Quantum Sound & ESP

What is? & What if?

A short quantum journey for humans

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Over the past few years, I have written articles on quantum topics including computing & cybersecurity[1], education & workforce development[2], and long-term technology trends with an eye towards the quantum future of biology and consciousness[3]. The current article builds on these concepts and posits an idea that maybe there are quantum effects that reach into our macro world dealing with sound and ESP. By first setting the scene with the 'What is?' question, we establish some basic tenants that seem very reasonable; like we as humans exist on this planet that is one of about nine (9) that orbit our Sun, which is an average star in an average galaxy that has maybe 200 billion stars[4]. And then we might agree that there are several hundred billion galaxies in the currently observable universe[5].

Next, we move to discuss the time scales of life on our planet Earth, which may be a controversial topic, but here we will focus on human life and in particular, the transition into our modern civilization which I discussed in my article, "The Quantum Universe – Atoms, Humans & Light[3]." In that article, Figure 1. Technological progress over time, was based on a chart from Buckminster Fuller's book Synergetics and showed how beginning about 300 years ago our modern civilization began taking root. As the foundation was built, humans began emitting (transmitting) and receiving (detecting) radio waves just before the year 1900. Throughout recorded history, humans have sought to understand the world we live in, where we came from and maybe where we are going as a species. Specifically, there exist (religious) texts[6, 7, 8], verbal stories, myths and legends, and many archeological finds all around the world[9] that people have examined, discussed, and written about that address these concepts. Most of these date back well before the modern era and there are debates about their meaning. One idea that seems to permeate these concepts is that there is a supernatural phenomenon (God) that created the world and all that exists (including humans) and that we can communicate with the creator by means of prayer[10] or meditation[11]. Modern science, specifically physics, astronomy, and cosmology, looks at the creation of the universe without the need for a supernatural creator and suggests that the universe was created in a 'big bang[12].' Of course, where this 'big bang' came from is still unknown and is the subject of much theoretical research. I have been interested in these topics since high school, but due to their controversial nature, have not written much about them over the years.

What is? We humans exist on this planet with everything we sense around us. There have been many nice videos created to help us understand the microscopic world we cannot see or touch directly, and there is one from 'noxnatura', titled "Quantum Dive: Zoom into the Vastly Small"[29], that I recommend watching to get some idea of the quantum world. In this video, you may notice that everything is moving, or vibrating, down to the smallest scale we can currently contemplate.

Figure 1. Images for the video Quantum Dive: Zoom into the Vastly Small.

We humans (and other animals) communicate with each other using our senses, mostly sound, light, and touch. From a physics perspective, a sound (wave or particle / phonon) is vibration of (air, water, etc.) molecules moving from the sender (vocal cords, musical instruments, etc.) to the receiver (ear drums, microphones, etc.) Light is electromagnetic waves (or particles / photons) emitted from atoms and received by other atoms (in our retinas or electronic detectors). However, our skin also sends and receives sound and light from the atoms that make up the molecules and cells. If you look through an IR (infrared) viewing scope at a person, as shown in figure 2, you will see the false color images of the heat (gradients) emitted by our skin and the IR light that is detected[13].

