

Quantum and the Cosmos

Science, philosophy, and spiritual inquiry, are humanity's grand approaches to discovering truth. Each purports to search for the truth about us, our world, and its place in the cosmos. Science is continually learning more of the laws that govern the operation of our physical universe. Scientific inquiry is grounded on physics, the underlying foundation upon which all the sciences are based. Physics is the study of energy, force and the study of matter and its motion through spacetime. It involves the study and analysis of nature and how the world and the universe behave.

The Substance of Atoms

Particle physics declares that 99.9999999% of every atom is essentially empty space. This means that whatever surface you are touching, the chair you are sitting in, the keyboard you're keying, the computer or smart phone you are using, are actually complex energetic force fields, and the solidness you feel is not a physical boundary. This declaration by science is absolutely non-intuitive to humans living within the density of a 3 dimensional universe. Nevertheless, science is clear about it. All mass, at the quantum level, is simply energy, vibration, frequency.

Matter is made up of elements. An element is a substance that cannot be broken down into less complex substances by chemical means. Hydrogen, Helium, Carbon, Oxygen, Iron, and Gold, are examples of elements. The smallest component of an element is an atom. An atom has a small nucleus made of positively charged protons and an equal number of neutrons that have no charge. Moving in orbit around the nucleus is an equal amount of negatively charged electrons, which are apparently simply concentrated wisps of negatively charged energy.

There are three main subatomic particles that make up atoms (protons, neutrons, and electrons). Physicists have discovered over 200 different subatomic particles. The number of protons in an atom of an element is referred to as its atomic number. Atoms arranged in order of their atomic number constitute the elements of the periodic table.

Cells

All living things are made up of microscopic units called cells. Cells are alive. They are able to perform numerous functions, perhaps as many as 100,000 different duties in one form or another. (Some cellular biologists claim that

number exceeds a million.) Cells stay in constant communication with one another, making adjustments and changes in routine as needed for themselves, and the greater need of the complex communities of which they are typically a part. The human body is a remarkably complex structure. Biologists claim that each of us is comprised of about 36 trillion cells!

Approximately 10,000 human cells will fit on the head of a pin but compared to an atom a cell is massive. It would take about two billion atoms to cover the head of a pin. The cellular level is what many scientists think of as the threshold of consciousness. Speaking to this conclusion, Dr. Candace Pert, an internationally recognized scientist and research professor at Georgetown University in Washington, DC, has stated succinctly that the cellular level is the threshold of consciousness adding: "After all, there is always the perspective of the cell." Dr. Pert goes on to share another remarkable conclusion:

"...you are biologically hardwired for bliss - all you need to do is tap your own body's unlimited natural capacity for living in joy and connecting to the divine."

At the biological level, consciousness seems to be present at the level of our cells. Interestingly, it is within the nucleus of the cell that our DNA code is stored. Each of us has a unique DNA sequence; this is the recipe for the cellular community that constitutes our physical make-up. All 36 trillion of our cells maintain this recipe book for the reconstruction of you. Perhaps it would be more correct to say, "recipe books," inasmuch as the typed out printed pages of a person's DNA sequence would fill 1,200 books of 500 pages each!

Cells are comprised of large numbers of molecules. In turn, molecules are formed from a complex of atoms. The cellular level appears to be the interfacing threshold between ordinary matter, the stuff of our world, and the extraordinary universe of quantum events.

Just as the huge spaces between stars contain vast amounts of subtle energy, the empty space that makes up over 99.99999999 percent of each atom, is abundant with energy thousands of times more powerful, comparatively speaking, than the other forces of which science is aware. At least this is true as far as we know, and at our scales of time and size. So, not only have scientists learned that atoms are mostly empty space, but that actually the empty space is not actually empty, it is teeming with unbelievably powerful energy referred to as zero point energy.

The parts of the atom that actually have something we think of as mass to them, are comprised of subatomic particles that themselves are made up of nothing more than temporary energy signatures. We have already concluded that everything derives from the energy configuration at the foundational base of our reality. Therefore, it seems reasonable that we might also conclude that it is at the atomic scale where atoms bind together to form molecules, where new creation is constantly being manifested.

Dr. Joyce Hawkes, a preeminent, award winning, biophysicist, put it this way:

“In the micro world of the inner composition of your cells, energy and matter interface in ultra-fast blips of times: nano - or pico - seconds. When an event occurs in these swift pulses ... the cells enter a type of quantum reality - no longer linear and no longer predictable. ... Possibilities exist here that we have barely begun to understand or develop. ... Yet, we can influence them with our consciousness.” (My emphasis)

New scientific efforts have demonstrated that within a living cell, molecules communicate not just by chemicals, as we've been taught, but by light (electromagnetic signaling), at low frequencies. Further, it appears that even individual molecules have their own unique frequency signatures.

