

A Transformed Understanding of Matter

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I'd like you to reflect for a moment on the following question: What is the one attribute of God that pretty much all religious and spiritual traditions would hold as true?

I think you will agree that God being the creator of the universe is a good answer. If that is the case then, at the risk of sounding a little dramatic, I am going to put forth a bold claim: Science has found God, and it is called the Quantum Field (when devoid of matter, the quantum field is also called the quantum vacuum, but that is not a good description since even without matter it is seething with energy). Mary, in her book, refers to it as the seamless plenum.

The reason I can make this claim is because physicists can now provide a step-by-step account of how everything in the universe evolved from a single quantum field using nothing but well-established laws of physics.

One might ask: Who created the quantum field? But that's really no different from asking: Who created God?

A more interesting question to ponder is: What gives the quantum field such amazing generative powers? The answer lies in a fundamental principle of quantum physics: Nothing can ever stand still! If you examine a still object under a microscope, you will see that its atoms are furiously vibrating. Nature is restless, by nature.

A field can be defined as an all-pervading presence of a non-material quality. In a quantum field, the magnitude of this quality keeps fluctuating all the time. Change implies movement and movement is energy. This is why the quantum field is so energetic. Creating the universe from a quantum field involves taking some of the field's energy and letting it take on the qualities of matter. After all, every atom of matter is just energy vibrating in special patterns. Of course, there is a lot of complex physics involved in this process, but we don't need to worry about that here!

What's important to understand is that a quantum field does not spit matter out, nor does it mutate or transform itself into matter. Some of the quantum field's energy alters its vibration pattern, while the field itself remains unchanged. A good analogy is a bubble that forms in an ocean of water. It does not change the ocean, but it does need it for its existence. No ocean, no bubble. Switch off the quantum field and there is no matter. Quantum physics is truly a radical shift in our view of reality. Instead of a whole being made up from a bunch of parts, parts are manifested from a pre-existing whole.

The quantum field is omnipresent, immanent, and eternal. It can birth a whole universe without being diminished in any way. Matter is not only infused with its presence, but it is sustained every moment by it. Latest research over the last couple of decades has shown that the total mass of the particles from which our bodies are made accounts for only 5% of our total body weight. The rest of the 95% comes from the energy of the plenum that is manifesting matter at every moment in the empty space at the center of each atom. This energy would disappear back into the plenum if the center of the atom were taken apart, justifying the name that Brian Swimme calls the plenum by, the all-nourishing abyss.

These qualities of the quantum field match well with the God described by the mystics of the world, if not the God of some religions. On the other hand, many scientists think of this discovery as a confirmation that God is not needed to explain the universe! The real issue is that the long association of God with religious dogma has saddled it with lots of baggage. For this reason, Mary suggests we avoid using this label. And I agree.

Another question often asked is whether the cosmic evolution of galaxies, planets and intelligent life is just meaningless blind chance, devoid of any intention. This question has taken on renewed significance after the non-deterministic nature of quantum physics demolished the clockwork universe of Newton and Descartes. It is true that evolution happens by generating many random variations, one of which ends up hitting the bull's eye by providing an opening for the next layer of self-organization. But that does not mean our existence here is by pure chance.

It is said that hydrogen left alone in an expanding universe will one day lead to the creation of Shakespeare's Hamlet. But this will only happen if the universe's expansion rate is just right. Even a change in that rate by a millionth of a percent will derail its path to life. Clusters of stars bumping into each other will eventually create spiral galaxies; but once again this will only happen if the average density of matter in the universe is just right! The laws of our universe are primed to lead to self-reflexive life. Random variations are important for evolution, but they are NOT the reason we are here today.

Random changes during evolution can be compared to random thoughts that constantly surface in the human mind. But our consciousness chooses to act on the thoughts that are life-affirming and growth-oriented, not the ones that are self-destructive. One can easily see this by looking at the trajectory of a typical human life. We can similarly discern the role of randomness in evolution by examining the life journey of the Universe. Let's recount the Universe story in a playful language that is easier for all to relate to.

In the beginning there was a single Quantum Field. Rich in its multidimensional beauty but restless in its disposition, it played random games with its fluctuating energy until one day it stumbled on a way to break itself into many different quantum fields.

What followed was a chain of events that adheres to a basic principle of nature – differentiation is always accompanied by an allurements between the separated parts.

