

## Article

# The World as a Virtual Reality

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### Abstract

This essay summarizes a scientific description of the world as a virtual reality that arises holographically from the true spiritual nature of consciousness. This description is based on the natural interpretation of the holographic principle of quantum gravity, which is the most fundamental scientific principle that unifies relativity theory with quantum theory.

**Keywords:** virtual reality world, holographic principle, consciousness, spirit

Modern theoretical physics, in its attempt to unify relativity theory with quantum theory, has culminated in the holographic principle of quantum gravity. The natural interpretation of this principle leads to a scientific description of the world as a virtual reality that arises holographically from the true spiritual nature of consciousness. The details of this description are discussed at length in the previously published article: *What is Reality in a Holographic World?* The purpose of this article is to further discuss the nature of the description, and to make contact with the virtual reality conjecture of Brian Whitworth.

All scientific laws make sense once we understand the world as a virtual reality created out of the true nature of consciousness. In a physical sense, that true nature is empty space. In a mental sense, that true nature is undifferentiated consciousness. The most accurate scientific description that can be given of that true nature is to understand it as a void of undifferentiated consciousness. In the sense of modern theoretical physics, the world arises holographically from that void. In the sense of all great spiritual traditions, our spiritual nature as a pure presence of consciousness also arises from that void.

The nature of how a perceivable world arises from the void is inherent in the holographic principle of quantum gravity. Images of the perceivable world arise holographically from an event horizon, which acts like a holographic viewing screen that encodes bits of information. Each pixel on the screen encodes a bit of information. The covariant entropy bound establishes that the area of a pixel is four Planck areas, and each pixel encodes a fundamental quantized bit of information, like a spin  $\frac{1}{2}$  variable that encodes information in a binary code. Hawking found the total number of bits of information encoded on an event horizon of area  $A$  is  $b=A/4\ell^2$ , where the Planck area  $\ell^2=Gh/2\pi c^3$ . If information is encoded in a binary code, the total number of possible quantum states that can be defined on the event horizon is given by  $N=2^b$ . The maximal entropy of any system defined on the event horizon, which is black hole entropy, is given by  $S_{BH}=k\log N=kA/4\ell^2$ .

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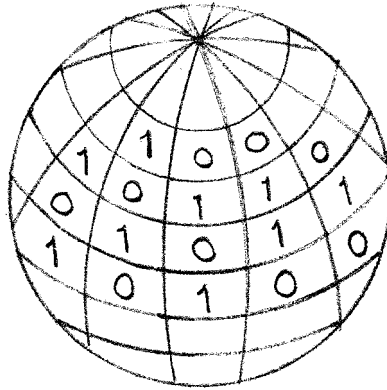


Figure 1. Information on a black hole event horizon. Each pixel on the horizon encodes a quantized bit of information, such as information encoded by spin  $\frac{1}{2}$  variables in a binary code. The radius of the event horizon is related to black hole mass as  $R=2GM/c^2$ . The gravitational attraction of the black hole is so strong at the horizon that even light cannot escape, but quantum uncertainty in energy allows for radiation from the horizon with a wavelength set by the circumference of the horizon,  $\lambda=2\pi R$ . Each such photon radiated away from the horizon carries away an energy  $E=h\nu=hc/\lambda$ . This results in a decrease in black hole mass and a decrease in the surface area of the horizon, and determines the area of a pixel that encodes a bit of information in terms of the Planck area  $\ell^2=Gh/2\pi c^3$ .

The covariant entropy bound is based on the idea of a light sheet, and establishes that all the information for the images of anything observed in space is holographically defined on the event horizon. If the event horizon is a spherical surface of radius  $R$  with an area  $A=4\pi R^2$ , like the event horizon of a black hole or a cosmic horizon, then the observable images of anything holographically defined on the event horizon can be projected to a focal point of perception located at the central point of view of that spherical surface.

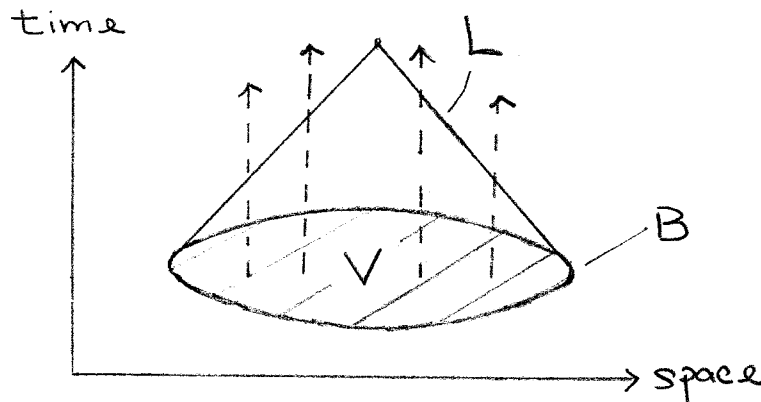


Figure 2. Space-like projection theorem. If the surface  $B$  has a complete future directed light-sheet  $L$ , then the covariant entropy bound applies to any spatial region  $V$  enclosed by  $B$ . The entropy in a spatial region  $V$  enclosed by  $B$  is bounded as  $S(V)\leq kA/4\ell^2$ .

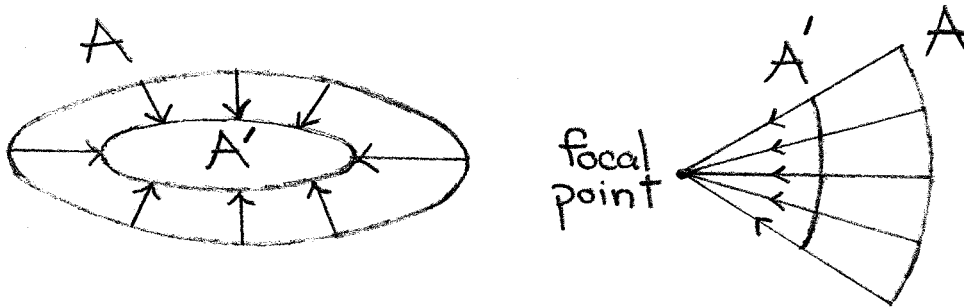


Figure 3. Local definition of "inside". Ingoing light rays orthogonal to a convex surface in a Euclidean geometry span decreasing area. Light rays locally intersect at a focal point.

Each viewing screen is only an event horizon that holographically defines a state of information for the images perceived in space from that particular point of view. The event horizon always arises from the central point of view of the observer. In the sense of a Penrose diagram, the observer's entire observable world is limited by the event horizon.

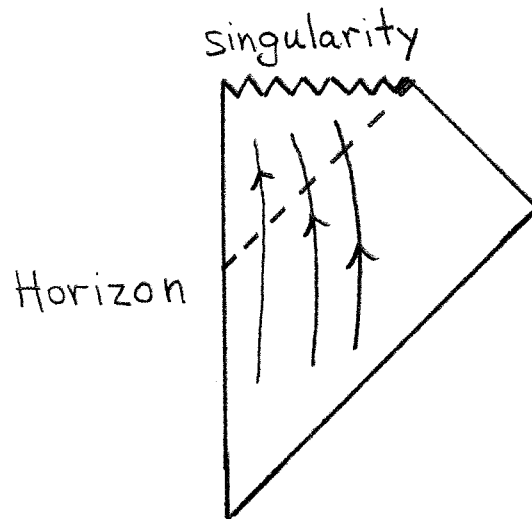


Figure 4. Penrose diagram depicting gravitational collapse into a black hole.

Modern physics conceptualizes the void as an empty background space. Empty space is not the same as the 3+1 dimensional space-time we observe, which is only holographic in nature. In the sense of modern physics, the void is the vacuum state or ground state from which all excited states of information and energy arise. Every excited state is a state of information defined on an event horizon. Each pixel on the screen encodes a bit of information, and viewing screens are animated over a sequence of events in the flow of

energy. The natural interpretation of the holographic principle is that an observer arises at a point of view in empty space while an observable world arises on a viewing screen.

The natural way to interpret the holographic principle is the viewing screen projects perceivable images to a focal point of perception, where a presence of consciousness is always present to perceive those images. In this sense, the observer is a pure presence of consciousness that arises at a focal point of perception in empty space. In a spiritual sense, an individual presence of consciousness is divided from its source, which is a void of undifferentiated consciousness. In the sense of modern theoretical physics, both the observer and observed arise together from the void. As the viewing screen arises from the void, an observer arises from the void at the central point of view of the viewing screen.

In the sense of quantum theory, each viewing screen is a state of information that defines its own world, and is always observed from its own central point of view. The viewing screen is an event horizon that limits the observer's entire observable world. Information encoded on any particular viewing screen, as observed from that particular point of view, can be shared with information encoded on other viewing screens to the degree those bits of information interact with each other, and those different states of information become entangled together. Interactions allow different states of information to share information with each other through the process of quantum entanglement.

In this view of things, consensual reality is best understood as many different worlds that share information with each other. Each world is defined by a state of information that is encoded on its own viewing screen and is observed from its own point of view. Different viewing screens become entangled with each other in the sense of quantum entanglement, as bits of information interact with each other. Each observer, present at a focal point of perception, perceives its own world. Each observer is a presence of consciousness.

Since the viewing screen is holographic in nature, the images perceived in that world appear three dimensional, even though all the information for that world is defined on the two dimensional bounding surface of an event horizon. Holography is only possible since those images are coherently organized, and hold together as a bound state of information over a sequence of events. Coherent organization allows images to become animated over a sequence of events in the flow of energy, just like the animated images of a movie. In this sense, a perceivable world is nothing more than bits of information coherently organized on a viewing screen. Coherent organization allows for the projection of images from a viewing screen to a point of view, and for the animation of those images over a sequence of events in the flow of energy, just like the animated images of a movie.

Coherent organization of information allows for bound states to form within bound states. The viewing screen itself is a bound state of information, since the event horizon is a bounding surface that holographically defines the observer's entire observable world. Within that world smaller bound states can form, like the bound state of a body. Within a body, the bound states of body organ systems can develop. Within a body organ system the bound states of cells can develop. Within a cell the bound states of atoms and

molecules can develop. But all of these bound states are holographically defined by the information encoded on the viewing screen. Even the information for elementary particles, like the electron and photon, are holographically defined on the screen.

The viewing screen always arises from the central point of view of the observer. The event horizon arises in a natural way if that presence of consciousness is in an accelerating frame of reference, which implies the expenditure of energy, just like a rocket ship that accelerates through space. It is the focal point of perception itself that is in the accelerating frame of reference and that expends energy. The event horizon arises from the central point of view of the observer in that accelerating frame of reference. The event horizon acts as a holographic viewing screen that holographically defines the observer's observable world. The viewing screen defines a state of information in the sense of quantum theory. That world may share information with other worlds defined on other viewing screens and observed from other points of view if those different states of information become entangled with each other.

