

You Are Here
A Visual Tour of the Universe
By
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The Earth is almost 8,000 miles across, which is about a billion times bigger than you are, and you are about a billion times bigger than an atom.¹ So if the Earth were a person, it wouldn't even be able to see you under a microscope. It would have to use a particle accelerator to smash you apart just to find proof you exist. It's remarkable on such a scale, even with more than 7 billion of us, that humans are having such a detrimental impact on our planet. Although 7 billion people might seem enormous, it's nothing compared to the octillion atoms in your own body. That's 7 billion, billion, billion atoms—7 followed by 27 zeros. And, given that the Earth is 4.5 billion years old, and modern humans have only been around 200,000 years, less than 0.00004 percent of the time, we are more akin to a sudden virus the Earth has contracted than anything else. Were it not for the high fever and other symptoms we're causing, the Earth, if it were a person, would have no idea we're even here.

Compared to the Milky Way, in which it dwells, the Earth itself is but a tiny particle. On a clear night we can see about 8000 of its estimated 100 billion stars, 0.00000008 percent, only those that are the brightest and closest to us. Even so, the Milky Way is so vast compared to our tiny planet that when we look up to see the Big Dipper, we're seeing it as it was 80 to 125 years ago. That's how long it takes the constellation's light to reach us traveling at 180,000 miles per second. Yet, again, the Big Dipper is relatively close at only 125 light years away at most. Our entire Milky Way, which is relatively small compared to some other galaxies we know of is about 100,000 light years across, meaning, if you had a ship that could travel 180,000 miles per second, it would take you 100,000 years to cross (kind of like driving through Kansas on a hot summer day). By comparison, traveling at 180,000 miles per second, it would take 220,000 years to cross Andromeda, our closest galactic neighbor. Of course you'd have to add another 2.5 million years to the trip, because even at the speed of light, that's how far away our nearest neighbor is.

As for our galaxy itself, a bird's eye view reveals a spiral of stars with a dense core surrounded by seven bands of stars called arms. Somewhere between the Scutum-Centaurus Arm and the Perseus Arm is a small cluster of stars called the Orion Spur, which includes the star we call our Sun. It's too small to see, but, obviously, this is also where our planetary home dwells.

The particular corner of the Universe our galactic neighborhood is in is a supercluster of galaxies named, Laniakea, containing not just the Milky Way,

¹ Gott, J. Richard & Vanderbei, Robert J., *Sizing Up the Universe*, National Geographic Society, Washington, DC., 2011, p. 190.

Andromeda, and a handful of other galaxies, but somewhere around 100,000 galaxies, the distances between which are, in the truest sense of the term, astronomical. The 2.5 million light years between us and Andromeda is nothing compared to the 520 million light-year long tree of galaxies called Laniakea, home to 100 million billion stars. And it really does look like a tree too—a tree made of nothing but light. As you can see from this depiction, at this magnitude you can no longer see the tremendous spaces between the galaxies comprising the supercluster. In the same way our bodies appear solid, even though on a quantum scale the distances between particles is as vast as intergalactic space, Laniakea, the Hawaiian word for, “immeasurable heaven,” appears to be one solid trunk of light, complete with limbs, leaves, and branches. That red dot to the right on the far edge is where the Milky Way is located, along with our solar system that, relatively speaking, is, once again, too small to even detect—just a particle in the rivers of light flowing through the veins of this galactic giant.

When paired with its neighboring supercluster of galaxies, Perseus-Pisces, these superclusters look as much like the bronchial branches in a pair of lungs, or like the neurons in a human brain. “As above, so below, as within, so without, as the Universe, so the soul,” our ancestors used to say. Could they have intuited the existence of these superclusters, the largest structures in the Universe, when they imagined the cosmic tree appearing in so many of their ancient myths? Like the Tree of Life in the Hebrew origin story, the Kabbalah tree of Jewish mysticism, Yggdrasil of Norse Mythology, connecting all the worlds together, or the sacred Bodhi Tree of Buddhism from which enlightenment comes, the upside down Ashvattha tree of Hinduism, showing that the Earth is rooted in the heavens, among many other similar images.

