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Information theory and dimensions: Enhancing Quantum Mechanics

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ABSTRACT

This paper seeks to discuss why information theory is so important. What is information, knowledge is interaction of human mind and information, but there is a difference between information theory and knowledge theory. Look into information and particle theory and see how information must have its roots in particle theory. This leads to the concept of spatial dimensions, information density, complexity, particle density, can there be particle complexity, and re-looking at the double slit experiment and quantum tunneling. Information functions/ relations are discussed.

Indexing terms/Keywords

Information, information density, information complexity, particles, holographic universe, quantum tunneling, knowledge, time

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If dictionaries are enough to allow us to understand a discipline there would be no need to do anything but read dictionaries. Dictionaries give what we have all somehow consciously accepted as the best definition of a word. Reference books are reference books we have consciously accepted them to be. Therefore conscious has a lot to do with trust, trusting an outcome, trusting that we will learn from the reference is an expectation of truth from the said book. When talking of reference books like dictionaries we believe in an outcome, we believe there is an extremely high probability that the dictionary is true, belief very much tied to the conscious, we have consciously believed that the information from the dictionary to be true, we have affected the outcome consciously as a society.

Looking up information in the internet website www.dictionary.com, information is defined as - knowledge, communicated or received concerning a particular fact or circumstances; news.

Clearly a dictionary is not enough to understand a concept, especially to any reader concerned with information in terms of particles, in terms of existence, this definition is not only insufficient but somehow fuzzy, knowledge is defined as - acquaintance with fact, truths, or principles, as from study or investigation; general erudition: knowledge of many things.

It seems information and knowledge are the same thing. This can never be, that would mean there is no information theory but knowledge theory, this can never be, no serious reader in quantum theory would ever consider this, let alone mix them up, what then is information.

Those understanding particles with the knowledge that has been acquired over the centuries and millennia understand that information is everything and everything is information. If information is everything with the dictionary definition it follows that knowledge being information is everything too leading to foolish conclusions that what we know is everything. Knowledge has to do with what humans know, humans do not know everything. Physicists consciously decided to think of information as everything, centuries of thought allowed them to take the next logical step and see that everything is just information, data if you cannot understand the true meaning of that data, but to consider it data would not be wrong, just not deep enough.

Those insisting on trying to mix the two, knowledge theory and information theory will at best mislead themselves. If information is everything what then is a more appropriate definition of information for those understanding that information is everything, a meaningful definition clearly separating knowledge theory and information theory.

In a blog entry entitled 'information and quantum mechanics' information was said to be "the instructions that give a particle its particular characteristics", we can continue such that the particle is information and information is the particle.

From this definition and more precise definitions in time, it is clear that information and knowledge are separate. Knowledge is a human factor, knowledge is only the information we know, the only way to get any scientific principles from knowledge is to look at it as the information we know in relation to the above definition that information is the information that gives a particle its particular characteristics. The two, information and knowledge, the two are vastly different. Knowledge for example can be related to time whereas information can not be related to time.

It takes time for an individual to gain knowledge, it takes time for societies knowledge base to grow. Information is always there, at its most basic information is there before time. Being related to time the concept of relativity comes to play with knowledge an impossibility with information as information is always there and ultimately constant. When growth of knowledge increases faster time slows down, time slows down because more work is being done for the same unit of time.

When somebody tells you what you already know, it adds nothing to your knowledge base, in mathematical terms 1 + 1 = 1. Information does not have this characteristics because information creates humans, humans are just an information pack, information can not exhibit the properties of 1 + 1 = 1. Even if you know it or not information is always there. 2 protons might be similar information packs, once you know one, you know the other but in terms of information there are two packs of information even if they are similar they can never be the same, but in terms of knowledge they are the same.

The original particle, the original information is the closest thing to zero dimensions in existence. We should understand this by the end of this paper. Just higher up in dimensions is the strings that this original particle creates by coming together. Strings are one dimensional and off different lengths, this represents the first variation in existence. Strings get together to create formless mass and if enough information in the form of strings bands together the formless matter will take up form in the manner of stable particles for our dimension, particles like protons, neutrons, electrons, photons, considered basic particles for existence, but literally most complicated information packs in the field, in the 2 dimensional form.