The first of these allurements was the chemistry between the different quantum fields. It tied their energies up into knots that we call particles. Billions and trillions of these tiny lumps of energy burst forth, giving rise to space, time, matter, and radiation. This event is what we call the great flaring forth. Our universe had been birthed – in the form of a tiny fireball packed with roiling bits of energy.

It was the expansion and cooling of the fireball that brought into full swing the spiral of differentiation, subjectivity and communion that runs through the rest of its evolution.

First, quark fields joined hands to differentiate themselves into neutrons and protons, which in turn glommed to each other to assemble a number of light nuclei. Further cooling relaxed the electron fields enough so they too could join the party forming the amazing patterns of energy that we call atoms.

Driven by an allurement called gravity, hydrogen atoms clumped themselves into clouds of gas. The same urging caused some cloud particles to crash so hard into each other, that they coalesced into the heavier elements essential for the existence of life. This passionate particle merger is what transforms a gas cloud into a shining star.

Affinity between clusters of stars drove them to find fellowship in huge spiral galaxies. The sweeping motion of a galaxy's arms recycles the matter spilled out from the guts of its dying stars. When a galaxy has collected enough stardust, its stars are able to lure some of it to circle around them as their own family of planets.

Only a planet can harbor the safe spaces where the allurements between different molecules can commune them into living cells. When the Earth brought forth single celled life it endeared itself to its star forever. Between the Sun and Earth, they stitched together a molecule called chlorophyll that enabled life to explode into a million different ecosystems on land and sea. Each ecosystem made its own selection from a set of randomly mutated genes to further evolve the species that occupy it. Working together, the ecosystems carved out versions of DNA capable of providing consciousness to a species that hosts them. Self-organizing dynamics that operate at every layer of evolution had done its job one more time!

It first did its job when it pulled together particles to make atoms
It did its job, again, when it pulled atoms together to make stars
And once again, when it pulled stars together into galaxies and the dust particles in those galaxies into planets.
It did its job when it pulled molecules together into living cells and the living cells into complex organisms.
It also did its job when it pulled diverse ecosystems together into the Earth's biosphere.

Is it any surprise that the urge to commune shows up again at the level of human consciousness? Where do you think our inner yearnings for love, peace, harmony, community, connectedness, and belonging come from? Why do we feel such concern for all living things, for our environment, for the whole of Earth and even for the Cosmos? Surely, it is the next level of subjectivity carrying out its magic, one more time.

This consciousness-based allurements is more evident in those indigenous people that are not too affected by the dominant worldview we are enveloped by. For many of us, who have been drinking deeply from the Kool-Aid of reductionist science and dualistic ideology, the primordial impulse, that began its journey during the great flaring forth, has gotten buried under a cacophony of everyday commercial allurements. For the luckier ones among us, this subjectivity emerges once in a while through the gaps in our consciousness, as a mystical experience – like the one experienced by Mary. Mary struggled for decades to make sense of her sacred experience because she lacked the right worldview, or lattice as she calls it. But if we can cajole our consciousness to shift from the reductionist view, we grow up in, to the more open-ended outlook revealed by quantum physics, it might just help us get in touch with the mystical side of our lives? To me, a mystic is simply one who is willing to embrace fully the mystery that lies at the heart of the universe.

We often brush off those moments of sacred presence that emerge from within us; like the hypnotic pull of a sublime melody, or the ecstasy of a wild dance, or the trance induced by a captivating landscape. What we should do is to lean into those moments

and listen to what they are telling us. Perhaps this will bring the healing that we all need from having lived with an objectified worldview for far too long. And then maybe we can start to heal the world.

We need to feel our way into the new story instead of thinking into it. Then we will hear the poetry that is being expressed by it. In our search for God we have been asking the wrong question all along. Instead of wondering who created the universe we should be asking who wrote the amazing poem that we are? Instead of arguing about the poem's grammar and meter, as scientists often do, we should be sensing into its numinous depth. Then it will dawn on us that the poetry and the poet are one and the same. We humans are not just part of the poem; we are involved in the sacred act of writing its next stanza. The real question is, are we up to that task? The Earth, the Sun, and the Milky Way are all cheering us onwards. But do we have the capacity to listen to them? Those are the questions I would encourage you to wonder about! THANK YOU.