

# Quintessence

According to ancient and medieval science, aether, the mysterious fifth essence, a mysterious field of dark energy, is the material that fills the region of the Universe above the terrestrial sphere. Aristotle included aether in the system of the classical elements of Ionian philosophy as the "fifth element" (the quintessence), on the principle that the four terrestrial elements were subject to change and moved naturally in straight lines while no change had been observed in the celestial regions and the heavenly bodies moved in circles.

Physicist Paul Steinhardt first used "Quintessence" in 1998, to describe his research on an earlier concept described by Chris Hill and Josh Freeman, Fermilab physicists, that was based on the idea that all of empty space is filled with a field that is a form of matter-energy that varies in density and strength. The reason we have had so much difficulty in finding this field? Simply put, it has no direction or vector field for reference, only magnitude. An example of a true Scalar Field...

The Michelson-Morley experiment of 1887 was designed to detect the ether's effect on the speed of light, or in essence, to find out whether the earth's speed relative to the ether could be detected. Michelson did many other independent experiments with the same purpose over many years. All found no evidence for the ether. Then along came Einstein's relativity in 1910, which accounted for those strange things without ever invoking ether. So gradually it dawned on physicists that the ether idea wasn't necessary, and never had been. So it died. Today it hardly rates a footnote in textbooks. One of Michelson's experiments, at the University of Chicago, was specifically designed to test the idea that the earth dragged ether along with it. It used an interferometer that extended from the basement to the top floor of a building. Again, no ether effects were found. By that time, Michelson, who believed in the ether, was resigned to the fact that it couldn't be detected, and expected the experiment to fail, as had all of those experiments before. Sir Oliver Lodge in England built an ingenious device to test whether ether was dragged along by rapidly spinning steel disks. Again, these attempts resulted in failure. No ether. But Lodge, too, believed in the ether, and said "The experiment may have to be 'explained away'."

And yet something apparently is exerting some influence, or the concept would have remained dead.

Tom Siegfried in his book *Strange Matters* described this field as kinetic energy whose strength would be measured by how quickly it approaches zero point. The "Quintessence" is believed to exert a negative pressure as a slow rolling scalar field that does not change very quickly over a period of time. If quintessence is the Dark Energy some physicists think it is, it will certainly decide the fate of the universe because of its relationship to expansion. The presence of a negative energy in space could stop expansion. This would mean we could no longer accurately predict the fate of the universe.

But let's back up just a bit. In 1725, astronomer James Bradley performed an experiment on stellar aberration that was intended to demonstrate *ether* drag near the earth, but instead it showed that starlight coming toward the earth was bent in the

opposite direction to that predicted by the ether theory. The explanation was quickly found, and it didn't require the assumption of ether.

All the other "manifestations of the ether", such as comet's tails and the perihelion of Mercury that had once seemed so persuasive were found to have other explanations. Did these experiments "disprove the ether"? None of these, or any other experiment could disprove the general idea of an all-pervading ether. The point is that there is simply no experimental evidence for the ether, and no need for it in any of our physical laws or theories. You can't disprove something that isn't there, or something that doesn't affect anything material in any way. But times are changing...

Quintessence may play a role in how matter and energy interacts. These interactions are called resonances. Resonance is all around us in nature, and in the universe itself, specifically demonstrated by synchronicity. From musical compositions to migraine causing mathematics, visible patterns emerge from these key relationships.

As such, the idea of a fifth essence is gaining a new meaning. Quintessence, some cosmologists say, is an exotic kind of energy field that pushes particles away from each other, overpowering gravity and the other fundamental forces. If quintessence is real, it certainly wouldn't be rare. Two-thirds of the universe would be made of the stuff. Some physicists believe that Quintessence encompasses a wide class of possibilities. It is a dynamic, time-evolving and spatially dependent form of energy with negative pressure sufficient to drive the accelerating expansion.