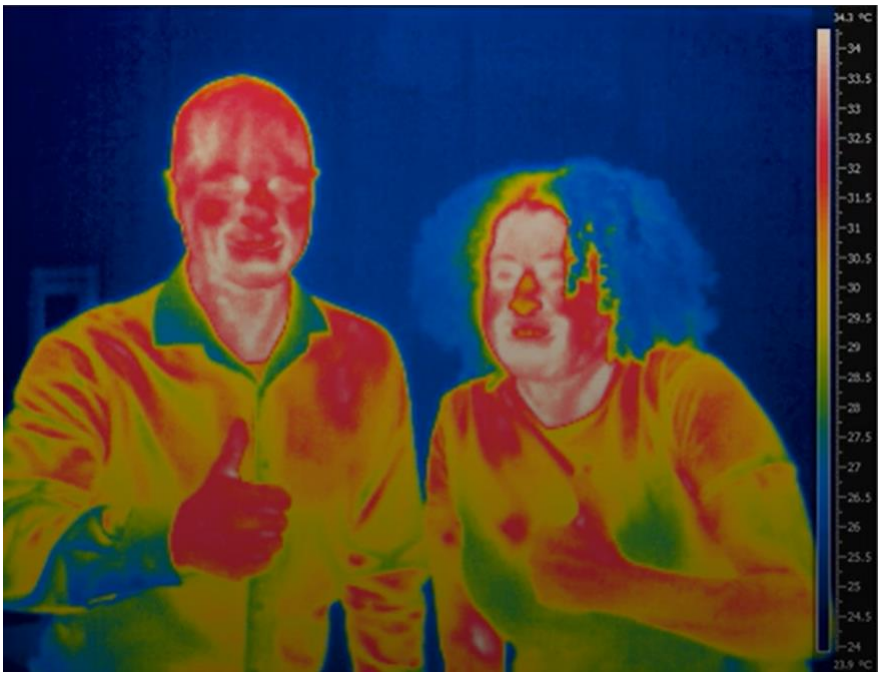

Figure 2. An IR image of two Laser Technology instructors at Irvine Valley College[13].

Are there other way humans (and other animals) communicate with each other and the environment? It is well known that birds have some magnetic navigation capabilities that help them migrate back and forth during the seasons. It has been reported that "While radio waves emitted by radio and television broadcasting and CB radio can disrupt the magnetic compass of migratory birds, those used in mobile communication networks do not because the frequencies are too high to affect their sense of orientation[14]." And "This finding also bolsters the researchers' theory that the magnetic compass sense in these birds is based on a quantum-mechanical effect (known as radical pair mechanism) located in their eyes. For this study, the team combined behavioral experiments with complex quantum-mechanical calculations on a supercomputer[15]."

What about human identical twins? There have been many research papers written about their abilities to 'sense' when each other is in distress[16]. Is it possible that they have some built-in communication system?[17] Before the modern era (before radio) many people believed that some people had the ability to sense things that are happening to others at a great distance; like spiritual people that might isolate themselves in a cave, serene garden or other remote, quite place. Modern science includes all aspects of how our brains and nervous systems operate and we continue to learn more about this every day. There are so many unknowns about reality that we can take some time to speculate about many things.

Some of our science fiction stories of the past have become our science realities of the present. Maybe some of our current era science fiction stories will become science facts in the future.

What if? Science fiction stories like Star Trek and Star Wars imagine that humans build and travel in spaceships that can travel faster than the speed of light to other star systems and maybe even other galaxies. Current mainstream science does not have any agreed upon theories that could lead us in that direction. However, as Albert Einstein once said, "Imagination is more important than knowledge.[30]" So, we have already clearly imagined this happening and some scientists have embraced this as an idea that could come to pass[31, 32, 33].

There are scientists that study and publish papers in the field of the philosophy of science and physics[18], where they seek to understand the fundamental nature of the universe we live and the various physical relationships between relativity and quantum theories; and electromagnetic and nuclear / atomic forces. The fields of neuroscience and brainwave communications are also studied intensely[19, 20]. There are people that study biophysics that might relate the above fields to each other and quantum computing[21] may play a role as we move forward to a brighter tomorrow.

The relationships I seek to explore might be called 'human physics,' which may be an extension of "Physics of the Human Body"[22], because we the people are part of the universe that is seeking to understand the universe and our place in it. And not just as individuals, but as family units and how we procreate and pass on information to next generations through our DNA and our social – educational interactions. One example I seek to understand is our human devotion to music (sound.) Why is it that groups of people tend to listen to and enjoy certain kinds of music and sounds[20]? And what about movies that tell us stories and have music and sounds to capture our attention and imagination!

