate these theories to explain Maxwell's theory and how this theory could be reconciled with Newtonian mechanics.

Since light exhibited wave properties, the waves were thought to travel in a "signal-carrying medium" (just as waves of sound or waves in water require a molecular medium).

However, physicists today ask: if light is propagated as a wave in the aether, how does quantization of light and absorption spectra occur? [34]

The aether approach was embraced by highly regarded scientists, such as Young, Maxwell, Kelvin, Lodge, and Lorentz, and
offered a means of applying Lagrangian and later Hamiltonian forms of mechanics to optics and electromagnetism, as a sort of unified field theory. [35]

The aether also played a significant role in the evolution of ideas about time and space.

Serious difficulties arose in developing a consistent aether theory to account for stellar aberration; the partial dragging of light waves by moving transparent media, and the null result of the 1887 Case Western Michaelson Morley interferometer experiment. To accommodate this null result, Fitzgerald and Lorentz proposed a contraction hypothesis in which the length of an object depended on its velocity through the aether. Soon after, Lorentz and Larmor developed other compensating effects, including an alteration in time, all of which succeeded in accounting for the absence of any aether wind effects.

Einstein, knowing of the null effects of the aether drift experiments, and being aware of Lorentz' transformation ideas, took the revolutionary step of elimination of the notion of an aether rest frame, resulting in a simple and consistent EM theory. [36]

Schaffner writes that the tasks of the 19th century aether are adequately fulfilled by fields, which transform in complete accord with Lorentz' transformations. [37] So, could fields then be aether like?

The vacuum itself has apparently been found to contain energy. The Dirac Equation, foundation for Quantum Electro Dynamics (QED), predicted what is called the Dirac Sea of negative energy, which has been discredited by the mainstream. [38]
Schaffner confirms that PAM Dirac proposed that this sea of negative energy state electrons might well be considered an aether.
[39]

In QED this invisible sea of energy has been identified as the Zero-Point Field, (ZPF) which is packed with virtual particles.

This vacuum energy, either negative or virtual, has become for some the "New Aether".

Schaffner observes that in the preface to his monolog, ET Whittaker [40] argued on QED grounds that the aether was a viable concept: "with the development of QED, the vacuum has come to be regarded as the seat of the 'zero-point' oscillations of the EM field, of the 'zero-point' fluctuations of electric charge and current, and of a 'polarization' corresponding to a non-unity dielectric constant… It seems absurd to retain the name "vacuum" for an entity so rich in physical properties." [41]

Glenn Starkman, ironically from Case Western, and colleagues Tom Zlosnik and Pedro Ferreira of the University of Oxford have resurrected the aether concept in a new form in an attempt to solve the puzzle of dark matter, the mysterious substance that was proposed to explain why galaxies seem to contain much more mass than can be accounted for by visible matter. They posit an aether that is a field, rather than a substance, and which pervades space-time. "If you removed everything else in the universe, the aether [as the zero point field] would still be there," says Zlosnik. (However, issues have developed in assuming the Zero Point Field, also known as the cosmological constant, in accounting for dark matter [42])

It has been shown that the magnetic vector potential, A, and electrostatic potential, J, are more fundamental than the electric and magnetic fields, since these fields can be mathematically derived from the potentials. [43]

The website Montalk.net alleges that since there is only one fundamental EM field; the magnetic vector potential field A, an "aether" medium is indeed needed for the electromagnetic field to propagate. [44]

ANU

Interestingly, in the esoteric tradition, as represented by Charles Leadbeater, Annie Besant, and the Theosophists in the book Occult Chemistry (1919), the most fundamental particles were described as positive and negative stringed vortices of energy, called "Anu"; the "ultimate atom". The word is Sanskrit for atom or molecule, and a title of Brahma. Needless to say, this concept of stringed vortices was not the product of advanced mathematics, as was string theory.
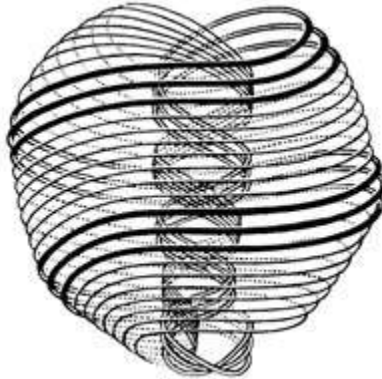
"Anu"; the "ultimate atom" [45]

These purported structures would correspond to the hypothetical constituents of quarks, given the "Russian doll" nature of matter. [46]

In 1974, physicists Jogesh Pati and Abdus Salam speculated that a small family of particles they called preons could explain the proliferation of quarks and leptons. Although not currently in favor with many physicists, the preon idea has not been ruled out. In 1999, Johan Hansson and his coworkers proposed that three types of preons would suffice to build all the known quarks and leptons. [47]
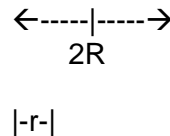
B.G. Sidharth, of the Centre for Applicable Mathematics & Computer Sciences in India, and developer of the Compton Radius Vortex model of the electron writes: "The physical picture is now clear: A particle can be pictured as a [quantum black hole] fluid vortex which is steadily circulating along a ring (or in three dimensions, a spherical shell) with radius equal to the Compton wavelength and with velocity equal to that of light."