Vacuum energy is the potential energy in an absolute vacuum, devoid of matter or radiation. Think of a chimney sucking air from the living room; that's the universe's matter expanding into the great unknown. Quintessence is a quantum field with both kinetic and *potential* energy. Depending in the ratio of the two energies and the pressure they exert, quintessence can either attract or repel. So is it real or not?

Let's assume for a moment it is real. Quintessence became a force to be reckoned with about 10 billion years ago, according to the current theory. That may seem rather early on in a 15 billion-year-old universe, but cosmologists don't see it that way. The dark energy was created when the universe was  $10^{-35}$  second old; it did not cause the universe to accelerate for another five billion years. That's a factor of more than  $10^{50}$  -- and relatively recently in terms of redshift and the size of the universe.

However, if the new discoveries of Roger Penrose and others hold true, it will change everything. They may be responsible for an extraordinary discovery and it has been made if confirmed. They have found evidence of something that occurred before the Big Bang. That's right, BEFORE the Big Bang! Our cosmos was "bruised" by collisions with other universes. Other universes? Can this mean there are multiple universes besides our own? Yes, it would seem so!

Astronomers, led by Sir Roger Penrose, mathematical physicist and Emeritus Rouse Ball, Professor of Mathematics at the Mathematical Institute, University of Oxford and Vahe Gurzadyan at Yerevan State University in Armenia have found the first evidence of these impacts in the cosmic microwave background data acquired by the Planck Space Observatory using high sensitivity and angular resolution.

They found patterns of concentric circles in the cosmic microwave background, the echo of the Big Bang, which is exactly what you would find if the universe were eternally cyclical. By that, they mean that each cycle ends with a big bang that starts the next cycle.

Naturally such an earth ergo cosmic shaking discovery has its skeptics, and they believe that the "circles" in the WMAP could be a trick of the eye. Feeney in fact acknowledges that "it is rather easy to find all sorts of statistically unlikely properties in a large dataset like the CMB."

However, it only took a few weeks for several independent research groups to confirmed Penrose's findings, while others have found no evidence for it. Sound familiar?

But what does this do to the idea of quintessence? Well, it may be that while the universe is cyclic, the fifth essence is too, to a point. If quintessence turned on during the transition from a radiation to matter-dominated universe, when it was cool enough for atoms and eventually stars to form, it could also have receded in amplitude during the matter collapse radiation expansion phase. So what the heck is this mystery stuff made of? No one knows for certain. Since radiation, ordinary matter and likely dark matter all have positive pressure; they exert a gravitationally attractive force. Anything with negative pressure, the general theory of relativity dictates, would have a gravitationally repulsive force.

Interestingly, the quantum field of quintessence would have a very long wavelength, roughly about the size of the universe. Its kinetic energy depends on the rate of oscillations in the field strength; its potential energy depends on the interaction of the field with matter. In other words, the more kinetic energy, the more positive the pressure, which by the way isn't so likely for a universe long wavelength. Because of this, potential energy and negative pressure dominates making quintessence a repulsive force. But as with most forces in the universe, its state is dynamic.

Quintessence interacts with matter and evolves over time. Quintessence can also decay into new forms of hot matter or radiation. So we are not necessarily doomed to a universe that expands forever, stretching every atom from here to infinity. On the contrary, we may expand and contract at a resonant frequency, or we may continue to expand based on multiple big flows instead of a big bang. So what does this have to do with us?

There is a theory called *Quintessence Emanation*, and it postulates that a person may be capable manipulating radiation energy in order to facilitate a paranormal event. They would do this by manipulating the Quintessence. One with this ability could increase their own physical capabilities, such as defiance of gravity or focus into powerful concussive blasts. One with this ability has altered senses, agility, speed, reflexes, etc. and is capable of perpetual energy generation (no need for sleep, rest, or food/water). It may be the only ability that power mimicry cannot replicate, as the energy is generated, not manipulated from outside sources. But it could also be manipulated by a formerly physical person who is no longer physical. They may manipulate the quintessence to manifest. Of course, all bets are off if Quintessence doesn't exist.