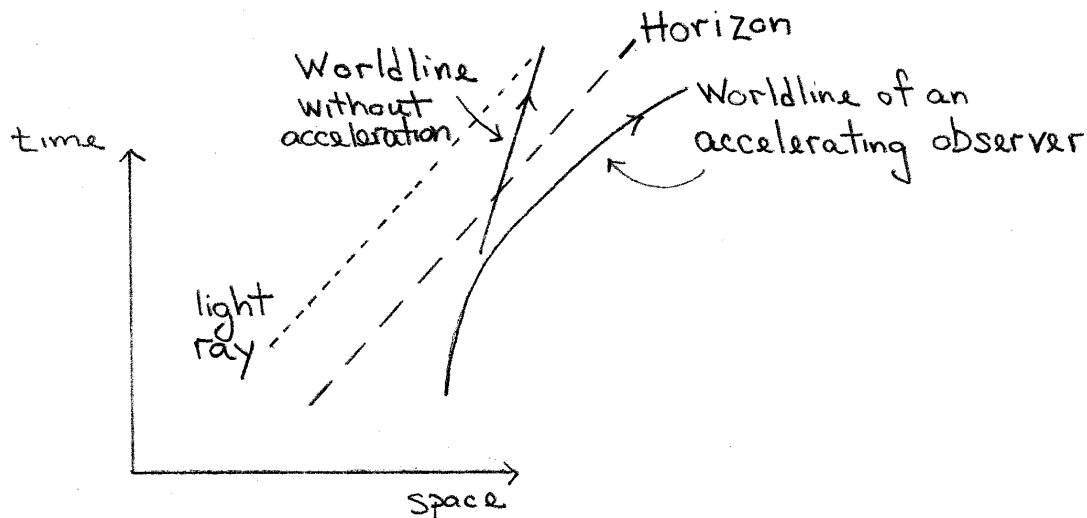


Figure 5. An observer in an accelerating frame of reference observes a world limited by an event horizon. As long as that observer follows a worldline that accelerates, a light ray can never reach the observer from the other side. If the acceleration comes to an end, the horizon disappears. An accelerating frame of reference implies the expenditure of energy.

The principle of equivalence is the natural way to understand how the observer's world arises from its point of view if that observer is in an accelerating frame of reference. The nature of a force is nothing more than an accelerating frame of reference. Forces are the nature of interactions with which bits of information defined on viewing screens interact with each other. That allows different viewing screens to share information with each other, but also allows information on a particular viewing screen to become coherently organized, as bits of information tend to align with each other like little magnets.

Alignment of information naturally arises from entangled quantum states, like entangled spin variables. Spin networks demonstrate that entangled spin variables tend to align with

each other like little magnets, as spin angular momentum adds together. In this sense, the images holographically projected from a viewing screen are coherently organized bound states of information animated in the flow of energy. The expenditure of energy inherent in the observer's accelerating frame of reference explains in a natural way how that world of images is animated over a sequence of events in the flow of energy.

Those images are composed of coherently organized bits of information. Each pixel on the screen encodes a bit of information. Images hold together over a sequence of events in the flow of energy, and are animated like the images of a movie. Images appear to move relative to each other, but that appearance of movement is an illusion, like the movement of animated images on a computer screen. Only the bits of information change their configuration state from one moment to the next moment, like a bit of information defined in a binary code of 1's and 0's that can switch back and forth. The bits of information can switch back and forth and change their configuration state in any state of information defined on a viewing screen, but those bits of information can also align with each other due to their interactions, and form bound states of information.

The principle of equivalence is the easy part of relativity theory to understand. A force is nothing more than an acceleration. In the sense of the holographic principle, every force implies the accelerating frame of reference of an observer. The difficult part of relativity theory to understand is the principle of relativity, which states that the speed of light is the same for all observers, no matter their relative state of movement. But the constancy of the speed of light for all observers is a natural consequence of a virtual reality world.

That virtual reality world holographically arises on a viewing screen. Animated images projected from the viewing screen appear to move relative to each other, but that motion is an illusion. All that really happens is the configuration states of information defined on viewing screens are updated from one perceivable event to the next perceivable event.

The laws of physics that describe how things interact with each other over a sequence of events are like computer programs that update the configuration states of those states of information from one moment to the next moment. In the sense of computer processing, the rate of a processing cycle is a constant of the computer. A processing cycle arises as a configuration state is updated from one event to the next event. Each event defines a configuration state of information on the viewing screen, just like the frames of a movie that are animated over a sequence of events. The rate of those processing cycles is a constant of the computer, but the size of the pixels that encode bits of information is also a constant of the computer. In the language of modern physics, the intrinsic processing rate is a unit of Planck time, and the size of a pixel is a unit of Planck length. The speed of light is a constant since it is a unit of Planck length divided by a unit of Planck time, which gives the maximal rate of information transfer in any direction. In a computer generated virtual reality world, the speed of light must be a constant for all observers.

So far so good. This is how the holographic principle incorporates relativity theory, but what about quantum theory? The fundamental nature of the holographic principle is the

nature of Hawking radiation. In any quantum theory we want to discuss, like quantum field theory or string theory, there are some kinds of particles that arise from the vacuum state as virtual particle-antiparticle pairs. The vacuum state is understood as empty space, and virtual pairs arise due to quantum uncertainty in energy. In QFT we understand those particles as point particles, and in string theory as vibrating strands of string.

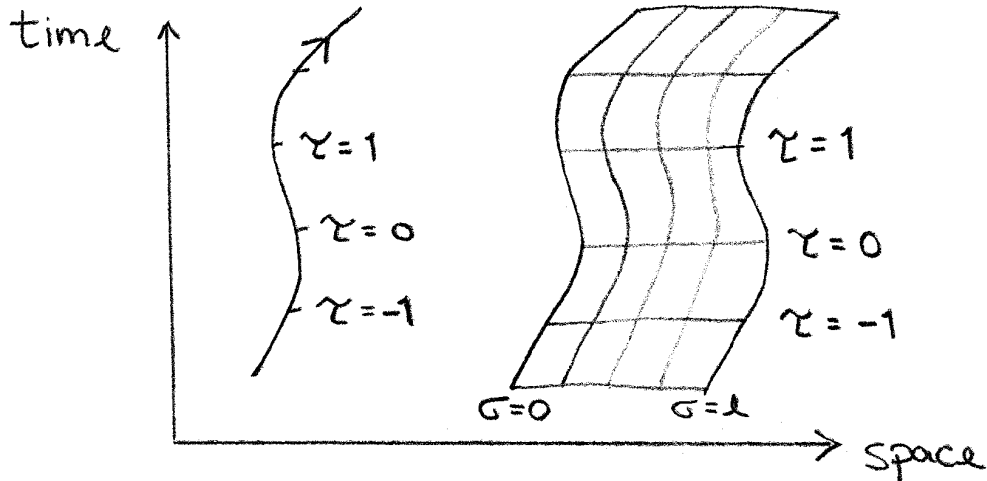


Figure 6. Parameterization of the world-line of a point particle, and of the world-sheet of an open string. Particle action is geometrically related to the length of the particle's world-line. String action is geometrically related to the area of the string's world-sheet.

In QFT we understand the nature of a force as an exchange of particles between other particles, and in string theory the description is much the same.

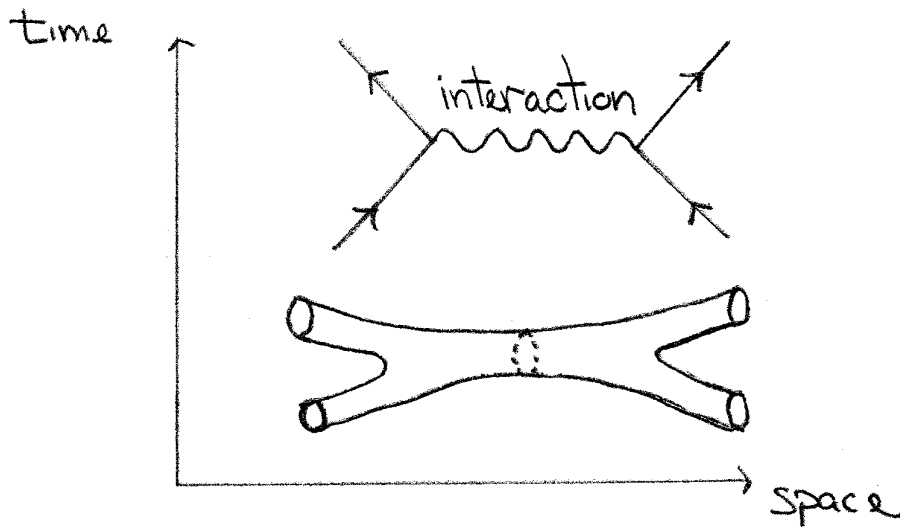


Figure 7. Two particles interact with each other through the exchange of another particle, like two electrons that interact through the exchange of a photon, which is the nature of the electromagnetic force as conceptualized in QFT. The trajectory of each particle is deflected as a consequence of the interaction. In much the same way, two closed strings interact with each other as they collide together and merge into a third string, which subsequently can split apart into two closed strings that travel along deflected trajectories.

In the viewing screen description there are no particles, only bits of information encoded on an event horizon. The image of the particle is holographically projected from the viewing screen to a point of view. The viewing screen and the point of view both arise in empty space. In the viewing screen description, empty space is truly empty. Our QFT description of virtual particle-antiparticle pairs arising in empty space is a holographic description. The more fundamental description is the viewing screen description.

In the vicinity of an event horizon, virtual pairs can appear to separate, as observed by a distant observer. The virtual antiparticle can appear to cross the event horizon and become unobservable, while the virtual particle appears to move toward the observer and becomes observable. Energy conservation requires the virtual particle to carry an equal but opposite amount of energy as the antiparticle. Virtual pairs are created out of nothing and normally annihilate back into nothing in a short period of time as specified by the uncertainty principle, but in the vicinity of an event horizon they can appear to separate, and the event horizon can appear to radiate positive energy, called Hawking radiation.

