

Article 1

The Vortex Key to Mass

Synopsis

Materialistic philosophy, originating in ancient Greece, as embodied in the atomic hypothesis is still the bedrock of science. From Einstein's equation $E=mc^2$ and cosmic ray research it is clear that mass is formed, not out of material substance but energy as pure movement. The greatest mystery in physics is how the energy forms mass. Mystic insight into the atom revealed spin as the solution. Applied to modern physics, vortex motion provides a model for the fundamental properties of matter; a visual image that everyone can appreciate and enjoy.

"Today there is a wide measure of agreement that the stream of knowledge is heading toward a non-mechanical reality; the universe begins to look more like a great thought than a great machine. Mind no longer appears as an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as the creator and governor of the realm of matter."

Sir James Jeans

1.1 Materialism

Materialism is a philosophy based on the idea that material substance underlies everything and in atheism the materialistic system of belief is that nothing exists but the material world made of atoms moving in a void of space. Atoms make molecules, molecules make cells, cells make brains, brains make the mind and then in their minds men and women imagine God.

Materialism originated in ancient Greece. The philosopher Aristotle (384 - 322 B.C.) was a major intellectual influence behind Western thought. He promulgated the idea that everything is formed of earth, air, fire or water.

Democritus (460 – 370 B.C.), however, was the father of scientific materialism. He taught that everything is formed out of *atoms* of material substance moving in empty space.

Democritus was opposed to the idea of soul and said: “*Nothing exists except atoms and empty space; everything else is opinion.*”¹

Democritus probably picked up the idea of the atom from his teacher, the speculative philosopher, Leucippus. As no writings survive of Leucippus we can only gather his ideas from the teachings of Democritus who was renowned for his laughter.

The word atom means ‘that which cannot be cut’. The concept of the atom was brought into the modern era by the writings of Epicurus (342 - 270 B.C.) and poem *De Rerum Natura* written by the Roman Lucretius (99 - 55 B.C.).²

Newton was inspired by Lucretius when in the *Opticks* he wrote: “*It seems probable to me that God, in the beginning, formed matter in solid, massy, hard, impenetrable, moveable particles.*”

This classical model of the ‘billiard-ball atom’ as the ultimate particle of matter was the basis of the atomic hypothesis; the bedrock of science. As Richard Feynman said, “*If in some cataclysm, all of scientific knowledge were to be destroyed, and only one sentence passed on to the next generation of creatures, what statement would contain the most information in the fewest words? I believe it is the atomic hypothesis... that all things are made of atoms - little particles that move around in perpetual motion.*”³

1.2 The myth of materialism

Energy is an enigma in physics. To quote Richard Feynman, “*It is important to realise that in physics today, we have no knowledge of what energy is.*”³

Energy is not understood because of materialism. Classical materialism cannot explain $E=mc^2$. In 1905 when Albert Einstein predicted that mass is equivalent to energy few people understood the implications of his discovery.⁴ However, when, in 1945, the first nuclear weapon exploded over Hiroshima, the world realised the truth in what he was saying.

The mystery of how energy forms mass is one of the greatest enigmas of modern physics. Solving it is a major objective of the Large Hadron Collider at CERN.

The atoms of Democritus have been replaced by the elementary particles in the atom. Subatomic particles appear to be solid because scientists can make beams of them and, in the vast intersecting rings at CERN, bounce them off each other like billiard balls. However, even though subatomic particles appear to be real and solid, that could be an illusion.

1.3 Mass as a form of motion

Early experiments performed in high energy physics gave clues as to how energy forms mass and bring us closer to understanding what energy is. The understanding of energy then leads to an understanding of God.

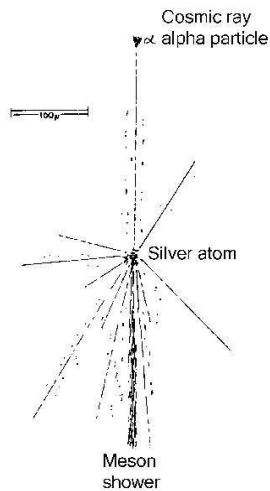
Original, low cost, high energy research was carried out by Professor Cecil Powell of Bristol University.⁵ Powell became renowned for littering the tops of Welsh mountains with stacks of photographic plates in black packets. He would leave them lying around for several weeks in the hope that a cosmic ray particle from the sun, penetrating the light proof wrapping, would collide with the nucleus of an atom in the photographic emulsion. He chose mountain tops for his experiments because cosmic rays are more numerous on high ground than at sea level. He later improved on this amazingly simple and inexpensive form of high-energy research by sending his photographic plates to the highest reaches of the atmosphere in weather balloons.