Although these gigantic cosmic trees of light are the largest structures known to exist anywhere in the Universe, they are dwarfed by the enormity of just the known Universe. There are an estimated 10 million of these superclusters in the known Universe alone, that region of space we’ve actually been able to detect so far. If we could zoom out to see all of them in a panoramic view, they’d look like an interconnected web of light, interspersed with huge pockets of empty space. It’s an amazing image, and yet, the known Universe is itself miniscule compared to all that remains.

The known, or observable Universe is the area of space we’ve been able to detect by registering the background radiation from when our Universe began unfolding into three-dimensional space 13.7 billion years ago in the event we call the Big Bang. Since it’s being observed from our perspective, we are at its center, creating an observable bubble around us that extends 13.7 billion years in every direction. Thus, it’s actually twice as long, 27.4 billion years across. In other words, it would take that long for us to cross traveling at the speed of light. Another way to grasp the enormity of the observable Universe is to consider that something traveling at the speed of light could cross the Earth’s diameter 22 times per second. So if you had a ship that could cross the planet 22 times by the time I say, “One thousand one,” it

would still take you more than 27 billion years to cross the known Universe. And if you aren't sure what a billion years feels like, keep in mind that only a billion seconds ago Ronald Reagan was still President of the United States, we didn't use the Internet or have cell phones, and there wasn't a Martin Luther King Jr. holiday. So even if we had the technology to travel across the Earth 22 times per second, 27 billion years is a very long time!

But here's the real kicker. The known Universe, so vast it would take more than 27 billion years to cross in a ship that could cross the Earth 22 times by the time I say, "one thousand one," is far smaller than a quantum particle is to us compared to the rest of the Universe. By now you should be noticing the pattern. Humans are to the Earth what a quantum particle is to us. The Earth is to the Milky Way what a quantum particle is to us. The Milky Way is to Laniakea what a quantum particle is to us. Laniakea is to the known universe what a quantum particle is to us. And the known universe is to the entire universe what a quantum particle is to us. And we don't now if the entire universe is a quantum particle to something even greater; or if, on the quantum level, there are worlds like our own within the 7 billion, billion, billion atoms that make up our own bodies.

On the one hand it would seem impossible for there to be something more than the entire Universe since being the entire Universe implies everything. Everything that is, is part of the Universe, so how can there be anything beyond the Universe? Yet physicists tell us the Universe is expanding. But if this is so, if it's getting bigger, it must be expanding into something. Yet there isn't anything besides the Universe for it to expand into. The entire notion is as mind-bending and boggling as some of the old theological paradoxes, like if God can do anything, can God create a stone too heavy for God to lift? If the Universe is everything, and, thus, there can be nothing beyond the Universe, what the heck is it expanding into?

John Dietrich, the founder of Religious Humanism and minister of this church between 1911 and 1916, once said, "...space rather than mass is the real characteristic of the galaxy."² For, like me, he was astounded and dumbfounded by these vast distances and the incomprehensible enormity of the Universe. "Many of the stars in the Milky Way," he said, "are so far removed that the light which we see twinkling in the heavens tonight left them in rout to earth before [humans] appeared on the planet, scores of thousands of years ago."³

To help further illustrate how vast the Universe is, let's take a few moments to consider the notion of parallel worlds. Quantum physicist, David Deutsch was the first to seriously postulate the many worlds interpretation of quantum mechanics because it helps explain how quantum reality works when there aren't enough

² Dietrich, John H., *What if the World Went Humanist? Ten Pulpit Addresses by John H. Dietrich*, The HUManists Association, Hamden, CT., 2010, p. 15.

³ Ibid.

observable particles for it to otherwise function the way it does; “and when we analyze the structure of the unseen part,” he says, “we see that to a very good approximation, it consists of many copies of the part that we can see... The unseen part behaves very much like the seen part, except that there are many copies.”⁴ In short, Deutsch is convinced the existence of unseen universes similar to our observable Universe helps mathematically resolve quantum weirdness. Although some physicists think the whole notion is nonsense, Deutsch is so convinced that when asked if he seriously believes there’s a parallel Universe out there in which the dinosaurs were not wiped out by a meteor, and went on to evolve and invent houses, cars, airplanes, spaceships, and other technologies similar to our own, he responded, “Undoubtedly. That’s what the laws of physics tell us.”⁵

Nowadays most of us have at least heard of the Multiverse, though generally we think of it as something that, if it exists, exists unseen in parallel to our own Universe, or else continuously branches off into an almost infinite number of new directions, each existing like a particle in a sea of universes. But for me the most intriguing parallel world concept simply considers our own single Universe so huge, and matter ultimately limited in the number of ways it can combine, that there must, according to mathematics, be numerous worlds out there just like our own, including the possibility of individuals just like you and me. More simply put, the Universe is so big the odds are there are countless worlds just like ours in it.