If one confuses information and knowledge they will be tempted to say Information is exponentially related to dimensions:

$I = f(\exp d) = f(e^{d})$ where

I - information

d - dimensions

This immediately gives us an enormous amount of information thanks to the partner of information, mathematics. Energy too must be exponentially related to dimensions.

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There is great logic behind the idea of information being exponentially related to dimensions but it is wrong. Humans still somehow believe they are the center of the universe, we look around see the great variation in flora and fauna, mountains, valleys, thunderstorms, hail, and earthquakes. If there is so much variation in what we can see imagine heaven, and heaven must be a higher dimension, there must be exponentially more variety in heaven.

More scientifically sound theories in knowledge were developed in knowledge economics, especially as explained in the paper "The long and short term behavior of knowledge". if you believe information is such that 1 + 1 = 1, a property of knowledge, then the only logical conclusion you can reach is that with increase in knowledge there ends up with an exponential increase in knowledge use because of greater number of permutations that are allowed a key reason why some people wrongly believe in a technological singularity.

However when it comes to information even if information is identical, each information package is unique, unique because it exists. What we consider fundamental particles are made up of other pieces of information, that is each piece of information independent of the other but when they come together create say a photon and the such, and these are independent and created by some random distribution. An electron is made up of information that is otherwise not dense enough to exist in this dimension, if all the particles are made up of more than one piece of information then there is greater variety in the lower dimensions. The relationship between information and dimensions is logarithmic:

I = f(logd)

Dimensions appear because of information density, important to remember. When an information package becomes too dense it moves up a dimension.

We could leave the function as I = f(logd) but this would not do the paper justice. Why did we say I = f(logd), it is because the number of permutations decrease the more dense the knowledge gets. In case the language is poor, mathematics can resolve our problem by what is meant by number of permutations decreasing. Let I_p = number of permutations of information and d = dimensions, then:

$I_p = f(\log d)$.

Let us look at a 3 dimensional universe we know so well, our own. Let us relate information and information density, information, I, = $f(\log d_3)$. Therefore total information is just a summation of all the dimensions of the function $f(\log d_i)$, $I = \sum f(\log d_i)$

It has been explained in article entitled "Information and Quantum Mechanics" that function E = MC2 can be in information terms be

E = f(I) - n you could logically reduce it to E = I - n where:

E = energy

I = information

n = amount of information with no energy.

n is real, we have particles with no mass most famous Higgs Boson, particles are information, therefore we must subtract this information if $E = MC^2$ is correct. Dealing with information, if energy is the ability to do work, we now know that there are particles with no mass that move and can be split, work is being done, then when we understand information i is possible to say $E = MC^2$ only holds in the third dimension because seemingly there is still action taking place in a world with no mass, in a dimension with no mass. If this is true then E = f(I) will hold in all dimensions, with all particles.

Such a direct relationship between energy and information will mean energy is also exponentially related to dimensions as information is. Information is exponentially related to dimensions as the more dense information becomes the greater the number of permutations possible in combining information.

Information density

Information density is the amount of information a body has. The least dense region of information is the one dimensional zone, the zone of strings and the original particle that is the closest thing in existence to zero dimensions. Strings being many original particles combined in different combinations are more dense than the singular original particle because there are more of them to create a string. By having more original particles than a singular particle strings are not only more dense but have added complexity.

As strings combine they create two dimensional particles that exist in the quantum field. There is therefore greater information in two dimensional field than in the one dimensional zone of the smallest of strings. As more information combines information becomes more dense until information in the field is dense enough to exist in 3 dimensions as our basic particles. Information is more dense and more complex in 3 dimensions than in 2 dimensional fields. Therefore information has to be dense enough to be in a certain dimension, with each dimension more and more information clumps together becoming more dense and complex.

However information density and complexity are not the same thing. The sun is information dense but a human being is more information complex than the sun, a human thinks, has a liver, kidneys, bones, complexity. One could very well argue that the more complex the information the less symmetry one gets, humans are not symmetrical, our heart for one is more to one side of the body.

Therefore we can get possibly particles with the same information density but different complexities. Therefore the two particles have similar size, but one particle has more varied information making it more complex. To understand the remainder of this paragraph let us look at what is most familiar to human beings, the third dimension. This dimension at the upper end we have d3, at lower end d2. Approaching d2 the information is less dense than information approaching d4. Approaching d2 we have information packets or packages the one the reader prefers, that are not dense enough to survive alone in 3 dimensions but too dense for 2 dimensions, particles like electrons, neutrons and protons, that is why they join together to create more dense information, an atom, approaching d2, we reach the basic particles of 3 dimensional information.

