Electron Spin and the Emission of Photons

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The awkward spin of an electron escapes rational understanding. But by principles from my previous study [1], the spin is portrayed as a *dual* spin— with one spin perpendicular to the other. A dual spin as such serves to explain the emission of photons, along with their wave-like pattern, and the speed limit c. Planck's radiation law and the photoelectric effect are also discussed.

Introduction

A means by which circular motion is natural and force-free was introduced in my original paper titled, *New Physics Based on Force-Free Circular Motion* [1]. Such motion is defined as the inertial effect of two separate motions, but where one motion carries the other. A body moves in a straight line, but its linear momentum is carried and turned effortlessly by a spin from the body itself. Thus, a body's straight-line motion is sustained but not always seen. It can only be seen if viewed from a frame of reference that turns with the body's spin. Yet, from a fixed frame of reference the two motions appear as circular motion.

The spin involved with force-free circular motion is no ordinary spin. The spin is strictly an inertial effect. But how can this be? A spin of any sort typically involves force. Newton's First Law says that a body in motion tends to move in a straight line, unless acted upon by an unbalanced force. For example, a body acted upon by force may twist itself so as to create a spin. Based on Newton's Third Law, the unbalanced force creates an action, while the subsequent spin is a reaction. Force works to push or pull on the body, while a fictitious force from the body itself, or its inertia, creates a twisting effect. The two events occur simultaneously, but each event is nevertheless a totally separate event of its own. But suppose a spin as such could exist independently and in total absence of force. It would then be just as effortless and force-free as straight-line motion. In essence, the spin would be a rotating inertial frame of reference.

The Moon's orbit can be explained by this idea of force-free circular motion. The Moon has an underlying straight-line motion, but its linear momentum is carried and turned by a force-free spin from the Moon itself. Hence, the Moon revolves about a full orbit with each of its own 360° rotations. And in fact the Moon does just that. However, things like this never happen by force because the force defeats the cause.

Force-free circular motion may truly exist, but when a body is acted upon by force, Newton's First Law comes into play. Consider a ball twirling from a string. The ball is pulled into a circular path by force. But at the same time, the ball's linear momentum is held at a right angle to the force, by the force itself. As a result, a body acted upon by force is caused by force to work at maintaining a straight line of travel. Newton's First Law is technically flawed. A body's tendency to move in a straight line is not just an act of Nature. It is caused by force. Consequently, force-free circular motion cannot be created by force. The very idea contradicts itself. And so how might it truly exist?

Pre-existing conditions of the Universe may allow for the existence of force-free circular motion. One can only speculate, but suppose it might exist, not by force, but because it has always existed. In other words, force was not the cause of the effect because the effect was already here. Force-free circular motion may have existed forever just as matter itself may exist. And so for the purpose of discussion, force-free circular motion is presumed to exist.

Dual Spin

Based on my previous work [1], the spin of an electron is force-free by Nature, and is the product of two distinct rotating motions. Moreover, one spin has twice the speed and is perpendicular to the other. In the same way, the orbit of an electron is in reality two orbital motions. One orbit has twice the rate as the other, and is perpendicular to the other as well. A dual orbit like this will cause an electron to curve about in a direction somewhat parallel to the axes of its dual spin. A wobble is therefore produced by the imbalance of momentum. This wobbling effect makes the emission of photons waver back and forth so as to produce different wavelengths and frequencies of light.

Now suppose an electron is like a sponge, and it absorbs particles at an exceeding rate. For every action, there exists an equal and opposite reaction. An electron may absorb particles so fast that the particles are drawn into it while the electron is drawn toward the particles. The process of absorption creates a pulling force, and so with the application of force, Newton's First Law holds true. The force is similar to the pull of a tether, except at speed c, particles break away from the rapid spin. The concept is no different than that of small stones that fly from a rotating carousel. The stones are turned by force, but flee from the carousel when their speed becomes too great.

The parts of an atom spin with force-free circular motion, but their exchange and absorption of smaller particles creates a number of pulling forces and inertial effects. Again, the pulling force of absorption creates the same effect as any other force. It holds the underlying straight-line motion of an absorbed particle at a right angle to the force itself. Hence, the spinning parts of an atom produce a discharge of radiation when the spin becomes too fast. Still, the true nature of the spin remains force-free because the pulling effects of absorption are like those of a ball twirling from a string. A fictitious pull from the ball is produced by inertia, while the string pulls back with a true force. During absorption, the parts of an atom and their exchange of particles each create a pull of their own from inertia, while exerting force on each other. However, the inertial pull of an electron is not in a straight line because it moves about naturally with force-free circular motion. So in truth, an electron pulls itself into a force-free spin. The spin is no ordinary spin. In likeness to its dual orbit, an electron pulls itself into a double spin. The dual motion has a 2:1 spin ratio, or thereabouts.