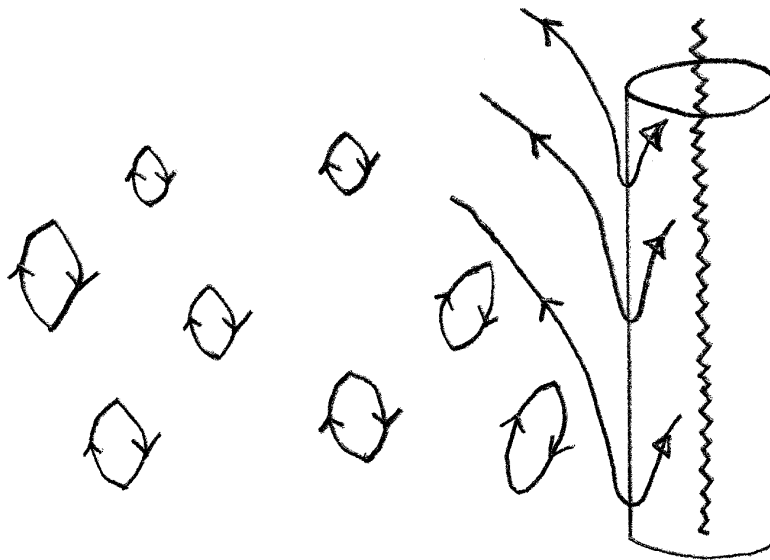


Figure 8. Hawking's intuitive derivation of Hawking radiation. Far from the black hole, virtual particle-antiparticle pairs are continually created out of the vacuum, but then annihilate together in a very short period of time as specified by the uncertainty principle. Virtual particle-antiparticle pairs are spontaneously created out of nothing and annihilate



back into nothing. A virtual particle-antiparticle pair can be considered to be a particle that follows a closed-loop trajectory through space-time. Very close to the black hole's event horizon, we can envisage that one of the pair falls into the hole, while the other escapes away to external infinity. For this to happen, the virtual particles must appear to become real. Energy conservation demands the ingoing particle has negative energy, while the outgoing particle carries away positive energy called Hawking radiation, which is radiated away in the sense of thermal blackbody radiation. The black hole decreases in mass, and the event horizon decreases in area, as Hawking radiation is radiated away.

The holographic principle arose from attempts to resolve all the paradoxes inherent in the nature of Hawking radiation. The only natural way to resolve these paradoxes is with the holographic principle, which is explicitly demonstrated in string theory. String theory demonstrates that a point particle description of physical reality along the lines of the atomic hypothesis is not a fundamental description, but only a holographic description of events in the world. The fundamental description of the world is the viewing screen description, since that is where all the fundamental quantized bits of information for the world are defined. The encoding of information on the viewing screen is fundamentally related to Hawking radiation. As virtual particle-antiparticle pairs appear to separate at the event horizon, quantized bits of information are encoded on the viewing screen.

The holographic nature of string theory is apparent in the lack of a fundamental formulation of string theory in terms of geometrical objects. There are many different formulations of string theory in terms of different geometrical objects called D-branes, and one formulation tends to morph into another formulation. D-branes represent geometrical objects, like points, strings and membranes, but all of these geometrical objects are holographic in nature. The only fundamental formulation of the theory is in terms of the viewing screen description, since that is where all the fundamental quantized bits of information are defined. In the sense of computer processing, every event updates the configuration state of a state of information defined on a viewing screen. Only images of geometrical objects are observable in nature, but those images are all holographic in nature, and are projected from a viewing screen to the point of view of an observer.

Why is the holographic principle implied in any world that incorporates both relativity theory and quantum theory? In quantum theory, if we want to observe the behavior of a particle as it moves through space, we use some kind of radiation, such as light, which is electromagnetic radiation. We shine radiation at the particle, and observe how radiation scatters off the particle. We can only know about the position and the motion of the particle because of the scattered radiation we observe. Quantum theory tells us that if we want to look at smaller distance scales we have to use higher frequencies of radiation, since the distance scale we can probe with light is set by the wavelength of light,  $\lambda$ , which is related to the frequency of light waves,  $\nu$ , and the speed of light, as  $c=\lambda\nu$ . In quantum theory, a higher frequency of vibration corresponds to a higher energy, as  $E=h\nu=hc/\lambda$ , so we must use higher energies to look at smaller distances. This is where relativity theory comes in. At some point we reach the Planck energy when  $\lambda=2\pi\ell$ , and we focus so much energy into such a small region of space that we create a Planck size black hole. Once the

black hole is created, the only radiation we can see scattered off the surface of the black hole is Hawking radiation. If we shine higher energy radiation at the black hole, we only create a bigger black hole, with a larger event horizon and a larger radius  $R$ , which can only radiate away lower frequencies of Hawking radiation back to us, with  $\lambda=2\pi R$ .

There is an ultimate distance scale that we can probe, which is the Planck length. This length corresponds to a frequency of radiation where enough energy is concentrated into a small enough region of space that a black hole is forced to form. Relativity theory demands that it is impossible to probe smaller distance scales than the Planck length.

The reductionistic tendency to probe smaller distance scales with larger energies must finally come to an end at the Planck length. The way that reductionistic tendency comes to an end is inherently holographic in nature. All the quantized bits of information for the black hole are encoded on the surface of the event horizon.

The other way to understand quantum theory is in terms of the branching of the quantum state. With the holographic principle, we understand that a state of information for the world is defined on a viewing screen, which is an event horizon in the sense of relativity theory. Each fundamental pixel on the screen encodes a quantized bit of information for that world. The quantum state of that world branches into alternative paths each event, due to all the different ways in which information can become encoded on those pixels. Each event is a decision point where the quantum state of any world defined on a viewing screen branches into alternative paths, due to all the different ways in which information can become encoded on the viewing screen to define a state of information for that world.

In the QFT description of particle physics, the quantum state of the particle branches into all possible paths with each event. We can express that quantum state either as a sum over all possible paths, or a sum over all possible position eigenstates.

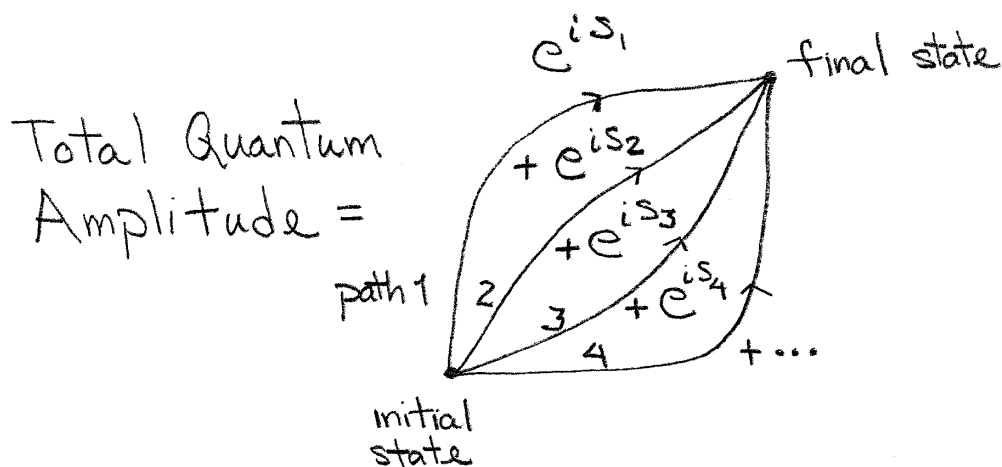


Figure 9. In the sum over all paths formulation of quantum theory, the total quantum amplitude for the dynamical evolution of any system from an initial state to a final state is

expressed as a sum over all paths, and each path is weighted with a probability factor  $z(\theta)=\exp(i\theta)=\cos(\theta)+i\sin(\theta)$ , where the phase angle  $\theta=2\pi S/h$ . The action,  $S$ , is written in terms of a Lagrangian,  $L$ , as  $S=\int dtL$ . Typically,  $L$  can be decomposed into separate kinetic energy and potential energy components as  $L=KE-PE$ . This procedure is valid for point particle motion, either as formulated in ordinary quantum mechanics or QFT, but is also valid for more complicated geometrical objects like strings. In the sense of relativity theory, particle action can always be written in terms of proper time, or the 'length' measured along the particle's world-line,  $\tau=\int ds$ , where  $ds^2=g_{\mu\nu}dx^\mu dx^\nu$ , and  $g_{\mu\nu}$  is the space-time metric that measures the curvature of space-time geometry. In a similar way, string action can be written in terms of the area of the string's world-sheet.

Some may argue that this procedure is not well defined mathematically, since there are apparently an infinite number of position eigenstates. We now know this objection is false. The holographic principle proves the number of position eigenstates in any world is finite, since the number of bits of information encoded on any event horizon is finite. The observer's entire observable world is always limited by an event horizon.

The classical path is the path of least action. In the sense of an interference pattern, the classical path gives maximal phase reinforcement or minimal phase cancellation.

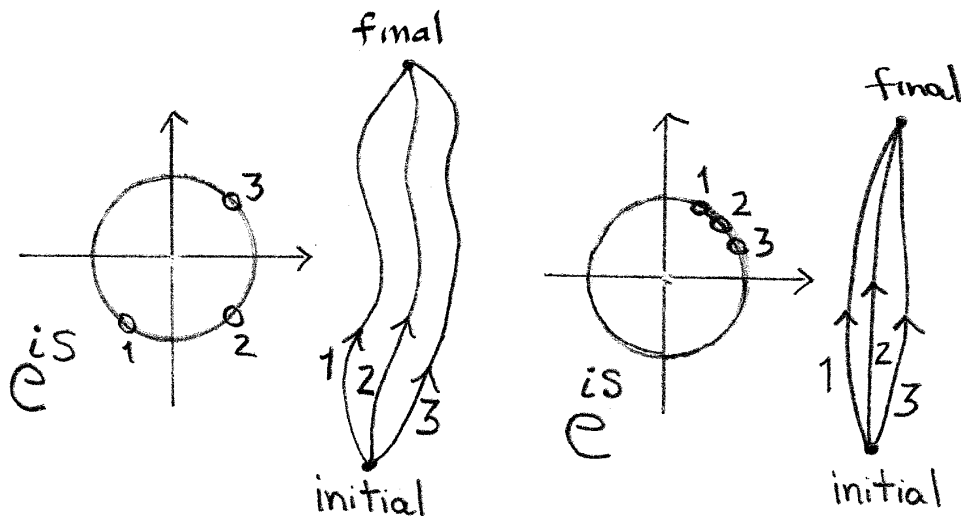


Figure 10. The principle of least action. For paths that are not stationary, the values of  $\exp(i\theta)=\cos(\theta)+i\sin(\theta)$  vary greatly around the unit circle in the complex plane, and so there is much cancellation in the sum, like the cancellation that occurs in an interference pattern when waves are out of phase with each other. For paths that are nearly stationary, there is much less cancellation, and the amplitudes tend to add together, like waves that are in phase with each other. The phase angle  $\theta$  parameterizes the interference pattern, and depends on the amount of action that characterizes each specific path. The stationary path is called the path of least action, and corresponds to the classical path as determined in classical physics. In the sense of classical physics, the path of least action minimizes the expenditure of kinetic energy while maximizing the preservation of potential energy.

In the sense of relativity theory, kinetic energy arises with all motion due to the effects of time dilation, while potential energy arises in an accelerating frame of reference, and reflects the effects of all forces. The interference pattern is inherent in the total quantum amplitude, and includes all possible paths that can deviate from the path of least action.

As is well known from all the controversy that surrounds the various interpretations of quantum theory, the nature of the interference pattern inherent in the total quantum amplitude raises fundamental questions about the nature of observation. Feynman once remarked that all the mystery of quantum theory is in the double slit experiment.