The most dense information of course in 3 dimensions being the black hole. Perhaps the most dense information in 2 dimensions as approach 3 dimensions are sort of 2 dimensional black holes. The implications of course are incredible. That means the stable particles like photons are the most basic stable information in 3 dimensions and the black hole most dense, the size difference is incredible, in the trillions of times. It can then be related to the 2 dimensional plane, it would mean particles just below the size of an electron, or proton are the most dense and information packages possibly millions of times smaller it would be getting more and more weird.

If the wave is 2d then the field is 2d. A quantum wave must be action taking place in the quantum field. As suggested in an article "Dear Physics and scientific community at large," a little variation in double slit experiment would allow us to determine the dimension of the wave, one slit must be at least half the size of the other slit. If top behaves like a particle but lower half like a wave, we have a 2 dimensional phenomenon, that is all there is to it.

Critical Thoughts

Information can allow us to think about questions that otherwise would be very difficult to answer if we did not think of information as everything. Please do not confuse information and knowledge, we do not know everything, to know everything is to know konke in knowledge terms. Can information give a sound reasoning for example to the concept of quantum tunneling, going back in time, holographic universe and what appears as particles cloning themselves.

Take this double slit experiment variation where an observation takes place just before wave hits a screen to be observed. The wave immediately collapses and the phenomenon acts like a particle, as if it was a particle from the moment it went through the slits meaning the particle has somehow gone back in time changed its behavior from wave to particle and all this is done instantaneously. Did the particle go back in time?

A wave is information and has been more than satisfactory proved to be a probability of the likely path of the particle that has just interfered with itself. That information is randomly distributed, a wave can be considered an information rich phenomenon. The distribution pattern must include the probability of what path the phenomenon will take if it is observed and if it is not observed. Being a probability distribution, the particle does not go back in time, it merely collapses by an already set probability distribution.

That the particle collapses to a preset distribution rather than go back in time should not be such a shock, the slits are the last obstacle the particle therefore any probability distribution has to include the effects of observation given the characteristics of the slits.

The question of quantum tunneling is a puzzling at first glance until we truly grasp the clarity once we accept what information is. There are trillions of stars out there, all stars but not exactly the same. Anybody reading this is a human, but we are not all the same. The more complex the information the less likely it is to be similar. This idea was postulated in the article, "Information Theory Answers Quantum Tunneling."

What is an electron, it is an information package, it a basic information package for the 3 dimensional universe, but it itself is created by smaller information packages. To be an electron not all information needs to be identical, what is important in our sense is the amount of information, and that means it must weigh a certain amount. The fundamental particle one dimensional and closest thing to zero dimensions, an electron is not it. That we do not have the tools to go to the constituents of an electron does not mean that it is true that an electron is an elementary particle, it is too big. Nothing that is stable in the third dimension is anywhere near the most elementary information package, that is found in one dimension, one dimension less than the quantum field, a field filled with information packages that are too big for one dimension, too dense for one dimension, but not dense enough to exist in the third dimension. As long as basic criteria remains the same that defines a particle, after all humans are not identical even genetically, we are in the range of 0.5% to 0.1% difference, we know this thanks to DNA.

Electrons too need not have identical information to be electrons, they need to have enough information that they behave similar. This is the only way to rationally explain quantum tunneling unless of course one believes particle is borrowing energy from the future to get through the barrier. Why are they not all borrowing from the future, much further investigation needs to take place. Some electrons having less information just by that tiniest of fractions makes them less stable allowing them to tunnel.

Understanding that information packages need not be identical for them to fall into the set of say particle x, should make common sense, the universe hardly anywhere has no variety, nothing is absolutely identical, otherwise we would all look

the same, when did the universe decide to add variation, with human beings? As there is variation and understanding that as the barrier gets smaller and smaller the effects of quantum tunneling become less effective, there is a size of the barrier when all the particles pass through, even if that size is zero.