Alternative physicist Frank D. (Tony) Smith, Jr. has used precisely the Leadbeater Theosophist figure of Anu to portray the Compton Radius Vortex. [48]

Appendix 1

Toroid, Vortex, and Knot

An important set of interrelated geometric figures are the toroid, vortex, and knot.

$\leftarrow$-----|-----$\rightarrow$
2R

|-r-|

	full view	*cutaway*	*cross-section*

ring torus

horn torus

spindle torus
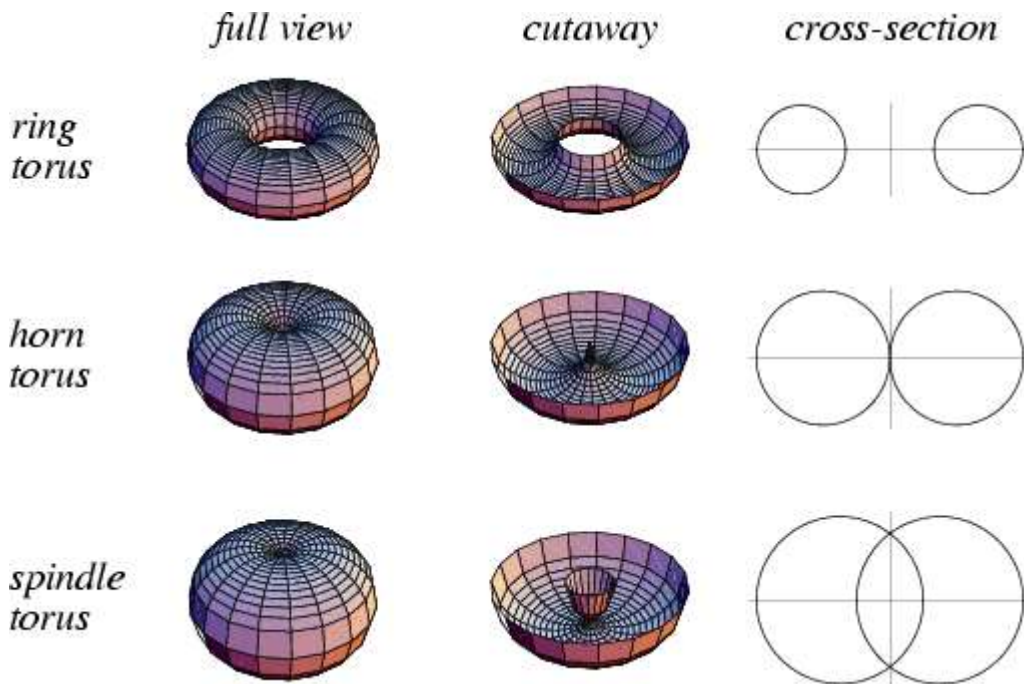
Image from http://www.harmonicresolution.com/Toroidal%20Space.htm

A "Torus" is simply a donut shape, which may be of several types, including ring, horn, or spindle.

As the distance 2R between the two circular "donut" cross sections of radius r decreases, the ring torus becomes a spindle torus, and when the distance 2R becomes zero, degenerates into a sphere of radius r. When the circular cross section of radius r is zero, the torus devolves into the circle of radius R, or a vortex. [49]

In precise mathematical language, a knot is an embedding of a circle in 3-dimensional Euclidean space. A circle is a trivial knot. [50]

A **vortex ring**, also called a **toroidal vortex**, is a region of rotating fluid (or energy) moving through the same or different fluid where the flow pattern takes on a toroidal shape. The movement of the fluid is about the poloidal or circular axis of the doughnut, in a twisting vortex motion. For example, a smoke ring.