So the many worlds, or multiverse prediction, is another way of helping us grasp the inconceivable enormity of the Universe. It’s so big, chances are there’s not only another just like you out there, there may be a countless number of yous out there. From our perspective, in which we conceive of ourselves as giants compared to things like ants, amoebas, and atoms, this may seem difficult to imagine, but when we consider, again, we are a human particle, within an Earth particle, within a supercluster particle, within a region of known space particle, within a seemingly endless Universe, that may itself be only one among an endless number of universes, it’s not only possible, it’s probable.

So what, if any, is the benefit in considering all this mind-blowing stuff? How does pondering the enormity of the Universe impact our lives here on Earth? Sadly, it seems, not enough. As miniscule as we are, less than a microbe in a cosmic body too vast to conceive, and our brief lives, less than a flash when measured by the eternal cosmic clock, so many of us continue to behave as if we believe we will live forever, accumulating more for ourselves than we could ever need at the expense of so many others and so much else. And too many feel as if their problems and desires are the most important matters in the whole world, worth hating and fighting and killing over.

⁴ Deutsch, David, *Philosophy Now* (Interview), December 20, 2000.

⁵ Brown, Julian, *Minds, Machines, and the Multiverse*, Simon & Schuster, New York, NY, 2000, p. 19.

But pondering the enormity of the Universe, and our smallness in comparison, helps us to see past our egocentric worldview and our anthropocentric myths and religions. It helps us understand that we are part of something far more than just ourselves, part of the interdependent web of existence somehow tied together with all that is. And it helps us see what a waste it is to let our problems overwhelm us in light of the endless possibilities before us.

For if we ponder the Universe long enough and often enough, it becomes possible to have another kind of religious experience, beyond selfishness, beyond beliefs, beyond knowing, beyond theology. It is the mystical experience of awe and wonder and a feeling of being part of something greater than just ourselves, a part of all that is. Ponder the enormity of the Universe long enough and it will turn you into a mystic. As the old Rabbinic saying goes, "Creation is the infinite in the garb of the finite."⁶ Or, as Meister Eckhart said, "...in the innermost and deepest aspect of the soul God creates the whole cosmos."⁷ An ancient Hindu poem says, "The Lord enters into every atom, every planet, and every living being."⁸ The great Sufi mystic, Rumi said, "I am all orders of being, the circling galaxy, the evolutionary intelligence, the lift, and the falling away."⁹ In Sanskrit, our most ancient language, the word for meditation, *Samadhi*, refers to that which "enables one to become conscious of the absolute oneness of the universe."¹⁰ And Buddhism tells us *Tathata*, translated as, *suchness*, "is the oneness of the totality of things, the great all-including whole."¹¹

And if, as the old sages believed, the secret to life is imitating the Way of Heaven, then we are in harmony with the Universe when we continue to create, continue to grow, continue to expand our consciousness, ever expanding our circle of inclusion, opening our minds, and hearts, and communities, and our arms to become far more than we ever imagined we could be.

⁶ See Fox, Matthew, *One River, Many Wells*, Jeremy P. Tarcher/Putnam, New York, NY, 2000, p.36.

⁷ Ibid. p. 32.

⁸ Ibid. p. 40.

⁹ Barks, Coleman, *The Essential Rumi*, Quality Paper Back Book Club, Harper Collins, New York, NY, 1998, p.276.

¹⁰ Ibid. p. 93.

¹¹ Ashvaghosha, Bhikshu, *The Awakening Faith*, transl. D.T. Suzuki, Open Court Books, Chicago, IL, 1900, p.55.