There are biological entities (cells, DNA, molecules) that are built from atoms that communicate with each other within our individual systems (bodies). Atoms that make up molecules emit and absorb light (photos); but are there ways that this happens between multiple? Clearly that is happening as mentioned earlier with light, sound, and touch. But are there other means of communicating like ESP? And if so, might that involve energies at the quantum level that might include quantum entanglement, superposition, and teleportation? A recent paper titled "Macroscopic Quantum Superpositions via Dynamics in a Wide Double-Well Potential"[23] describes "*an experimental proposal for the rapid preparation of the center of mass of a levitated particle in a macroscopic quantum state, that is a state delocalized over a length scale much larger than its zero-point motion and that has no classical analog. This state is prepared by letting the particle evolve in a static double-well potential after a sudden switchoff of the harmonic trap, following initial center-of-mass cooling to a sufficiently pure quantum state. We provide a thorough analysis of the noise and decoherence that is relevant to current experiments with levitated nano- and microparticles*." Since I have some experiences with levitated microparticles from my college years[24, 25] and subsequently in my work with PI (Physik Instrumente)[27], I will attempt to comprehend the details and speak to other local experts[28] to see if there may be a way to learn more along the concepts discussed above in this paper.

Conclusions

The story of this paper, along with my previous articles, seeks to take the readers on a journey from our everyday experiences to the quantum world that exists at spatial and temporal levels that underpin the very foundation of our universe and our knowledge. The first quantum revolution that started over 100 years ago brought us to our current modern civilization with the transistor, classical computer, and communication technologies. We are currently in the 2nd quantum revolution that uses the concepts of superposition, entanglement, and teleportation for quantum computing, communication, and sensing.

What if this 2nd quantum revolution brings us a deeper understanding of how humans (and other animals) communicate with each other at levels that seem mysterious to us now but may become scientific facts in the future. And then maybe we can use this new information to improve our lives and perhaps help us move out into the Milky Way galaxy and learn to live on other planets orbiting other stars?

Link to references

Donn M. Silberman is an SPIE Fellow, Past President and Fellow of the Optical Society of Southern California and Senior Member Emeritus of Optica (formerly the Optical Society of America.) He is also a member of the Quantum Economic Development Consortium (QED-C), where he volunteers on their Workforce Development Technical Advisory Committee (TAC). He has provided technical engineering, management, and education to many precision optical and optical instrument companies and educational entities in Southern California for over 35 years. Retired from his industry career in early 2021, he has been focusing on current and new quantum technological applications as they are impacting the lives of people globally. He has also been a volunteer with Vital Link, a 501(c)3 Non-profit in Orange County, California, for 10 years and now serves on their Board of Directors inspiring students to explore and experience education and career pathways that secure their future.

Donn consulted with EdQuantum, an NSF funded educational program to develop curriculum and lab experiments for community college students that have completed at least some laser electro-optics courses and he continues this path on the QED-C Workforce Development TAC. He holds a BS in Engineering Physics from the Univ. of Arizona (Honors in Physics) and an MS in Technology Management from Pepperdine University.

He was an advisor to Irvine Valley College's Laser Electro-Optics Technology programs from the early 1990s to 2020, and he helped move the program to Pasadena City College and continues to advise and assist. Donn founded the UC Irvine's Optical Engineering and Optical Instrument Design programs in 2009 and continues to support those programs; and he received the UC Irvine Extension's (now the Division of Continuing Education - DCE) Dean's Outstanding Service Award in Nov 2012; and was the 2012-2013 Univ. of Arizona Honor's College Advocate for Education Award Winner.

Donn was a Senior Applications Engineer for PI (Physik Instrumente) L.P. for over 10 years, where he worked on many world-class optical instruments for science and industry, including the world's largest astronomical and solar telescopes and the highest precision measurement systems for today's Quantum Photonic (Silicon) Integrated Circuits (QPICs) that are being used in Quantum Computers.

For exercise, Donn trained for and participated in over 65 Sprint and Olympic distance triathlons starting in 2008 and is back racing again after the COVID years. Donn lives with his wife Ana Maria in Rancho Mission Viejo. Their son, Michael "Six" Silberman lives in London and is currently a Postdoctoral Research Fellow at the University of Oxford, Faculty of Law and Department of Computer Science.