Vortex rings were first mathematically analysed by the German physicist Hermann von Helmholtz, in his paper of 1867 *On Integrals of the Hydrodynamical Equations which Express Vortex-motion.*[51]

[1] worldsci.org/topics/structure

[2] **http://en.wikipedia.org/wiki/History_of_knot_theory**

[3] http://www.pengfeiding.com/index.php/Toroidal_ring_model

This argument does not seem to be relevant:
Parson's magneton predicted the existence of an electron magnetic dipole moment; this dipole moment is indeed present. However, later work by Paul Dirac and Alfred Landé showed that a pointlike particle could have an intrinsic quantum spin, and also a magnetic moment. Therefore, in the modern theory, unlike the classical theory Parson used, the electron does not *need* a ring current to generate a magnetic dipole moment.
http://www.pengfeiding.com/index.php/Toroidal_ring_model

[4] This includes not only sub atomic particles, but larger molecular sized particles as well. Ref:

[5]

http://chemwiki.ucdavis.edu/Physical_Chemistry/Quantum_Mechanics/Atomic_Theory/Electrons_in_Atoms/Electron_Spin

Robert Hofstadter has also provided new evidence for finite-sized nuclear particles in his Nobel Prize-winning scattering experiments, calculating the charge density of protons, neutrons, and other nuclei as a function of radius. http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf

[6] see http://www.physicsforums.com/showthread.php?t=460209

[7] In simplest terms, an atomic orbital refers to the spatial region around a nucleus in which an electron is likely to be found. The simplest orbitals are the S, P, D, and F.
In this model the electron cloud of a multi-electron atom may be seen as being built up (in approximation) in an electron configuration that is a product of simpler hydrogen-like atomic orbitals.
Each orbital is defined by a different set of quantum numbers and contains a maximum of two electrons.
The s orbital, p orbital, d orbital and f orbital refer to orbitals with angular momentum quantum number l = 0, 1, 2 and 3 respectively
The repeating periodicity of the blocks of 2, 6, 10, and 14 elements within sections of the periodic table arises naturally from the total number of electrons which occupy a complete set of s, p, d and f atomic orbitals, respectively.
In quantum mechanics, as a particle is localized to a smaller region in space, the associated compressed wave packet requires a larger and larger range of momenta, and thus larger kinetic energy. Thus, the binding energy to contain or trap a particle in a smaller region of space, increases without bound, as the region of space grows smaller. Particles cannot be restricted to a geometric point in space, since this would require an infinite particle momentum.
In chemistry, the electron, as a wave packet, could not be considered to have an exact location in its orbital. Max Born suggested that the electron's position needed to be described by a probability distribution which was connected with finding the electron at some point in the wave-function which described its associated wave packet. The new quantum mechanics did not give exact results, but only the probabilities for the occurrence of a variety of possible such results. Heisenberg held that the path of a moving particle has no meaning if we cannot observe it, as we cannot with electrons in an atom.
http://en.wikipedia.org/wiki/Atomic_orbital

[8] Each orbital contains a maximum of two electrons.

[9] http://galileo.phys.virginia.edu/classes/252/Wave_Packets/Wave_Packets.html

[10] Teaching Company DVD: *Science wars*: Chapter 12 *Trading Reality for Experience*.

[11] 61 "fundamental" particles. http://en.wikipedia.org/wiki/Particle_physics

Confusion among physics followers regarding number of fundamental particles:
http://www.physicsforums.com/showthread.php?t=240659
Griffith 60 fundemental

[12] Science Wars Lecture 18 *Challenging Mainstream Science From Within.*
See also http://plus.maths.org/content/physics-elementary-particles

[13] Hillary Putnam and Nelson Goodman argue that scientific concepts are classification schemes. Defining space time, etc are metrics; measures that then allow us to begin reasoning. If all classification schemes are artificial, we need to think differently about scientific knowledge than if they are natural. If there is a natural classification scheme, our job is to find it and use it.
Science Wars

[14] http://abyss.uoregon.edu/~js/glossary/elementary_particles.html

[15] [science wars]

[16] Andrew Pickering is a sociologist, philosopher and historian of science at the University of Exeter. He was a professor of sociology and a director of science and technology studies at the University of Illinois at Urbana-Champaign until 2007. He holds a doctorate in physics from the University of London, and a doctorate in Science Studies from the University of Edinburgh. His book *Constructing Quarks: A Sociological History of Particle Physics* is a classic in the field of the sociology of science.

http://en.wikipedia.org/wiki/Andrew_Pickering

[17] http://press.uchicago.edu/ucp/books/book/chicago/C/bo5951816.html

[18] Science Wars Lecture 20: Scientific Knowledge as Social Construct

[19] *Dirac's Equation and the Sea of Negative Energy* **by D.L. Hotson**
http://openseti.org/Docs/HotsonPart1.pdf
[20] (Feynman, 1985)
[21] (Gleick, 1992)

[22] Gordon Kane, *The Particle Garden*, 1995

[23] As to the carriers of the four fundamental forces, symmetry considerations would require they are all massless. However, it is well known that things are not so simple: weak quanta are massive. It is therefore necessary, in the framework of the Glashow-Weinberg-Salam model of electroweak interaction, to hypothesize the Goldstone mechanism, able to give weak bosons mass with the (till now unobserved!) Higgs boson. http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf

[24] http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf

[25] "In this paper, we want to show that the electron mass me can be obtained from arguments related to the breakdown of local Lorentz invariance, in the framework of a generalization of Special Rela tivity (Deformed Special Relativity, DSR), based on a "deformation" of the Minkowski space" (Cardone) http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf

[26] http://www.worldsci.org/php/
[27] http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf
Fabio Cardone, Alessio Marrani, and Roberto Mignani
Dipartimento di Fisica, Università dell'Aquila, Rome
A geometrical meaning to the electron mass from breakdown of Lorentz invariance

Note: Cardone notes:
However, even in this framework, the value of the electron mass is not the intrinsic one but only that resulting from its interaction with the vacuum.