Light Energy

Light energy is a form of electromagnetic radiation. It travels as waves of oscillating electrical and magnetic fields and is made up of tiny packets of energy called photons. Light behaves as continuous waves of energy and as discrete particles called photons. This is confusing, and makes no sense to the rationale mind, just as atoms being basically nothing but positive, negative and neutral energy. And yet, science is very clear that light is both waves of energy and discrete particles of energy, either or, or both based on observation. An even weirder phenomenon.

Light moves constantly, unless frozen in place within a physics lab, which was first done here on earth just a few years ago. Light normally moves at a rate of approximately 186,282 miles per second in a vacuum. According to mainstream science this speed constitutes the speed limit, or absolute boundary of the 3 dimensional universe in which we reside. When we figure out how to move up a

dimension or so, (apparently there are 12 and we're at 3) the speed limit set by light will not restrict us from faster than light speed travel. In quantum theory, there is no light speed limit when operating with quantum entanglement. Entanglement is proven to be instantaneous between quantum particles, including atoms, regardless of their physical distance from one another.

Multiplying the speed of light per second, times 60, we arrive at the distance light travels in one minute, or about eleven million miles. In one hour light travels more than 670 million miles, in one day more than sixteen billion miles, in one year six million, millions, or six trillion miles. Astronomy refers to the distance light travels in one year as a Light Year, which is a term of distance not of time.

Normal humans can see light within a narrow band of 380 to 680 nanometers. This is the visual range for most of us. A restricted visible spectrum that our eyes can actually perceive and our minds convert into information. Some few humans can see slightly into the ultraviolet. These are those who see human energy signatures, or Auras. Yes, they are real. In the visual range, the slower moving light particles appear to humans as red; the highest frequency particles we can see appear to us as violet. We can see the colors in between these two visual boundaries, which are representative of the rainbow. However, light energy encompasses much, much more.

What we call the electromagnetic spectrum is the total band width of light, both what we can see and what we cannot see but verify with specialty technology. The light spectrum includes the visible range of colors, plus radio waves, microwaves, infrared, ultraviolet, X-rays, and gamma rays. As a thought-provoking illustration, were the entire light spectrum laid out on a football field, and we were sitting in the bleachers looking at the bandwidth stretched out from goal post to goal post, from infrared to gamma, the amount of light energy we can actually see with our unaided human eyes, would be about the width of a grain of rice in the middle of the football field. In other words, we're viewing the universe through the smallest of keyholes and all the time thinking we are seeing everything around us that there is to see. We are not. Period. Full Stop.

Why is the above important for us to know? Simply because most of us are so sure that what we see is the only reality affecting us. In fact, what we can see with unaided eyes is not even close to the greater reality in which we live. We can argue that what we can see is humankind's collective reality, and that is a solid argument, but as we evolve and develop tools to see more clearly into the infra-red, and the ultraviolet, we are discovering amazing things. For example,

some birds, cats, dogs, and other animals, see and hear things humans do not hear or see. Dolphins, for example, have a powerful sonar system with a large brain to visualize things we cannot even imagine. They literally “see” things in absolute darkness, things below the sand, or similar to lidar, things behind sea growth. They do this through clicks sent out and imaging the echo returns. Returning signals paint pictures in their mind.

Cats can see things we cannot. Most of us have seen a cat staring at a wall where there is nothing to see. At least to us. Obviously, they are seeing something that is apparent in a slightly higher vibration. Many birds have feather markings visible to them that are not visible to humans. Dogs have their own superpower; they create mental imagery through a sense of smell. Their world is first and foremost smell imagery, and second visual imagery. It’s easy for us to say we know this, or have heard this before, it is much harder for us to visualize.

Many of us are content to only grasp what is easy to observe either by hearing or seeing. And yet, most of us have at least some interest in understanding more about the emotions we sense and feel. Emotions are energy vibrations, just like smell, hearing, and visual sight. Nicholas Tesla told us, (and eventually science confirmed), that everything in the physical universe emanates from energy, vibration and frequency. Einstein summed it up by saying, “Everything is energy and that’s all there is to it.”

Science has now demonstrated that each of us has a unique energetic frequency, which constitutes our vibrational signature. Our aura, or energy signature, shifts based upon the thoughts we are focused upon. Thoughts precede the feelings those thoughts engender. Thus, at any given moment, we are a composite of our emotions, memories, habits of thought, along with our physical and spiritual presence.