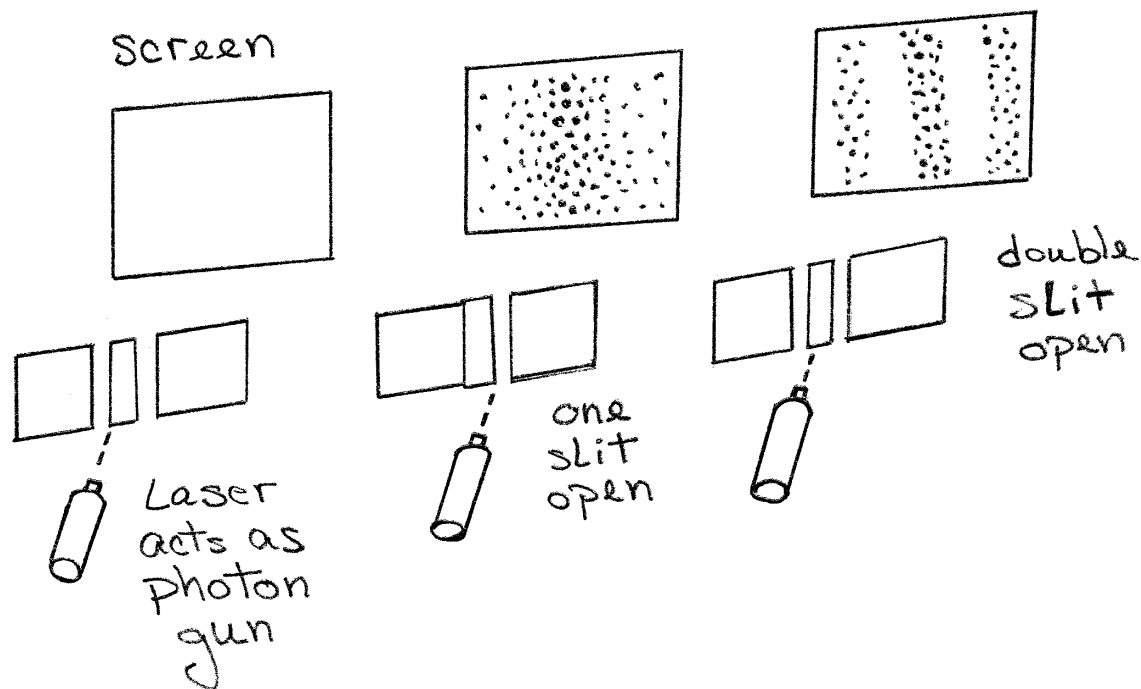


Figure 11. The double slit experiment. A laser acts as a photon gun, and emits a photon one-at-a-time. Each photon is understood as a quantum of electromagnetic radiation. A photon must pass through the slit before it reaches the screen, where a detector measures the arrival of each photon one-at-a-time, like a particle. If only one slit is open, the screen displays a random pattern of dots on the screen that follow a Gaussian distribution. If both slits are open, the screen displays an interference pattern. The interference pattern indicates coherent organization, like waves that add together when in phase and cancel out when out of phase. Even with the double slit open, each individual photon arrives at the screen one-at-a-time in a random way, but when the arrival of many different photons is superimposed, the coherent wave-like nature of the interference pattern is displayed.

The standard interpretation of quantum theory says the arrival of each photon at the screen is measured one-at-a-time, like a particle, but when the arrival of many photons is superimposed, we observe a wave-like interference pattern. How can the arrival of many photons become superimposed? Brian Whitworth suggests that in a computer generated virtual reality world, a screen output only occurs if the processing network becomes

overloaded with too much information and is forced to reboot itself, which is the nature of a quantum state reduction. In this sense, the intrinsic processing rate of the computer is not the same as the rate of observational events. An observational event is a screen output that occurs as the processing network is overloaded with information and reboots itself. This idea fits in nicely with the idea of the mind as a mental screen that displays forms of information. As is well known from the study of the mind, the duration of each distinct mental event is about one-tenth of a second, which is much longer than a Planck time.

In quantum theory, every event is a decision point where the quantum state branches into alternative paths. For particle motion, this allows for paths that deviate from the path of least action. In some sense, these imagined paths violate the classical laws of physics.

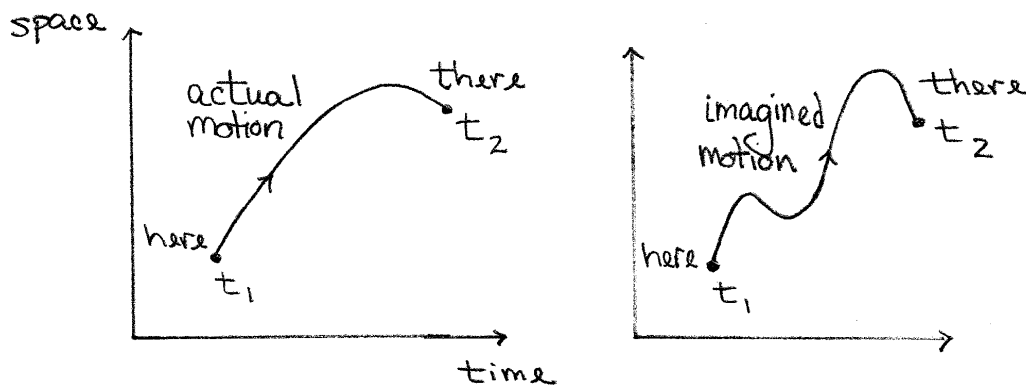


Figure 12. The classical path is the path of least action, which is the actual path as determined by classical physics. Quantum theory allows for paths that deviate from the classical path, which in the sense of classical physics are imaginary.

In the viewing screen description, there are no particles, only bits of information encoded on the viewing screen. A viewing screen defines a state of information for a world. Every event is a decision point where the quantum state for that world branches into alternative paths. We usually think of a path for a point particle through space over time, but that is only a holographic description of particle motion. That particle is a part of a world, and that entire world is holographically defined on a viewing screen by a state of information for that world. In the more fundamental viewing screen description, a state of information for that world branches into alternative paths for that world with each event.

In this view of things, consensual reality is not a single objective reality, but many entangled worlds that interact with each other, and share information with each other due to quantum entanglement. Each world is defined by a state of information encoded on a viewing screen, and each world is observed from its own point of view. Every event horizon arises from the central point of view of an observer. Any observer that expends energy is in an accelerating frame of reference, and observes a viewing screen that holographically defines that observer's world. The event horizon always arises from the central point of view of the observer, and is as far out in space as the observer can see things in space due to the constancy of the speed of light. The observer's entire

observable world is limited in space by the event horizon. The holographic principle implies an inherently subjective, observer-centric description of observable reality.

Every event is a decision point where the quantum state for any world branches into alternative paths for that world. A state of information for that world is defined by the way information is encoded on all the pixels on the viewing screen, and that world is animated like the frames of a movie over a sequence of events in the flow of energy. In the sense of computer processing, every event arises in a processing cycle that updates the configuration state of that state of information. We understand the nature of how information is encoded in any state in the sense of quantum theory, and we understand how those configuration states are updated in the sense of thermodynamics.

The second law of thermodynamics tells us the total entropy of a world tends to increase as energy flows through that world. Entropy is a measure of disordered information. In the sense of how quantized bits of information are encoded in any quantum state, entropy measures the number of binary yes-no questions that can be asked about the quantum state of some thing so that the thing's macroscopic appearance remains the same even as the microscopic details of its quantum state change. If we only observe that macroscopic appearance, we don't observe the microscopic details. In the sense of the holographic principle, entropy is a measure of the information about things hidden from an observer behind an event horizon. All the observable things in any world are holographic in nature, as all the information for anything is defined on an event horizon. If something appears to cross the event horizon that defines an observable world, information for that world becomes more disordered and entropy increases as that thing becomes unobservable.

In the sense of modern cosmology, the initial state of information for the world is defined by a big bang event, which gives rise to the most ordered state of information for the world. As the world expands from the big bang event, information for the world becomes more disordered. We understand the flow of energy through the world over time in the sense of this increase in entropy. The other way to state the second law is heat tends to flow from a hotter to a colder object. Hawking discovered that the apparent temperature of an event horizon is related to its radius as  $kT=hc/8\pi^2R$ . In the sense of the holographic principle, the initial state of the world is defined on an event horizon with a radius of about a Planck length, which gives it a temperature of about  $10^{32}$  degrees Kelvin. If the world continues to expand in size indefinitely, its temperature will approach absolute zero as its size approaches infinity, which is called the heat death of the world.

Modern cosmology is in the midst of a paradigm shift, just as modern particle physics is in the midst of a paradigm shift. For cosmology the problem is the cosmological constant, and for particle physics the problem is the holographic principle. Ironically, these two problems and their resolution are closely related to each other. For particle physics, the problem is that there really are no particles, only bits of information holographically encoded on an event horizon. For cosmology, the problem is a cosmic event horizon.

We live in a world with a positive cosmological constant, which means the world appears to exponentially expand over time. A cosmological constant, also called dark energy, is a kind of anti-gravity that causes the universe to repel itself, and leads to the exponential expansion of space. The nature of exponential expansion is manifested in a cosmic event horizon, which is a spherical surface where the world appears to expand at the speed of light. Since nothing can travel faster than the speed of light, an observer present at the central point of view of that spherical horizon can only see things in space as far out as that horizon. The current measured value for the cosmological constant indicates that cosmic horizon has a radius of about 15 billion light years, or  $10^{62}$  Planck lengths. In the sense of the holographic principle, a state of information defined on the cosmic horizon has a temperature of about  $10^{-30}$  degrees Kelvin, and encodes about  $10^{123}$  bits of information. Ultimately, the second law is only a description of how heat flows from the big bang event to the cosmic event horizon, or how the total entropy of the world tends to increase over time as things appear to become hidden behind the cosmic horizon.

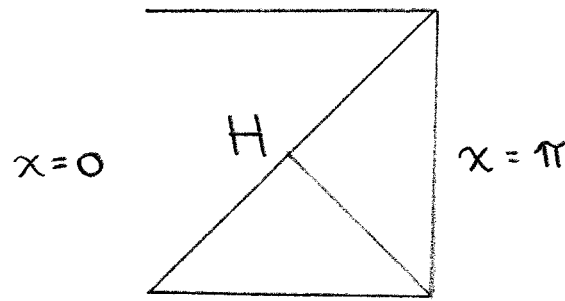


Figure 13. Penrose diagram for empty de Sitter space. H is the future event horizon of an observer on the south pole,  $\chi=\pi$ .

In an exponentially expanding world, all matter and energy will eventually cross the cosmic event horizon, as observed from the central point of view of that world, and that world will only consist of empty space with a cosmological constant. That state is the most disordered state of information that is possible for that world. If the cosmological constant approaches zero, the size of that empty space approaches infinity, and its temperature approaches absolute zero, which is the heat death of that world.