[28] http://www.irprout.it/Documenti/superluminal_helical_model.pdf
Note [1] Bergman, D.L. and Wesley, J.P., "Spinning charged ring model of electron yielding anomalous magnetic moment", *Galilean Electrodynamics* **1**, 63-67, (Sept./Oct.1990)

[29] http://www.irprout.it/Documenti/superluminal_helical_model.pdf
Note [2] Bergman, D.L., "Correspondence: Characteristics of the charged-ring electron", *Galilean Electrodynamics*, **5**, 56-57 (1994)

[30] http://www.irprout.it/Documenti/superluminal_helical_model.pdf
 Note [3] Siddharth, B.G., "Quantum mechanical black holes: towards a unification of quantum mechanics and general relativity", arXiv:quant-ph/9808020, **1**, (12 August 1998) (http://xxx.lanl.gov/pdf/quant-ph/9808020)

[31] http://xxx.lanl.gov/pdf/quant-ph/9808020

[32] http://www.irprout.it/Documenti/superluminal_helical_model.pdf
 Note [4] Wolff, M., "Matter waves and human consciousness", *Noetic Journal*, **2**, n. 1, 67-75 (January 1999)

[33] *Dirac's Equation and the Sea of Negative Energy* **by D.L. Hotson**
http://openseti.org/Docs/HotsonPart1.pdf

[34] http://www.cellularuniverse.org/AA2MM_Aether.htm

[35] http://www.sciencemadness.org/scipics/NineteenthCenturyAetherTheories.pdf
Kenneth F. Schaffner Associate Professor of Philosophy and of History and Philosophy of Science,
University of Chicago, 1972. p. 3

[36] Schaffner p. 4. Einstein once suggested that his General Relativity theory had a type of aether associated with it. Schaffner p. 116

[37] Schaffner p. 116

[38] *Dirac's Equation and the Sea of Negative Energy* by D.L. Hotson
http://openseti.org/Docs/HotsonPart1.pdf

[39] Schaffner p. 116

[40] Schaffner advises the interested reader to consult ET Whittaker's important monograph (1960) on the history of aether theories. However, he finds severe defects in Whittaker's book, including his unwarranted idolization of the McCullagh's aether and unfair treatment of Einstein's SR schaffner p. VIII

[41] Schaffner p. 116

[42] [Ether returns in a bid to oust Dark matter : www.mkaku.org/forums/archive/index.php?t-83.html]
See also Dark matter, dark energy, dark… magnetism?
by Stephen Battersby
New Scientist 04 June 2012
http://www.newscientist.com/article/mg21428671.800-dark-matter-dark-energy-dark-magnetism.html?full=true
Finds issues with the Zero point field, also known as the cosmological constant, in accounting for dark matter.

[43] Olariu and Popescu, 1985. See http://www.item-bioenergy.com/infocenter/ConsciousIntentiononDNA.pdf

[44] http://www.montalk.net/notes/transverse-waves

As to the carriers of the four fundamental forces, symmetry considerations would require they are all massless. However, it is well known that things are not so simple: weak quanta are massive. It is therefore necessary, in the framework of the Glashow-Weinberg-Salam model of electroweak interaction, to hypothesize the Goldstone mechanism, able to give weak bosons mass with the (till now unobserved!) Higgs boson.
http://arxiv.org/ftp/hep-th/papers/0505/0505137.pdf

[45] http://www.esotericscience.org/article5a.htm

[46] Atoms are made of protons and neutrons (together called hadrons), along with lighter electrons. In turn, hadrons consist of particles called quarks, of which there are six varieties. In addition, there are six varieties of fundamental particles related to the electron, called leptons.
http://www.nature.com/news/2007/071130/full/news.2007.292.html

[47] Note:
http://www.nature.com/news/2007/071130/full/news.2007.292.html

[48] http://www.valdostamuseum.org/hamsmith/worm4holes.html

Note;
http://xxx.lanl.gov/pdf/quant-ph/9808020.pdf

[49] see http://en.wikipedia.org/wiki/Torus

[50] http://en.wikipedia.org/wiki/Knot_theory

[51] http://en.wikipedia.org/wiki/Vortex_ring