We may conclude that each of us is the sum total of every thought and feeling we’ve ever experienced. Our thought and feeling vibrations are amalgamated and stored in our subconscious and become the lens through which we view the world. As noted above, thought vibration precedes feelings. Feelings create attraction through the principal of resonance. This is easily demonstrated by stimulating, or striking, a tuning fork. If another tuning fork is calibrated to the same frequency, it can be across the room, and it will begin to vibrate at the same sound frequency as the one first activated. Physics proves that energy of similar vibrations attract and magnify. Thoughts and emotions create waves in the quantum field. When they synchronize, harmony generates the energy to

mirror this clarity into external manifestation. Ergo, we attract what we believe, feel, and resonate with, not what we say we want. Like attracts like. Positive feelings attract positivity. Negative thoughts and feelings attract negativity.

The Cosmos

Our earth is the third planet from the sun. Our sun is a typical star, and very much like the majority of those you see in the night sky. Our sun's ancient and more traditional name is Sol. The sun and its planetary system we call the Solar System. Notwithstanding all of the planets, moons, and other celestial bodies moving around our star, the sun amounts to more than 99 percent of the total mass in our solar system. Compared to the earth, our sun is huge. Were the sun an empty sphere, we could fit about 1.3 million earth-size planets inside it.

Our Solar system is located in the Milky Way galaxy. Thirty years ago scientists thought our home galaxy might have as many as a 100 billion stars within it. Our sun is one of these stars. NASA now says the general consensus of astronomers is that our galaxy might have up to 400 billion stars, hosting up to a trillion planets, moons, etc. The most recent astronomical information suggests there may be as many as two trillion galaxies in the universe. And each galaxy, or island universe, may contain 100 to 1000 billion stars, and together they likely have numberless planets, moons, asteroids, comets, etc. The universe is large. Larger than we can even begin to comprehend.

Our sun is a fairly average star. Stars ranging from about half the size of our sun, to about four times its size, comprise the large majority of the stars that we know of. There are numerous smaller stars, and some so gigantic they are more than a 100 times larger than our own. Just like living things, stars have an identifiable life span. They begin as proto stars in stellar nurseries made up of huge clouds of hydrogen and helium gas. These gas clouds are speckled throughout with various complex molecules that have been fused together in the cores of earlier generations of stars, which subsequently exploded or dissipated out into space at the conclusion of their life cycle.

Stars are like giant factories, they forge hydrogen gas, the simplest of all atoms, into all the other atoms that make up everything we know. There are 94 basic elements beginning with hydrogen and ending with plutonium. The observable universe is still comprised of about 78 percent hydrogen gas, which is slowly being processed into more complex elements by star factories. All matter, except hydrogen gas, began its physical existence after having been fused into its atomic and molecular parts within the nuclear furnace of stars.

Hydrogen is the first element of the periodic table. It is both the initial fuel of stars and the basic ingredient that is broken down and reconstructed into all the other elements of the periodic table. When hydrogen is cooked up at a high enough heat helium results, when helium ignites and becomes the fuel for stars, other elements like carbon and oxygen result. When stars die they seed the interstellar medium - the empty space between stars - with newly created atoms and molecules which eventually recombine through the dance and swirl of gravity into the worlds and everything in them.

A galaxy is a giant collection of gas and molecular dust along with billions of suns and their accompanying planetary systems all bound together by just one thing: gravity. Gravity is the most powerful force in the universe at our size and scale of things. Although science knows a lot about what gravity does and its mathematic predictability, no one knows how it came about, or just how it does what it does.

A galaxy is essentially an island universe spiraling in the immensity of space. These island universes are separated from one another by unbelievably large distances. But, even within the galaxies the amount of so-called empty space is enormous. The average distance between stars in our home galaxy is on the order of 22 million millions of miles. In the U.S. this number would be expressed as 22 trillion miles, a vast expanse that reflects just how isolated each star is from each other. On the other hand, there is a growing body of work that suggests there is no distance between stars, only a difference in frequency. This suggests that an advanced civilization might be able to travel by dialing in the exact frequency and move instantly across all time and space, as science has now demonstrated it can do with entangled atoms.

Our local sun system consists of eight primary planets, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto was once considered the 9th planet from the sun, but it lost its status at an astronomical conference in 2006 and was relegated to a "dwarf planet." Astronomers recognize five dwarf planets, Pluto, Eris, Haumea, and Makemake, which are all beyond Neptune, and Ceres, which sits closer to us in the asteroid belt between Mars and Jupiter.