Armies of women spent months analysing the tracks left in thousands of developed photographic plates in the attics of the Wills Building in central Bristol. Powell trained them to look out for tell-tale tracks in the photographic emulsions revealing the high-energy atom smashing reactions he was looking for.

One of Powell's photographs⁶ witnessed the collision of a cosmic ray alpha particle with the nucleus of an atom in the photographic emulsion.

In the collision a huge amount of energy, carried by the cosmic ray particle, was transformed into the mass of a shower of new particles called *mesons*.

This Nobel Prize winning experiment revealed that the *movement* of the cosmic ray bullet was transformed into the *mass* of the new particles as it struck the target atomic nucleus. It proved mass is a form of motion.



In his equation $E=mc^2$ Einstein predicted the transformation of energy into mass. Powell's experiment photographed it happening. Powell proved that energy is pure movement.

There is no experiment in the history of science that can prove that mass is a form of material substance whereas this cosmic ray experiment shows that mass can be formed out of the arrested motion of a cosmic bullet. The question about energy has always been, 'how can energy be tied up in matter?' What is potential energy? The word energy means *the movement within*. How can movement form something so seemingly inert as matter? What form does the movement take within mass to make particles of matter appear substantial and solid?

1.4 The vortex of energy

Thousands of years ago it was written in the Vedas of ancient India that matter – *akasa* – is formed out a vortex - *vritta* - of energy – *prana*.⁷

Mystics in ancient India appreciated material as an illusion set up by spin. They called this *maya*. *Maya* is Sanskrit for illusion.

The spin of energy in a vortex is a form of activity that can set up an illusion of solidity. Spin creates inertia. This is clear from the spin of a gyroscope.

Richard Feynman said “*The Laws of Inertia have no known origin.*”⁸

Through meditation mystics in ancient times became aware of the origin of inertia. Many thousands of years ago they saw in the spin of energy forming mass, the cause of the inertia of fundamental particles of matter.

Albert Einstein first published his groundbreaking equation $E=mc^2$ in 1905, revealing how energy is locked up in the inertia of mass.⁴

Mystics anticipated Albert Einstein by millennia

Eight billions dollars have been spent on the Large Hadron Collider at CERN mainly to find out how energy forms mass. This was discovered in ancient India about the time the philosophers in ancient Greece were dreaming up materialism.

Around 400 B.C. in the Sutras of Patanjali the physiological and psychological results of meditation, concentration and contemplation are described in detail. In Aphorism 3.26 it states, “*prṛty-aloḥa-nyasat suksma-vyavahita-viprakṛsta-jñanam*,” e.g. knowledge of the small, the hidden and the distant can be acquired by directing the light of super-physical faculties. The word in Sanskrit for such faculties is *Siddhi*. The siddhi for perception of the small, the distant and the hidden is called the *anima siddhi*. The siddhi is developed in the practice of advanced yoga (yoga means *union with God*.)

In an altered state of consciousness the mystic exercising the siddhi could experience visual images of objects too small for human sight to discern. The experience they described was shrinking in consciousness to a size comparable to the objects being viewed.

Many scientists treat mystics with derision. The Oxford scholar, Andrew Harvey summarised the typical attitude of university academics toward mystics when he quoted a colleague: *“Only scientific criteria for truth are valuable and mystics are pathological cases.”*⁹

If mystics managed to solve the greatest mystery in physics thousands of years ago through nothing but the power of the mind, maybe the attitude of scientists and atheists toward mystics is due for reappraisal.

1.5 The material delusion

When the smallest particles of matter are treated as vortices of energy materialism is explained away as delusion. In $E=mc^2$ Einstein disproved materialistic philosophy early in the 20th century but couched in complex equations few people really understood his theories.