Modern cosmology tells us the world rapidly inflated in size from the big bang event due to an instability in the cosmological constant, which is really not a constant at all. At the time of the big bang event, the value of the cosmological constant in Planck units was about 1, and at the current time, its value is about  $10^{-123}$ . Relativity theory makes this explicit, as the radius of the cosmic event horizon, R, is related to the cosmological constant,  $\Lambda$ , as  $R^2=3/\Lambda$ . In the sense of computer processing, the quantity  $T=R/c$  is a measure of the total number of computer processing cycles from the big bang event until the current time, which gives about  $10^{62}$  cycles. The world inflates in size because its size increases by a Planck length each processing cycle. Each cycle requires a Planck time.

The big bang event was the initial processing cycle. In the sense of computer processing, the cosmological constant is really telling us something about the age of the universe.

The holographic principle tells us that the total entropy of the universe tends to increase over time as the universe expands in size. This increase in entropy is inherently related to the nature of gravitational collapse, by which process black holes are formed.

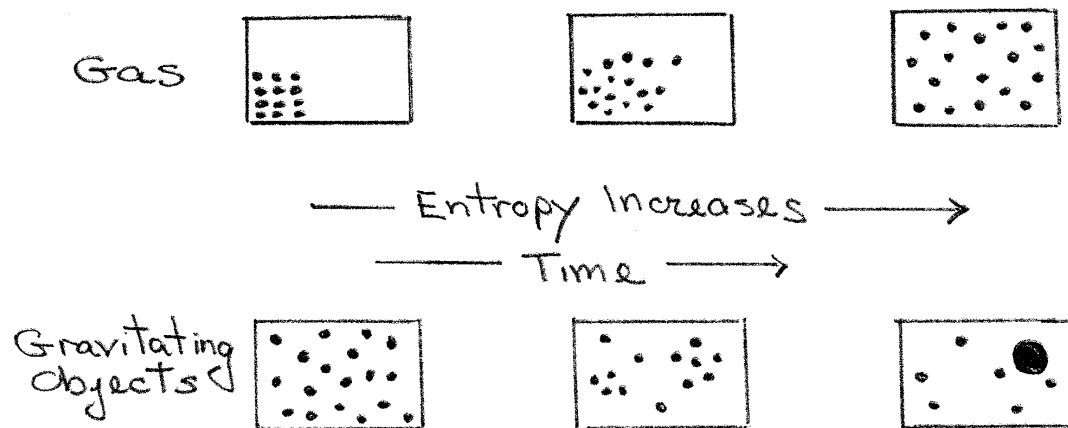


Figure 14. Entropy tends to increase over time. For a gas of non-interacting particles in a box, entropy increases as the particles spread out throughout the box in the most random way possible. The particles randomly sample all possible position and momentum states, with positions constrained by the size of the box, and velocities constrained by average kinetic energy, which is related to absolute temperature as  $KE = \frac{1}{2}kT$  for each independent direction of motion. For a collection of gravitating objects in a box, things tend to be the other way around. Entropy increases as the objects gravitationally bind to each other. Due to their gravitational interactions, the objects tend to clump together, until maximal gravitational collapse occurs and a black hole forms, with maximal entropy.

Why does gravitational collapse result in an increase in total entropy? Whenever two things bind together, like an electron that binds to a proton to form a hydrogen atom, or two protons that fuse together to form an atomic nucleus, if those two things are initially unbound to each other, they initially move with greater than escape velocity. The only way they can bind together is if their velocities fall below an escape velocity, which means they must radiate away some of their kinetic energy as some kind of radiation.

When two things interact with each other they can scatter off each other, but they can also bind together and form a bound state. If they are initially unbound, they must radiate away some of their kinetic energy as radiation. That radiation can interact with something else in the universe, and so the formation of a bound state is always like a scattering event with something else in the universe. The total entropy of the universe tends to increase with the formation of any bound state, since that radiation tends to be radiated away in



random directions, and that radiation is a form of heat that tends to flow from a hotter to a colder region. Since hotter objects radiate away more heat than colder objects, more radiation tends to be radiated away from hotter objects than colder objects, and so the total entropy of the universe tends to increase over the course of time. If anyone has any doubt about this natural state of affairs, just look at the Sun. As protons fuse together deep within the interior of the Sun, radiation is radiated away. About 1% of proton mass is converted into electromagnetic energy as  $E=mc^2$ , and is radiated away.

Every step along the way, that radiation tends to flow from a hotter to a colder region, and the photons tend to become dispersed into lower and lower energies. Since the energy of each photon is quantized as  $E=h\nu$ , the frequency of photons tends to decrease as the photons become dispersed. Since total energy is conserved, the total number of photons tends to increase as they become dispersed, and total entropy increases. But the Sun is only able to radiate away photons due to the gravitational collapse of matter and energy that occurred after the big bang event, which was the hottest state of the universe.

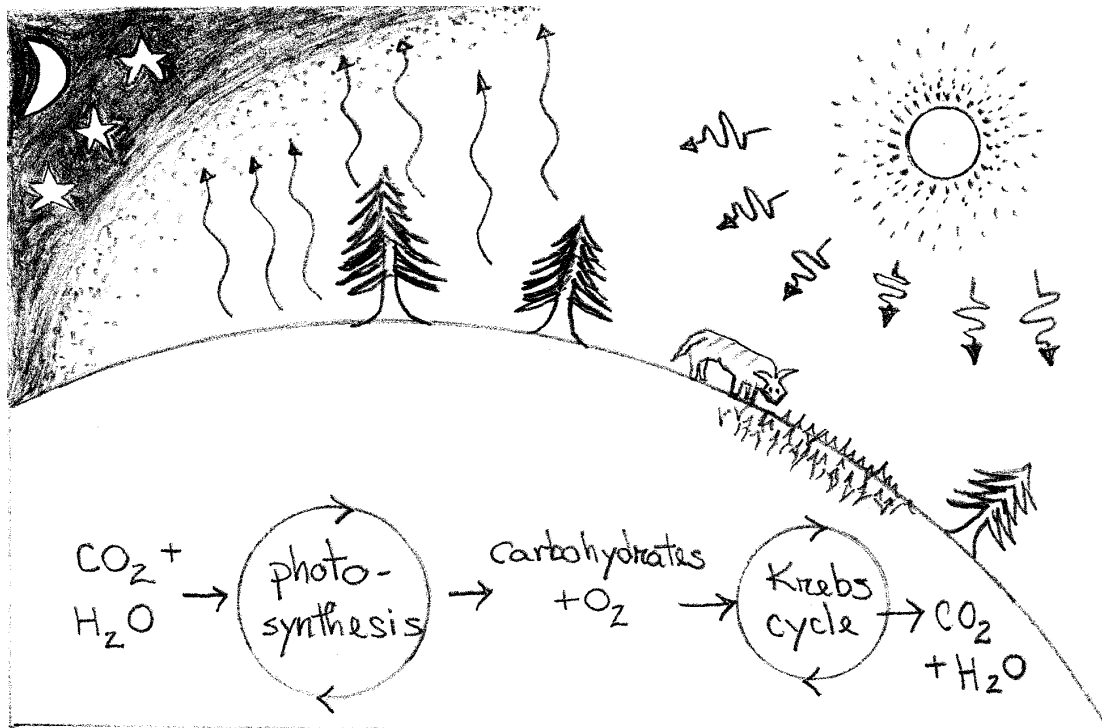


Figure 15. The flow of energy. The Earth radiates away the same amount of energy as it receives from the Sun, but the energy received is a much lower entropy form, since the Sun's visible light has a higher frequency than the infrared radiation radiated back into space. Since energy is quantized as  $E=h\nu$ , each photon that arrives carries more energy than each infrared photon radiated back into space. Fewer photons arrive to the Earth than the number of photons radiated away. Entropy increases due to this increase in the number of degrees of freedom. Plants make use of the low entropy energy in sunlight photons through the process of photosynthesis, as some of the directed energy of the photon is converted into electromagnetic potential energy carried by carbohydrate

molecules. Those molecules are burned through the Krebs cycle, which energizes behavior, but also releases heat radiated back into outer-space as infrared radiation. This flow of energy is only possible since entropy increases every step of the way, as higher energy photons are dispersed into lower energy photons. The same kind of dispersion occurs inside the Sun with nuclear fusion. Dispersion occurs as heat flows from a hotter to a colder region. The interior of the Sun is several million degrees, the surface of the Sun several thousand degrees, the surface of the Earth about 300 degrees, and outer-space about three degrees Kelvin. It all began with the big bang event, which was  $10^{32}$  degrees, and it will all finally end at absolute zero, with the heat death of the universe.

It is worth stating again. The normal flow of energy through the universe is related to this increase in entropy. As energy flows over time, entropy tends to increase. Heat tends to flow from a hotter to a colder region, and as energy flows, entropy tends to increase due the dispersion of radiation into lower and lower frequencies. This flow of energy is only possible due to the temperature imbalance in the sky, and is ultimately a consequence of the gravitational clumping of matter and energy that occurred after the big bang event, which produced the Sun and all other stars. When stars gravitationally collapse into black holes, entropy becomes maximal. All life on Earth makes use of this normal flow of energy, as the directed energy of photons is converted in electromagnetic potential energy through the process of photosynthesis. That potential energy is utilized in the Krebs cycle as complex molecules are burned back into their more elementary constituents, which energizes all behaviors. None of this would be possible if the big bang event was not a very highly ordered state. That order was inherent in a nearly uniform distribution of matter and energy early in the history of the universe. Most of that matter was in the form of protons and electrons that bound into hydrogen atoms, which clumped together into stars. The stars began to burn bright due to nuclear fusion deep inside their interiors, which allowed the flow of energy to reach the Earth, and for life to develop. Every step along the way entropy tends to increase. None of this is possible without gravity.

The problem modern cosmology faces is how to put order in the initial state of the universe, so that the universe can become more disordered as it expands. That initial order is inherent in a nearly uniform distribution of matter and energy early in the history of the universe. The universe becomes more disordered as that matter and energy tends to gravitationally clump together, and the universe expands in size from the big bang event.

This problem is far more complex than our current theories are able to represent. In the sense of computer processing, the universe inflates in size every processing cycle, as the distance to the cosmic horizon increases by a Planck length every processing cycle. With every processing cycle, the total entropy of the universe tends to increase, but new bits of information are also added. The instability in the cosmological constant reflects this addition of new information with each processing cycle. We have to account for the tendency of information to become disordered even as new information is added. Until this problem is solved, we really don't understand the natural evolution of the universe.