Astronomers have discovered more planet-like spheres out past Pluto, the most prominent of which include Sedna, Quaoar, Gonggong, Orcus, and Salacia. These last are structurally the same as a dwarf planet (large and round) but are currently classified as "candidate" dwarf planets. There is a constant flow of new discoveries about our local solar neighborhood every year, as there are for our galaxy and the observable universe at large.

Some of the moons in our solar system are essentially worlds in their own right, having active volcanoes and oceans under ice crusts that may harbor life. Moons are celestial bodies that orbit a planet, whereas planets are the major celestial bodies that are orbiting a star. All planets are shaped like giant basketballs, in other words they are round, whereas some smaller moons are not necessarily so. Moons circle all the planets of our home solar system except Mercury and Venus. The first two planets closest to the sun do not have even a single moon.

Earth has a large moon, compared to the size of the earth. Three moons in our solar system are larger than earth's moon. In fact, Ganymede of Jupiter is larger than the planet Mercury, so is Titan which revolves around Saturn, Callisto another Jupiter moon is larger than earth's moon, but a bit smaller than the planet Mercury. The current count of moons in our solar system is 970. A staggering number compared to what we thought it was just a few years ago. In addition to our Sun, its planets and their moons, there is a myriad of asteroids, meteoroids, and comets. At its outer edge, the solar system is ringed by the Kuiper belt (pronounced "Kiper"), and then another large broad circle of debris called the Oort Cloud is outside the Kuiper belt. Think of these giant outer rings like the outside rings on a large target where the bull's eye represents the sun.

Our star's planetary system (the sun, its planets, moons, etc.), is a relatively flat disk, like a dinner plate, with the sun in the middle. Perhaps a more appropriate analogy might be an old-fashioned record album, or "vinyl." The sun would sit in the middle hole with the circular bands around it representing the orbits of the planets. If you're too young to know much about record vinyls then consider the same illustration by looking at the flat side of a CD or DVD and then look at the thin edge by comparison. Curiously, were we to view the solar system edge on, the edge of a DVD, is a good example of how flat the disk of our solar system really is. It's wide across but very thin. The width of our planetary system, or the diameter across the DVD, if you prefer, is believed to be about 19 trillion miles, or a bit more than three light years.

Our solar system, is located about two-thirds of the way out from the super massive black hole that forms the nucleus, or galactic center, of the Milky Way. The Milky Way galaxy is also a relatively flat disk, just like our local solar system. Our galaxy contains billions of other planetary systems, similar to our solar system. Every day there is new astronomical evidence coming forth to support the widely held belief that there must be millions, perhaps billions, of planetary systems similar to our own, right within our home galaxy. The current scientific

estimate for livable worlds in our galaxy ranges from 300 million to 60 billion planets. It is safe to assume that life is present throughout our galaxy and beyond.

A galaxy is unimaginably huge, but there is an even larger structure than a galaxy: a super cluster or a metagalactic system. A super cluster is a group of galaxies circling one another in one area of the universe. Some of these groups comprise up to a thousand separate galaxies. Our Milky Way is part of a super cluster of galaxies, ironically called the “Local Group.” One of our nearby neighbors in the Local Group is M-31 our sister galaxy, commonly known as Andromeda. We’ve always believed Andromeda was much larger than our own Milky Way but recently that has become an open question. In any event, our sister galaxy has well over a trillion stars of her own and likely multiple trillions of planets. The enormity of the numbers boggles the brain!

Astronomy is more than the study of faraway stars, lifeless planets, and cold dark moons; it is the study of the universe in which we live. Ultimately, it includes the study of all things, living or not. Astronomy attempts to answer the question “What are we?” It approaches this question from a physical perspective without reference to spiritual implications, but this unfolding insight alone provides us with the knowledge that we are a part of something amazing and beautiful. We are planet-walkers living in a whirling complex universe filled with stars and galaxies.

We can readily see that atoms and gravity work together to make stars, generate energy, light the universe, and produce all the chemical elements in our bodies. According to cosmologist Paul Davies:

“Through science, we human beings are able to grasp at least some of nature’s secrets. We have cracked part of the cosmic code. Why this should be, just why *Homo sapiens* should carry the spark of rationality that provides the key to the universe, is a deep enigma. We, who are children of the universe - animated stardust - can nevertheless reflect on the nature of that same universe, even to the extent of glimpsing the rules on which it runs. How we have become linked into this cosmic dimension is a mystery. Yet the linkage cannot be denied. What does it mean? What is Man that we might be party to such privilege? I cannot believe that

our existence in this universe is a mere quirk of fate, an accident of history, an accidental blip in the great cosmic drama. Our involvement is too intimate... This can be no trivial detail, no minor by product of mindless, purposeless forces. We are truly meant to be here."