Gyroscopic effects from a dual spin create a drag upon the spin itself. As you would expect, the drag gets stronger as the spin becomes faster. Yet, a spin gains momentum from the absorption of particles, and therefore it overcomes the drag. But when the spin reaches speed c, photons are discharged by the rapid spin. And since photons have mass, their discharge creates a loss of mass in the electron itself, and therefore a loss of momentum. Hence, the spin loses momentum and is stopped from going faster by the drag of its two directions. Indeed, a slower spin is increased by the absorption of particles, or by an increase of momentum. But at speed c, momentum is lost through the discharge of radiation. And because the spin cannot gain momentum at speed c, it cannot overcome its drag. The drag is too strong for the spin, and so it maintains the speed of light at c.

Frequency and Energy

The rapid spin of an electron creates a discharge of photons. And because the electron wobbles as it spins, a wave-pattern is produced by the discharge. Naturally, the wave-pattern is in likeness to the wobble. Yet, the wobble can change with any change in the orbit of an electron. Therefore, the frequency and wavelength of light is altered as well. But here is a good question. What is the connection between frequency and the energy of light as noted by the photoelectric effect, and as stated by Planck's radiation law?

A simple explanation of the photoelectric effect might be as follows. The process of absorption creates a pulling force, and so the pulling force complies with Newton's Third Law. Photons are absorbed and pulled toward an electron as the electron is pulled toward the photons. Photons are absorbed one at a time, but since they travel in a wave-like pattern, electrons are pulled from "side-to-side" in likeness to the wave pattern. And so when electrons in a metal plate absorb photons from a beam of light, the electrons are pulled from side-to-side according to the frequency of light. At higher frequencies, electrons become unstable and are pulled away, or emitted, from the metal plate.

Intensity (flux) of light has no impact on the photoelectric effect. This is because electrons absorb photons just one at a time regardless of their intensity. The flow of photons will increase with intensity, and so the number of photons absorbed by an electron over a given period of time is greater. But still the photons are absorbed only one at a time. The process of absorption does not get stronger; it is just more continuous with one photon after another. Pulling effects produced by the wave-pattern of light are independent of those produced by an increase in flux. Quite simply, low frequencies of light are not strong enough to pull electrons away from a metal plate no matter how often they pull.

According to Planck's radiation law, radiation power increases proportionally with its frequency. You can see this effect when comparing the light of two electric light bulbs of 50 watt power each with the light of a single 100 watt bulb. Though both settings require the same electric power, the single 100 watt bulb emits brighter light than the two 50 watt bulbs. This is because the temperature (and subsequent frequency) of a 100 watt filament is higher than that of a 50 watt bulb.

Typically speaking, the brightness (intensity) of light is determined by its flux. Flux is the rate of flow of energy, and the energy of light comes from momentum. Momentum is the product of mass and velocity ($\mathbf{M} = m\mathbf{v}$). An increase in flux comes with an increase in the flow of photons. Photons have mass, and so the end result of more photons is more mass. An increase in mass (flux) leads to an increase in momentum (energy), and so the brightness of light becomes more intense (brighter).

Momentum not only depends on mass, but also on velocity. The rate of change (velocity) in the wave pattern of light is affected by its frequency. Again, the frequency of light is produced by the wobble of its emitter. The wobble has momentum, and so the faster an electron wobbles the greater its momentum. Momentum is never lost with a discharge of photons--it is conserved. Momentum is transferred from the emitter of photons to a receiver of photons via the wave-pattern of light. A receiver absorbs photons, and is therefore pulled from side-to-side according to the wave-pattern of light. The side-to-side pulling effects become faster with any increase in frequency. In other words, higher frequencies of light produce higher rates of change (velocity) during the absorption of photons. Higher rates of change (velocity) produce an increase of momentum, and so the intensity of light increases proportionally.

In summary, the intensity (brightness) of light is a function of its momentum (energy). Momentum is the product of mass and velocity, while velocity is the rate of change. As a result, the intensity of light can be increased either by its flux (mass) or by its frequency as determined by its rate of change (velocity).

Conclusion

An electron's spin as portrayed by a dual spin—with one spin perpendicular to the other—provides a rational explanation for the emission of light, along with its speed, its wave-form, and its energy as defined by Plank's radiation law.

Reference

[1] Mitch Emery, "New Physics Based on Force-Free Circular Motion", Proceedings of the Natural Philosophy Alliance Vol. 3, No. 1: 24-36.