Until this problem is solved, the only solution we have is to assume an ensemble of initial states of the universe, in the sense of a thermodynamic ensemble, or in the sense of many worlds. An ensemble of universes describes all possible ways in which the universe can initially be created. Some of those initial states will naturally be highly ordered. But the assumption that all the information for the observable universe is created with the big bang event is incorrect. New bits of information for the observable universe are added as the cosmic event horizon inflates in size, which makes the problem of how the initial order of the universe arises much more difficult to solve. The only other solution to this problem is to put that initial order in by hand, as in the hand of God.

How is this puzzle related to the holographic principle? If the Sun suffers maximal gravitational collapse, it will collapse into a black hole. A black hole is defined by an event horizon, which is a surface where the force of gravity is so strong that even light cannot escape. But the black hole radiates away Hawking radiation due to quantum uncertainty. In a sense, Hawking radiation is a kind of thermal blackbody radiation that is radiated away due to the apparent temperature of the event horizon. Just like any other bound state, the radius of the event horizon is determined by an escape velocity, but that escape velocity is the speed of light, and nothing can travel faster than the speed of light.

As the Sun collapses into a black hole, total entropy becomes maximal, since a maximal amount of information about things is hidden behind the event horizon. But the black hole continues to radiate away energy in the form of Hawking radiation. The only way this is possible without violating the second law of thermodynamics is if all the disordered information that defines the black hole is encoded on the event horizon.

All the paradoxes of Hawking radiation arise from this fact. As we've already discussed, the constancy of the speed of light for all observers implies the kind of computer processing that leads to creation of a virtual reality world. That world is holographically defined on the event horizon. The only way we can understand the nature of entropy is if all the information for that world is encoded on the event horizon. Quantum gravity is inherently about how information is encoded in the world. Information is not encoded in three dimensional space, but on the two dimensional surface of an event horizon. All the three dimensional images we perceive in space are like a holographic projection from a viewing screen to a point of view. Both the viewing screen and the point of view arise in empty space. The viewing screen holographically encodes all the bits of information for whatever images are perceived in that space. Not only is all the information for all the things that fell into the black hole encoded on the event horizon, but all information for Hawking radiation is also defined on the event horizon. Hawking radiation is holographic in nature, just as much as the Sun and all the other things that fell into the black hole.

The radical nature of the holographic principle cannot be overstated. Whatever system we want to discuss in the world, like the celestial body of the Sun or the body of a person, all the information for that system is encoded on a viewing screen, which defines a state of information for an entire observable world. That world is always observed from the central point of view of an observer. The observer does not arise within a body. That is

impossible. The observable image of a body arises on a viewing screen, and is observed by the observer. A body is a bound state of information, but that bound state arises within a larger state of information defined on the bounding surface of an event horizon, which always arises from the accelerated point of view of the observer.

If we think of that body as a system, that system interacts with its environment, which is defined by a state of information for that world. The holographic principle implies both system and environment are defined on the viewing screen. There is no such thing as an isolated system that is totally isolated from its environment. Even the different viewing screens that define different worlds, as observed from different points of view, interact with each other and share information with each other due to quantum entanglement.

Different things appear to interact with each other in any world as energy flows through that world in the sense of thermodynamics, but all the images of things that appear in that world are holographic in nature, and are holographically defined on the viewing screen. The only thing not defined in that world is the nature of consciousness, which is always present at a point of view in empty space. In this sense, consciousness is not-a-thing.

All our scientific laws naturally arise from the true nature of consciousness, as long as we understand that true nature to be empty space. Empty space is the nature of the void, or vacuum state. That empty background space is the ground state from which all excited states arise. Empty space is not the same as the 3+1 dimensional space-time we observe, which is holographic in nature. Every state of information for the world is defined on a viewing screen, and is some kind of excited state. In the sense of the holographic principle, empty space is truly empty, and all perceivable things are holographic in nature. The true nature of consciousness is not holographic, and is not-a-thing.

In some sense, the whole thing is geometrical in nature. All scientific laws represent the symmetry of empty space, like conservation of momentum and angular momentum that arise from translational and rotational symmetry. The most fundamental symmetry of empty space is general coordinate invariance, and all the fundamental forces arise from this symmetry. Einstein's field equations for the metric naturally arise from general coordinate invariance, and the fundamental gauge field theories of the electromagnetic, strong and weak forces also arise from this fundamental symmetry.

We usually think of field equations as low energy approximations to a more fundamental theory, but they may be more like thermodynamic averages that arise in large volume elements, rather than fluctuating quantum fields. In this sense, the metric may only give a thermodynamic average for the curvature of space-time geometry that is valid for large volume elements. This idea fits in with the holographic principle, since the curvature of space-time geometry arises holographically from quantized bits of information encoded on the bounding surface of an event horizon, where all the quantum fluctuations occur.

The principle of equivalence is geometrical in nature, since it equates a force with an acceleration. In the sense of the holographic principle, only an observer can enter into an

accelerating frame of reference and expend energy. As that observer arises at a focal point of perception, all the perceivable images of its world arise on an event horizon.

Spinoza expressed this connection between actions in the world and the symmetry of empty space with: *That eternal and infinite being we call God or Nature, acts from the same necessity from which It exists.* All modern theories which unify the laws of the universe, like gravity and electromagnetism, demonstrate those laws arise from general coordinate invariance, which is the most fundamental symmetry of empty space. In the same sense, all the actions of the universe in some way arise from symmetry breaking. Every state of information defined upon a viewing screen breaks the symmetry of empty space, as the screen displays images of an observable world observed by an observer.

In the sense of quantum theory, any state of information for the world is holographically encoded on a viewing screen. In the sense of thermodynamics, those states of information evolve over time as energy flows through that world over a sequence of events, and information for that world becomes more disordered with an increase in total entropy. In the sense of computer processing, the configuration state of information for that world is updated from one event to the next event, which is how that world is holographically animated on a viewing screen over a sequence of events, like the frames of a movie. In this sense, that animation leads to the creation of a virtual reality world. The only real puzzle about the nature of that world is the mystery of free will. Quantum theory tells us each event is a decision point where the configuration state of information for that world branches into all possible alternative paths. Unlike classical physics, where a path is classically determined, in quantum physics, all possible paths are determined. An event is always a decision point that requires a choice about which path to follow.

All the mystery about quantum theory, and all the debate about the correct interpretation of quantum theory either in terms of the standard or the many world interpretation, comes down to this mystery about how the choice is made. In classical physics there is no choice, since only the path of least action can be followed. In quantum physics there is a choice, and there are many alternative paths that can be followed. Each path defines its own world. A path that deviates from the path of least action in some sense is like a path that bends the laws of physics, like the law of gravity. We usually don't think of it this way, but when gravity is combined with quantum theory, the law of gravity can be bent. The classical way we understand the law of gravity is in terms of the path of least action, but quantum theory allows for paths that deviate from the classical path. To speak in metaphorical terms, if the law of gravity is bent enough, it is possible to walk on water.

The mystery of free will is inherently related to the mystery of the mind. The only natural way to understand the mind is as a mental screen that displays forms of information. We usually think of the mind as arising from the brain, as organs of sensory perception in the body relay information about the world to the brain. That relay of information includes external sensory perceptions of the world and internal emotional perceptions of the body.

Some sort of complex information processing occurs in the brain. The result of that information processing is mental imagination. We not only perceive external sensory perceptions of the world and internal emotional perceptions of the body, but we also perceive forms of mental imagination in the form of memories and thoughts. In some sense, memory is only possible since mental images are held in mental imagination over a sequence of mental events. That holding of images in mental imagination only arises from coherent organization, as the form of those images is self-replicated in form over a sequence of events. That self-replication of form is inherently a body-based process.

The form of a body is self-replicated over a sequence of events. Self-replication of body form is called body survival. Self-replication of body form only arises from coherent organization, as the form of the body holds together as a bound state of information, just like the animated form of a computer generated body image on a viewing screen.

Self-replication of body form is possible due to the second law. Any form self-replicated in form over a sequence of events arises due to coherent organization. In the sense of thermodynamics, that form is self-replicated in the same coherently organized phase of organization. Self-replication of form is a thermodynamic process that gives rise to the same macroscopic form of something even as the microscopic details change. If we only observe the macroscopic appearance, we don't observe the microscopic details. In the sense of quantum theory, a macroscopic form arises from microscopic states that give rise to the same macroscopic appearance. A change in the macroscopic form of something is called a phase transition. All phase transitions are examples of symmetry breaking.

Phase transitions allow for the development of coherent organization, as a more ordered form of something develops. The second law requires that the total entropy of the world tends to increase over time even as any localized form appears to become more ordered, like liquid water that freezes into ice. This is only possible since heat is radiated away from the water molecules as they freeze into a more orderly arrangement of positions in space. That heat is a form of radiation that carries disordered kinetic energy away from the molecules into the environment. The environment becomes more disordered as heat flows from the hotter system of water molecules into the colder environment. As the entropy of the water molecules locally decreases, the total entropy of the world increases.

The coherently organized bound state of a body is more complex than a simple system of water molecules, but only in the sense of how that coherent organization develops and is maintained over a sequence of events. For the system of water molecules, the only way coherent organization can develop is if heat is radiated away into the environment. That heat is disordered kinetic energy. For a body, coherent organization can develop if potential energy is added to the system. We call the addition of potential energy to a body the process of eating. A body can appear to become more ordered and develop coherent organization, but only if it eats other bodies. Potential energy is added to a body in the form of high potential energy molecules, like carbohydrates, and those molecules are burned within the body to energize the behaviors of the body. In this process, heat is radiated away into the environment, which leads to an overall increase in total entropy. A

body may develop and maintain coherent organization through this process, and locally become more ordered, but only because the environment becomes more disordered.

The second law is as relevant for the development of coherent organization in the bodies of plants as it is for the bodies of animals that eat plants and other animals. The only difference is plants eat photons that arrive from the Sun, while animals eat other bodies. In the process of photosynthesis, higher energy photons from the Sun are absorbed, some of that directed kinetic energy is converted into high potential energy molecules like carbohydrates, and lower energy infrared photons are radiated away as heat. As a high potential energy molecule is burned to energize behavior, heat is also radiated away. Since the energy of a photon is quantized as  $E=h\nu$  and total energy is conserved, and since more lower frequency photons are eventually radiated away than higher frequency photons are absorbed, total entropy tends to increase through this process of energy flow. The thermodynamic situation for the animals that eat other bodies is really no different. The source of that low entropy energy is locally the Sun, and globally the big bang event.

Coherent organization only develops in a body through a process of eating. Entropy can locally appear to decrease in a body as it develops and maintains coherent organization, but only at the expense of another body that is eaten. A body that eats another body becomes more ordered, while the body that is eaten becomes more disordered. This is an inevitable consequence of the second law, as the total entropy of the world tends to increase over the course of time. This inevitable consequence of the second law is the survival of the fittest body. The way this consequence is energetically expressed is in terms of emotional expressions. Emotional expressions are inherently self-defensive, as their expression defends body survival. The nature of body survival is the self-replication of the form of the body over a sequence of events in the flow of energy. The second law is all about how energy flows through the world as the total entropy of the world tends to increase over time. Bodies only survive because their complex forms are self-replicated in the same coherent phase of organization. Bodies survive and are self-replicated in form due to the complex ways in which energy coherently flows through a body to allow for the development and maintenance of the coherent organization of a body. We recognize the ways in which energy coherently flows through the body as emotional expressions.

