

Divine Principle, Quantum Physics and Interstellar Migration

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The Divine Principle is unequivocal in its view that the vastness of space, with its quintillions of stars, was carefully designed to be the home for humankind to mature, multiply and have dominion of love. This is implicit in the Divine Principle, since an unfallen human race would quickly outgrow a single planet.



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In modern cosmology, the Earth is at the center of the visible universe, a sphere with a radius of 13.5 billion light years. The boundary is 80 quintillion miles away in every direction and is visible in the light of cosmic microwave background radiation. The modern concentric spheres are crystalline but it is the Earth that rotates so that our view of them repeats every 24 hours. These spheres are not simply spatial but spatiotemporal; as we observe farther away in space, we also observe farther back in time. The Sun, for example, is eight light-minutes distant in space and eight minutes in the past as we see it.

The only galaxy visible to the naked eye (other than the home galaxy we are embedded in, the Milky Way) is Andromeda, which is 2.5 million light years distant and we see it as it was 2.5 million years ago.

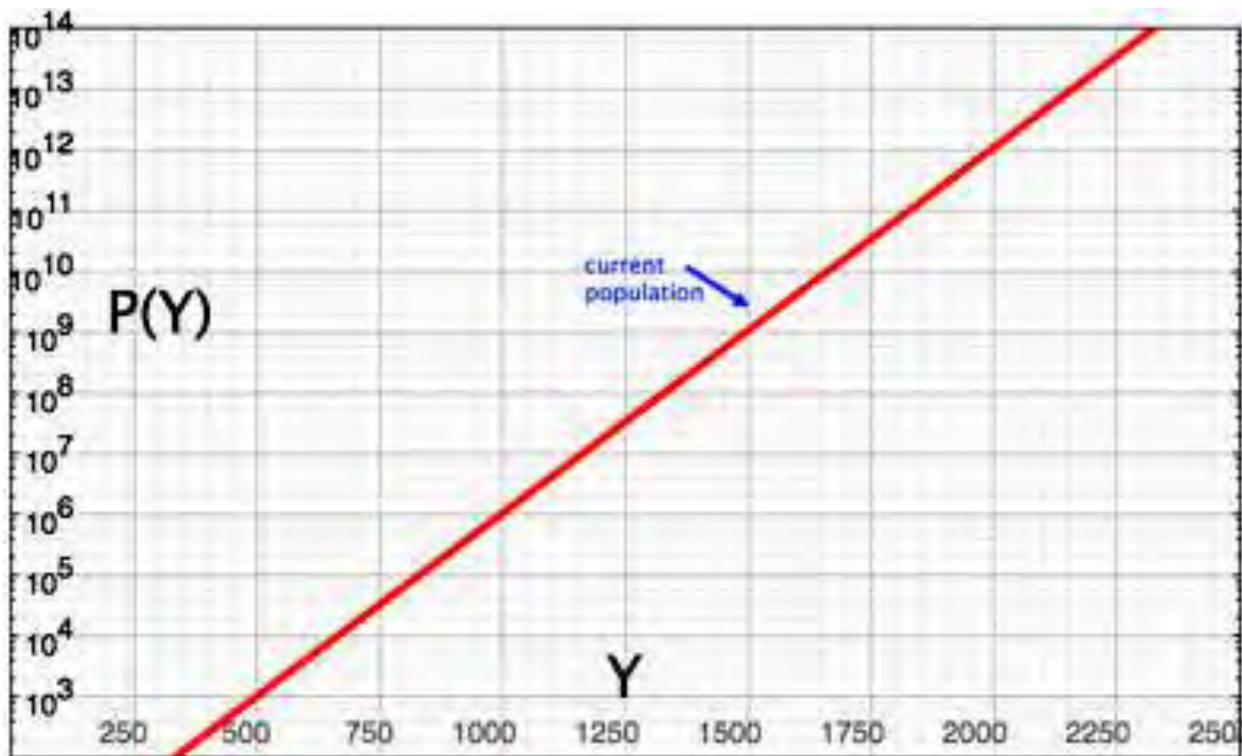
With a modern telescope, however, we can see billions of galaxies out as far as 12 billion light years and as they were 12 billion years ago. There are about 100 billion stars in the Milky Way and about the same number of galaxies in the visible universe. It is only recently that technology has developed to the point that it is apparent that most of these stars have planets revolving about them, the exoplanets.

In a True Love culture, we can reasonably expect the human population to double every 50 years or so. So Y years after Adam and Eve, the population P of the Earth would have grown to $P(Y) = 2^{Y/50}$ and the exponential growth would reach, according to the logarithmic graph below, current population levels in only 1,500 years.

By the year 2000, the human population would be one trillion! At this point, there are only two alternatives to the limited capacity of the Earth to sustain such population densities:

1. A drastic birth control policy, such as China's one child per family policy; or,
2. Trouble-free migration to other planets.

The first alternative is anathema to God's purpose of creation, so we have to consider the second alternative as the only possibility in a well-designed universe.



This is where we hit a problem. Travel through the light years of vacuum between Earth and even the nearest star is utterly impossible given current technology of space travel. True, with tremendous effort we were able to land men on the Moon, but this is only 1.3 light seconds away, while the nearest star is four light years away.