1.6 The Vortex: A simple model for mass

The beauty of the mystic insight is that it presented a model, a simple visual image of the way energy forms mass that everyone can understand, appreciate and enjoy.

In the articles to follow detail will be given as to how:

- The spin of energy in the vortex sets up the inertia of mass.
- The vortex accounts for potential energy. It explains how energy is stored in matter.
- The vortex accounts for quantum spin, the innate property of a particles that is not the spin of the particle. The vortex model reveals quantum spin as the particle.
- A vortex is three dimensional spin so vortices of energy set up the three dimensions characteristic of matter.
- Because energy is neither created nor destroyed there is no end to the vortex. Every vortex of energy extends into infinity. That is why particles are non-local..
- Vortices are dynamic so as every vortex overlaps and interconnects with every other vortex they interact. Vortex interactions account for the forces of electric charge, magnetism and gravity.

- Space is the infinite extension of the vortex beyond human perception. On arrival in New York in 1919, Albert Einstein summarised his theory of relativity in the single sentence: “*Remove matter from the universe and you also remove space and time.*”¹⁰ He said matter and space are connected. The vortex shows how they are one and the same thing. Matter is thick space; space is thin matter.
- The infinite extension of vortices of energy explain the instantaneous effect of gravity over infinite distances.
- The transformation of mass into energy could be vortices unraveling. That would account for nuclear energy. Richard Feynman said “*Nuclear energy, we have the formulas for that but not the fundamental understanding...we don't know what it is.*”¹¹ The vortex model provides a simple account for things yet unexplained in physics.

Mystics make matter simple to understand. They provide an account for fundamentals in physics as yet unexplained by physicists. Mysticism could be the turning point of physics which is now in decline. A major new breakthrough in physics for the new millennium is needed to restore public confidence in the king of sciences. If mysticism were seen to make a contribution to the advancement of science that heals the rift with religion an whole new wave of interest in the subject could be generated amongst people inclined to believe in matters pertaining to spirituality and religion.

1.7 Mass, energy and the Vortex

In classical physics, energy was defined as the *ability to do work*. It was understood as the ability of things to act and move. In modern physics this simplistic understanding of energy became confused by the discovery that nuclear energy could be derived from the destruction of mass.

With the vortex, it is easy to picture mass as a form of energy. When, in an atomic explosion, mass is destroyed to give rise to violent activity, this release of nuclear energy can be explained, quite simply, in terms of the transformation of energy

trapped in vortex into a form of energy that is free to radiate away. But with or without the vortex, Einstein's $E=mc^2$ equation explained this anyway.

The vortex makes it possible to understand what potential energy is. The vortex is a form of motion in which energy can be contained and harnessed. The vortex model enables us to understand how mass stores and releases energy. This is supported by experiments performed every day in the particle accelerators.

Just as the potential energy in mass can be converted into kinetic energy in an atomic explosion, so in cosmic ray and high-energy research, kinetic energy can be transformed back into mass. The vortex shows clearly how mass can be formed of movement. Even without the vortex model this is abundantly clear from high energy physics

To appreciate that mass is nothing but movement imagine rain in the Swiss Alps. As the water falls to form streams tumbling down the mountainsides, these join the torrent of rivers that pass through hydroelectric plants. There the fall of the water is converted into the spin of the turbines and then the flow of electricity. Some of this electricity is fed into CERN, the European particle accelerator where it is used to accelerate protons. As the protons collide in the intersecting rings of this high-energy laboratory, their motion is arrested. The arrested kinetic energy is then transformed into the mass of a host of newly synthesised particles.

Is anyone going to suggest that some sort of material substance clunked down in the fall of rain, and then clattered along in the tumble of streams, trundled in the torrent of Alpine rivers and scabbled in the spin of the turbines, flapped along in the flow of electricity and then raced up to full pelt in the acceleration of protons to be burped into new particles as the protons collided with a mighty kablunk!

Fall, flow, spin and acceleration describe motion. Nothing was fed into the mass making process apart from pure, movement. There is nothing in mass but movement. With or without the vortex model, that is a fact. The vortex merely provides a visual model that makes that fact comprehensible to everyone.

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