Emotional expressions are inherently self-defensive in nature, as their expression defends body survival. Bodies could not survive without such expressions, which are an inherent aspect of coherent organization. An essential aspect of the development and maintenance of coherent organization is a process of eating, which adds potential energy to the body. In the process of eating another body, a body becomes more ordered, but only at the expense of the other body that becomes more disordered. In some sense, the desire to eat another body is the most basic emotional expression that can be expressed by a body. As the desire to eat is satisfied, the flow of energy through the body comes into alignment with the flow of energy through the other body. From the point of view of the body that eats the other body, that alignment of the flow of energy is perceived as feelings of connection, which feel good. Feelings of connection that arise as desires are satisfied in some sense is the only reason the expression of desire is perpetuated in repetitive cycles.

But things appear quite different from the point of view of the body that is eaten. The emotional expression of fear or anger is a natural response to a threat to body survival, as the body that is threatened attempts to run away from or attack the other body. The same kind of self-defensive expressions naturally arise if desires are frustrated, which leads to feelings of disconnection that feel bad, as the flow of energy goes out of alignment.

Ultimately, only a coherently organized body can express self-defensive emotional expressions, which represent the complex ways in which energy coherently flows through a body to allow for development and maintenance of coherent organization. As desires are satisfied and the flow of energy comes into alignment, feelings of connection arise that feel good, which perpetuates the expression of desires in repetitive cycles. As desires are frustrated and the flow of energy goes out of alignment, feelings of disconnection arise that feel bad, which leads to self-defensive expressions, like fear and anger. Only a coherently organized body can express self-defensive expressions, which ultimately are self-limited to the body, as body survival is defended, and body form is self-replicated.

Attachments naturally develop as desires are expressed and satisfied in repetitive cycles, and self-defensive expressions naturally arise as desires are frustrated. An emotional attachment arises as the flow of energy through the body comes into alignment with the flow of energy through some other thing, and a self-defensive expression arises as the flow of energy goes out of alignment. In some sense, these processes are only possible since feelings of connection feel good, while feelings of disconnection feel bad.

Attachments are necessary for development, since every developing organism only develops if it attaches itself to the parent organism and feeds off the parent. Coherent organization of bodies only develops through a process of eating, as potential energy is added to the organism, and the parent feeds the developing organism. We recognize the developing organism as immature and dependent on the parent. To fully mature, which is the development of autonomy, the developing organism must sever that attachment.

If desires are frustrated, self-defensive expressions arise. In some sense, the desire to possess and control things only arises in an attempt to force other things to satisfy desires. But there is something extraordinarily counterproductive about this strategy. The desire to possess and control things inevitably leads to more frustration of desires, since nothing ever wants to be controlled, and all things will eventually resist those attempts at control.

Such self-defensive expressions arise naturally in the moment if desires are frustrated or if body survival is threatened. But something very peculiar occurs in mental imagination as a consequence of these normal self-defensive expressions. Mental imagination allows images to be held in the mind over a sequence of mental events. The most important of those images is a body-based self-image. In all self-referential thoughts, a body-based self-image is held in mental imagination, and is emotionally related to other images held in mental imagination with some kind of emotional body feelings. The problem is mental imagination allows self-defensive emotional responses to become amplified and distorted like an out-of-control positive feedback loop. Each self-referential thought expressed in



the mind is the stimulus for another self-defensive emotional response in the body, which only leads to the mental construction of more self-referential thoughts. The body not only responds to actual threats to its survival in the moment, but continually responds to imagined threats to its survival as emotionally constructed in mental imagination. This self-reinforcing process only amplifies and distorts normal self-defensive responses.

The nature of stimulus and response is a consequence of coherent organization. If we think of the mental landscape as a phase space, that landscape is characterized by peaks and valleys. In some sense, an emotional response is like an attractor that drains a basin of attraction, just like a river that drains a mountain range. The mental landscape is characterized by many different attractors and basins of attraction. A particular stimulus is like an initial condition that occurs within some basin of attraction. Energy flows over time from that initial condition toward a particular attractor, which leads to a particular kind of response. Both the attractors and the basins of attraction are conditioned, in the sense that they only develop with the mental development of coherent organization, which always develops within the framework of environmental conditions.

This classical description of the mental landscape in terms of attractors and basins of attraction is too limited, since every event is a decision point where the quantum state branches into all possible alternative paths. The classical path is only the path of least action. There is a choice every event about which path to follow. If we think of the mind as a mental screen that encodes bits of information, every mental event is a decision point where the state of information for the mind branches into all possible alternative states, due to all the different ways in which information can become encoded on the different pixels that comprise the mental screen. In this sense, the mind is just like a computer generated viewing screen, except the mind undergoes quantum processing of information.

If we think of the mind as a mental screen, images of mental imagination arise through the same kind of body-based processes that allow for the self-replication of the form of the body. For the purposes of a self-concept, the most important of those images is a body-based self-image. A self-concept only arises in the mind if a body-based self-image is held in mental imagination over a sequence of mental events, which requires coherent organization and self-replication of the form of that self-image. A self-concept arises in a self-referential thought, as a body-based self-image held in mental imagination is related to the images of other things held in mental imagination. Those mental relationships are inherently emotional in nature. In all self-referential thoughts, a body-based self-image is emotionally related to other mental images with emotional body feelings.

To be totally forthright about it, the typical functions of a human mind are a mess. The self-reinforcing nature of mental imagination is dysfunctional, as it leads to distortion and amplification of self-defensive emotional expressions within self-referential thoughts. Those distortions include expressions of desire to control things in order to force things to satisfy desires, but this is counterproductive, as it only leads to more frustration of desires as things resist those attempts at control. If that wasn't bad enough, emotional conflicts arise from contradictory desires, due to the ever changing nature of mental imagination.

Things that are initially desired can easily turn into things that are feared or hated. The conditioned nature of emotional responses is also immature, since they are predominately conditioned early in life during critical periods of development. The development of coherent organization within the human mind has pretty much run its course by three years of age. But the biggest problem with the human mind is its inherent falseness, as the perceiver of the mental screen falsely identifies itself with a perceivable body-based self-image that arises within self-referential thoughts displayed on the mental screen. The expression of self-referential thoughts inevitably creates paradoxes of self-reference. As is well known from the incompleteness theorems, paradoxes of self-reference imply logical inconsistencies in the computational rules that govern computer processing.

The idea of the mind as a mental screen that displays mental images is well and good, but how can that mental screen arise inside a brain? The brain is a part of the body. The mental screen displays images of an entire world, which include the body. In some sense, the body is the central image of that world, and information about that world is only relayed through the body. The brain only processes information, which leads to the images of mental imagination. How can the mental screen display information about an entire world that includes the body if that mental screen arises inside the body?

Our usual ideas about the mind do not make any sense. The only way to make sense of the mind is if the mental screen is a viewing screen in the sense of the holographic principle. That viewing screen is a state of information defined on an event horizon that holographically displays images of an entire world. The form of the body is only the central image of that mental display. This discussion of the mental screen raises another interesting question. Who is the perceiver of the images displayed on the mental screen?

What is the nature of the mind's eye? The only answer the holographic principle can give is that as a viewing screen arises in empty space, an observer also arises at a point of view in empty space. In the sense of modern physics, both the viewing screen and the observer arise from the void, which is the true nature of consciousness. In this sense, the mind's eye is a pure presence of consciousness that arises at a focal point of perception.

It simply makes no sense that the mental screen arises inside a brain inside a body, and that the observer of that mental screen also arises inside the same brain. Our usual ideas about the mind are nonsense. The mind is a mental screen that displays images of an entire world, which include images of the body. The observer of that mental screen is always outside that mental screen, just as the viewer of a computer generated virtual reality world displayed on a computer screen is always outside the computer, and outside that virtual reality world. There is no logically consistent way in which the observer of the mental screen can arise inside the computer that generates the mental screen. The observer can never be reduced to the way information is encoded or coherently organized on the mental screen, no matter how complex those processes. The observer is outside.

The observer is always outside the mental screen. The observer only observes the images displayed on the mental screen. This is what all our great spiritual traditions tell us about

the nature of consciousness. As an individual presence of consciousness is divided from undifferentiated consciousness, and arises at a focal point of perception, the images of a perceivable world arise, as displayed on a viewing screen. As an observer focuses its attention on that world, energy is expended, which places the observer in an accelerating frame of reference, from which an event horizon arises that holographically displays information about that entire world. The perceiver and the perceived arise together.

In the sense of the holographic principle, consensual reality is not a single objective reality, but many entangled worlds that share information with each other. Each world is defined on its own viewing screen, and is observed from its own point of view. The focus of attention of an observer on its world leads to an investment of energy in that world, which animates the form of the observer's body, which is the central image of its world.

From the point of view of any observer, its own body is emotionally animated in its own world. Different worlds, as observed from different points of view, may become entangled with each other and share information, which is how other bodies become animated in any particular observer's world. Each body is the central image of each observer's own world, and is emotionally animated as the observer focuses its attention on its own body. That body is only self-replicated in form due to coherent organization.

The second law tells us that the total entropy of any world tends to increase over time. Within that world, a particular form may develop coherent organization, self-replicate its form, and appear to become more ordered, but only at the expense of some other form in that world, which must become more disordered. For every body that becomes more ordered, some other body must become more disordered. We recognize this as a process of body survival, which requires a process of eating. The body that eats another body is able to develop coherent organization, self-replicate its form, and become more ordered, while the body that is eaten becomes more disordered. This is obviously a problem if every observer wants to survive in the form of its own body.

In spite of this problem, there is natural way for the world to evolve over the course of time, which is for all things to follow the path of least action. In the normal flow of things, all things tend to follow the path of least action, which is the most energy efficient way for things to act as energy flows in its universal gradient from the big bang event to the heat death of the universe. In the sense of the action principle, the path of least action minimizes the expenditure of kinetic energy while it maximizes the preservation of potential energy. Any path that deviates from the path of least action will either expend more kinetic energy or utilize more potential energy. In the sense of relativity theory, the path of least action maximizes proper time from the point of view of the observer of those actions. Any path that deviates from the path of least action utilizes more time. In this sense, any path that deviates from the path of least action is a waste of time and energy. Any path that deviates from the path of least action is also an interference with the normal flow of things, in the sense of an interference pattern. The classical path is the path of least action. Only with the potentiality of a quantum state, which implies an interference pattern, is it possible to deviate from the path of least action.

There is obviously a problem with the normal flow of things if every observer wants to survive in the form of its own body. For selfish reasons, an observer may choose not to follow the path of least action in order to maximize the chances of body survival, which brings us back to the mystery of free will. An observer may choose to deviate from the path of least action in order to survive in the form of its own body.