We then can have a relationship between the size of particle and the size of the barrier. It is most likely that the relationship will be simple and direct such as $S_p = a - bS_b$ limited by $S_p = 0$ or $S_b = 0$ such that:

S_p = size of particle

S_b = size of barrier

a = constant

b = constant

Experimentation probably has been done, matter of verification, it can only mean particle size, difference in information content. Collecting data, or carrying out more measured experiment, reducing the size of barrier in measured amounts. We will also most likely find a familiar random pattern of the likes of a chi - squared or gamma distribution.

This has extremely important implications in technology application. Industry, that part dealing with quantum technology such as quantum computers, quantum instrumentation, one would prefer particles that are stable but have least amount of information thus needing less energy for desirable quantum effects.

Holographic Universe:

Our existence, the universe we know and understand, what we consider the material, our 3 dimensional existence, every single particle has its origins in the two dimensional quantum field. The most dense information a package in this 3 dimensional existence is a black hole, a vast store of information.That would mean that the 2 dimensional quantum field is our barrier giving us entanglement, once instruments can overcome that it would be a triumph as greater variety of information will be available to us, an exponentially greater amount of information, and an exponentially greater amount of knowledge.

Once again we do not fully understand the black hole at the other end of the information density of this dimension. It is as puzzling as entanglement, another barrier? We have just been informed by other seekers of this type of knowledge that a black hole has information around it and that information is never destroyed. We can argue that this information is the beginnings of another universe similar to our own, but the more one understands information perhaps this is seeds for the 4th dimension, it is an immense amount to take in, because we would be part of what is being described as a holograph for the 4th dimension. The third dimension is just information for the next dimension up. Strangely this supports an idea just starting to make its rounds in quantum theory that maybe there are black holes in the middle of particles, or something similar, a 2 dimensional black hole. Information theory as we have just read supports this idea that particles are the result of information coming together on a grand scale in the 2 dimensional field allowing it to be stable in the 3 dimensional existence.

This brings about the question of a finite and infinite universe. If information for 3rd dimension comes from a 2 dimensional field and 3 dimensional plane is information for 4^{th} dimension, what happens to the lower dimensions. If they cease to exist once everything is in a black hole that is end of 3 dimensions and all information becomes more dense in 4 dimensions. This line of thought would imply that there is no more 1 or 2 dimensions, all their information moved up one dimension. This would comply with the idea that our universe is made up of finite amount of material a debate sparked by arguing the nature of infinity in theory and in reality.

If anything faster than light is to be discovered it would be near black holes, if rate of changes indeed does slow the higher the dimensions because of the amount of space taken, then that would mean black holes are foundation for 4 dimensional existence. Some argue of wormholes near and about black holes, entanglement on a giant scale between two dense information packages. A wormhole involves a different kind of entanglement than we see with basic information packs in this dimension, entanglement between particles involves a one dimensional string. A wormhole would then involve a 2 dimensional field.

Does third dimension survive though? It can only if the original particle, the one dimensional particle the closest thing to zero dimensions is self-replicating to maintain existence of lower dimensions. This thought can not be just brushed aside, we see the remnants of this behavior in the double slit experiment, an unstable replication because at the end the wave collapses to one particle not two, there has been interference, there is a wave.

If all dimensions are maintained then existence truly is infinite or recycling on a scale so grand that the infinite dimension can continuously absorb more and more information, unless it is recycled to one dimension.

Going beyond entanglement into the field, in the dimension that the higgs boson is stable will we be able fully understand quantum mechanics and dimensions. What will we find there, the forces there what are they like. In the 2 dimensional field what forces are the most important, a good guess is gravity will be far stronger than it is in the 3 dimensional universe, but what other forces are there. For one, the electromagnetic force is not as prevalent in the majority of the 2 dimensional field, electrons are not formed, information creating electrons is largely dispersed. Electrons only appear at the end when there is enough information density for an electron to form.

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The 4th dimension will have new forces that we do not yet understand and the power of electromagnetism would seemingly be reduced. But no force actually is reduced or weak, gravity remains the same for example but in relative terms because of introductions of new forces because of information density. Once we understand the forces most prevalent in the 2 dimensional field including gravity, though gravity is only force we feel from the field, the other forces are not destroyed, they are relatively that much weaker in the 3rd dimension to be non existent, but they are there we need to find them.

All forces are created by the interaction of information. All forces are related to information density and complexity, all forces are information.

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