Could it be that God forgot about this hostile, immense barrier in the overall design, and that the billions of stars and billions of galaxies are forever beyond our reach? Until just recently, materialistic scientists would have answered, “Yes.”

Fortunately, for those who believe in a genius Creator, modern science has advanced beyond simple classical externals — a universe composed of material “particles” — to the quantum view that includes an internal wavefunction combined with external particles (I describe this new view briefly here, but go into more detail in my book, *The Unity of Science in Unification Thought*). The external particle aspect has a local position in spacetime; the internal wavefunction is non-local and wave-like, embracing a volume of spacetime.

The external aspect is mathematically described by the familiar real numbers with a linear size we learn about in elementary school. The internal aspect is mathematically described by the unfamiliar complex numbers with a linear size and angular rotation we only learn in advanced university courses. There is a simple connection between internal and external: The internal aspect determines the quantum probability of where the external aspect will be in spacetime; the external interactions of the external aspect alter the form and extension of the internal aspect.

Quantum probability is very real — if the quantum probability of being in a bounded volume is 100%, the external is never outside that volume; if the quantum probability of being at a location is 0%, the external aspect is never there. One of the most non-classical quantum properties is if the internal wave aspect is divided into two volumes of 50% probability (quantum lobes) separated by a zone of 0% (called a node), then the external aspect spends 50% of the time in one lobe, and 50% in the other while never appearing in the node separating them. In a sense, the particle aspect teleports or tunnels between the two lobes quite ignoring the space between the two lobes.

When two external particles share the same lobe-and-node shape wavefunction they are said to be in a state of entanglement. Each particle spends 50% of its time in one lobe and 50% in the other, teleporting instantly between the two even if the separation is light years between the lobes.

The node of zero quantum probability can be spatially tiny, as is the case in the p, d and f atomic orbitals — or spanning centimeters, as they do in the slit experiments, where large molecules appear to pass through both slits at the same time — or extend over many meters, as current experimental protocols have done — or billions of light years, as theory indicates.

Einstein, who was always suspicious of the non-classical aspects of quantum science, was a co-author of the EPR paradox (Einstein-Podolsky-Rosen paradox) that showed that either quantum science was only an approximation of a deeper local reality of hidden variables or included non-local connections that

could span interstellar distances. As Einstein could not conceive of such galactic connections, he assumed the paradox was a convincing argument for the incompleteness of the quantum perspective.

Here Einstein stumbled, for in 1964, John Bell — using very simple math — came up with a clear way of distinguishing between local hidden variables and global entangled connections called Bell's Inequalities. Local reality would obey the inequality while global reality would not. Many experiments have been performed to test Bell's theorem and all such experiments have affirmed global entanglement and denied local reality.

One well-characterized natural process for generating entangled particles involves a calcium atom absorbing a high-energy photon and then, moments later, emitting two lower-energy entangled photons that shoot off in opposite directions at light speed.

The near-vacuum of intergalactic space does contain a few calcium atoms. Consider a calcium atom 1.25 million years ago floating half the distance away to Andromeda. Absorbing a photon, it spits out a pair of entangled photons, one traveling towards Earth, and the other traveling towards Andromeda. Space is so empty that the photon will make it all the way without interacting and so spoiling the entanglement.

The good news is that if we capture the one, we have a non-local connection to Andromeda. It is quite likely that most of the cosmic rays striking the Earth have an entangled partner somewhere in this or any other galaxy. The Earth is bombarded constantly with non-local connections to all sorts of places throughout the universe. These could be the source of the interstellar highways that a beneficent God surely included in His plan for human interstellar travel and galactic colonization.

Such non-local connections when they are opened up for travel are often called wormholes, but I prefer the more dignified EPR tunnels. A train zipping through such a tunnel could simply skip over the intervening 2.5 million light years of hostile intergalactic space and provide intercity transport on different planets.

The bad news is we have yet to master and exploit the phenomenon of entanglement. Entangled particles hitting the Earth's atmosphere quickly lose their interstellar connections so a base on the Moon will probably be necessary and this will require a space elevator to be practical. Capturing and exploiting entangled connections is as yet beyond our technology, so there is a ways to go before we can get out there. Then again, the endless usefulness of electricity in this Electronic Age started just 250 years ago with Galvani and Volta playing around with frog's legs and metal wires. Much has already been accomplished, as recorded in the recent book, *The Age of Entanglement*.

Advances in science usually involve insights and hints from spirit world, and they are unlikely to wish spreading fallen culture throughout the galaxy. The needed advances will probably not occur until the *Cheon Il Guk* culture is well-established. So there is a great deal that needs to be done by the coming generations, and I am sure we wish them Godspeed.

Dr. Richard L. Lewis was raised in Wales, and obtained his B.Sc. in Biochemistry from Sussex University. He joined the Oakland Church in 1975, became a U.S. citizen, and obtained his Ph.D. in Quantum Physics from Kensington University. He was blessed in 1982 and lives with his wife in New Jersey.

Photo at top: The Andromeda galaxy.