This raises the next interesting question. Does an observer really survive in the form of its body? Is the existence of the observer body-based? Is body survival the same as the observer's existence? There are many in the scientific world that would try to convince us that consciousness arises from a brain inside a body, but this is blatantly false. These arguments may sound convincing, but that is only because the deceiver is also deceived.

The holographic principle demonstrates that the mind is a mental screen that displays an entire world, and the body is only the central image of that world. The consciousness of the observer cannot arise inside that body, since the observer observes that entire world. The consciousness of the observer can only be described as the mind's eye, which is outside or external to the mental screen. As the mental screen arises on an event horizon in empty space, the mind's eye arises at a focal point of perception in empty space.

Yet there is something about the mental self-concept, as emotionally constructed within self-referential thoughts, that tells us our consciousness is self-limited to our body. The reason is simple. We feel like we are self-limited to our body as we perceive emotional body feelings expressed in the construction of our thoughts, and feeling is believing.

Each self-concept is emotionally constructed as a body-based self-image is held in mental imagination and is related to other images with emotional body feelings. Only the perceiver of the mind perceives these self-referential thoughts and the emotional body feelings inherent in their mental construction. In some sense, the perceiver of the mind really feels like it is embodied as it perceives the emotional body feelings expressed by its body. That feeling is what makes the self-concept a believable belief. The perceiver of the mind mistakenly believes it is embodied, and attributes its existence to arise from its body, which leads the perceiver to identify itself with its body-based self-concept.

There is another mystery besides that of free will, but that mystery is not about the nature of the world, but about the nature of spirit. The whole point of this exercise is to describe the world as a virtual reality that arises from computer processing, like a computer generated virtual reality game. The big mystery is: *Who is playing the game?* To paraphrase the Bhagavad-Gita, who is wearing the costume in the make-believe game?

For thousands of years, this mystery has been described in many different spiritual traditions as the *play of consciousness*. In this sense, a virtual reality world arises from the true spiritual nature of consciousness, and a spiritual presence of consciousness is playing the game in its own virtual reality world. The game is interactive, as different

players can interact with each other in their respective worlds. As the Bhagavad-Gita clearly states, all the players have the same unchanging spiritual source of consciousness:

*Birthless and deathless and changeless remains the spirit forever*

*As when one lays his worn-out robes away  
And taking new ones, says "These I will wear today"  
So the spirit puts on lightly its garb of flesh*

In Hinduism, the incarnation of a Hindu deity is called an avatar. In a computer generated virtual reality game, the incarnation of the player of that game in that virtual reality world is also called an avatar. In the sense of spirituality, the player of the game in our perceivable consensual reality is a spiritual presence of consciousness. That presence of consciousness does not arise from its avatar in the virtual reality game. It is exactly the other way around. That virtual reality world arises from the true nature of consciousness, which is only describable as a void of undifferentiated consciousness. That individual presence of consciousness is divided from undifferentiated consciousness, and is only present at a focal point of perception while its perceivable world holographically arises on a viewing screen. As that presence of consciousness arises from the void, its perceivable world also arises from the void. Both perceiver and perceived arise together.

The game is played as that presence of consciousness focuses its attention on its virtual reality world. Its focus of attention on that world leads to its investment of energy in that world, which is how its world is animated over a sequence of events in the flow of energy. The expenditure of energy places the observer in an accelerating frame of reference, which allows for the holographic construction of its world on an event horizon.

Without that expenditure of energy, there is no accelerated frame of reference, there is no event horizon, there is no viewing screen, and there is no world. An individual presence of consciousness is only divided from its source of undifferentiated consciousness with the expenditure of its energy, which leads to the creation and animation of its world. Without its focus of attention on its world and its expenditure of energy in its world, it has no world, it has no mind, and it has no mentally constructed self-concept. It remains in its true undivided, formless state of undifferentiated consciousness. That primordial state of timeless, limitless pure being can only be described as void.

Where does the individual sense of being present, the sense of 'I-am-ness', come from? The individual sense of being only arises as a world arises. As a world arises on an event horizon, like a movie of images that play upon a viewing screen, a presence of consciousness arises at a point of view, and perceives that world. That individual sense of being is already a movement in duality, as a presence of consciousness is divided from the one source of consciousness with the creation of that world. The individual sense of being can be imparted to any form that appears in that world, as in the self-concept 'I am identical to the form of a body'. That self-identification with a particular body is only a

perception that occurs from a particular point of view, and is only possible due to the individual sense of being that arises as an individual presence of consciousness arises.

To continue our virtual reality game metaphor, the player of the game imparts its own sense of being to its avatar in the game. The avatar is only an animated image perceived on the viewing screen, but the perceiver of the game can impart its own sense of being to its avatar. The avatar proclaims "I am this particular person in this world who is emotionally related to other things in the world". The perceiver believes this nonsense, and imparts its own sense of 'I-am-ness' to the avatar. The perceiver believes it since the perceiver really feels self-limited to a body that expresses emotional body feelings. But the true nature of being can never be reduced to a form perceived in the world, anymore than the true nature of a dreamer can be reduced to a character perceived in a dream. The source of that individual sense of 'I-am-ness' is the changeless existence of the void.

In a sense, Einstein was right. God does not play dice with the universe. There is no one here but us. If we believe otherwise, we only put ourselves in the position of someone who is waiting for Godot. We can consider our individual consciousness to be a fragment of God consciousness, if that is what we want to call the void of undifferentiated consciousness, but it makes more sense to refer to the void as the true nature of what we are. There is only one source of consciousness, just as there is only one source of this world or any other world. We might say that we play dice with each other, since the virtual reality game is interactive, and we always have a choice to make about which path to follow every event, as the quantum state branches into all possible alternative paths.

To continue the religious metaphor, in the sense of pantheism we can say 'God is in all things', since consciousness is present for all things, but the much better description is non-dualism, in the sense 'all things are in God'. In a nondual sense, all perceivable things holographically arise within the void, and a divided presence of consciousness is always present at a focal point of perception. That divided presence of consciousness can always return to its true undivided formless state of pure being. Of course, once you return you are no longer playing the game. Once you return, there is no longer any 'you', only 'one'.

Shankara refers to the absolute nature of existence as Brahman, the ultimate impersonal reality that underlies everything in the world, the source from which all things arise and to which they return. He refers to the divided presence of consciousness that perceives that world as Atman, or the Self. This is what he has to say about the nature of the world:

*Brahman is the only truth. The world is illusion, and there is ultimately no difference between Brahman and Atman.*

The Self refers to the presence of consciousness that perceives the entire world displayed in the mind of a person. In that world, the body of that person appears as an animated form of information, just like the animated form of a computer generated avatar in a virtual reality world. The Source of that world, and the Source of that individual presence of consciousness, is a void of undifferentiated consciousness.

Shankara describes the undivided, formless, non-identified nature of consciousness as that unchanging, timeless, limitless, infinite empty background space:

*That which permeates all, which nothing transcends and which, like the universal space around us, fills everything completely from within and without, that Supreme non-dual Brahman – that thou art.*

Brahman is understood as the ultimate impersonal reality underlying everything in the universe; the source from which all things come and to which they return. That ultimate reality is understood as void and formless. Brahman is understood as undifferentiated consciousness to which all individual consciousness must return. In the sense of unity, Brahman is understood as the unmanifested nature of all existence. In a pantheistic sense, the manifested nature of existence is dualistic, with many things, and with consciousness present for all things. In a nondualistic sense, all things are in Brahman, the 'existent one'.

The Bhagavad-Gita goes to great lengths to describe the nature of Brahman:

*Thus action is of Brahman, who is One, the Only, All-pervading, at all times.*

*Higher, deeper, innermost abides another Life, not like the life of sense, escaping sight, unchanging. This endures when all created things have passed away; this is the Life called the Unmanifest, the Infinite, the All, the Ultimate.*

*The Highest, holding all, whose Name is LORD, The Eternal, Sovereign, First. Who fills all worlds, sustaining them, and dwelling thus beyond Divided Being and Undivided*

*For in this world Being is twofold  
All things that live are "the Divided"  
That which sits apart "the Undivided"*

*I am Brahman, the One Eternal GOD,  
And Atman is My Being's name  
The Soul of Souls.*

*The ignorant minds mistake Me, veiled in form  
Naught see they of My secret Presence*

*Know Me as the source of all, by Me all creatures wrought*

*By Me the whole vast Universe of things is spread abroad-by Me, the Unmanifest  
In Me are all existences contained  
Not I in them*

*I create and I destroy this Universe.*

*Those visible things  
Move in the measureless space, but are not space.  
So all things are in Me, but are not I.*

*Discern Me in all, and all in Me.*

*Know Me, as I am, the very Truth.*

*My Being, creating all, sustaining all-still dwells outside of all.*

The Bhagavad-Gita also describes the enlightened state:

*In the knowledge of the Atman  
Which is a dark night to the ignorant  
The recollected mind is fully awake and aware  
The ignorant are awake in their sense life  
Which is darkness to the sage*

*The subtle Soul sits everywhere*

*The Soul's light shines pure in every place*

*In its bodily prison-Spirit pure*

*Never the spirit was born  
The spirit shall cease to be never  
Never was time it was not  
End and beginning are dreams*

Socrates tells us to *Know Thyself*, but also has this to say about the nature of death: "To fear death, my friends, is only to think ourselves wise, without being wise; for it is to think that we know what we do not know". Body death is only a transformation of form into new form. The divided consciousness of an observer can only be present for the form of a body, or return to its true undivided, formless state of pure being.

The Tao Te Ching describes enlightenment in much the same way as the Bhagavad-Gita:

*Knowing the Self is enlightenment*

*In the silence and the void  
Standing alone and unchanging  
Ever present and in motion  
I do not know its name  
Call it Tao*



*Ever desireless one can see the mystery  
Ever desiring one can see the manifestations  
These two spring from the same source but differ in name  
This appears as darkness  
Darkness within darkness  
The gate to all mystery*

*The ten thousand things rise and fall while the Self watches their return  
They grow and flourish and then return to the source  
Returning to the source is stillness, which is the way of nature*

The Tao describes that *being*, in the sense of *being* something in the world, can only arise from *not being* something in the world, in the sense of the timeless existence of the void:

*Being is born of not being*

*Being at one with the Tao is eternal  
And though the body dies, the Tao will never pass away*

*Because there is no place for death to enter*

*To die but not to perish is to be eternally present*

*Brings freedom from the fear of death*

The Tao expresses the limits of all learned knowledge, like scientific knowledge, and its ultimate limitation vis-à-vis the ultimate knowledge. All learned knowledge is the nature of imagination, and is a part of the world of images we perceive. The ultimate knowledge isn't a part of the world of images we perceive, isn't imaginary, and isn't learned:

*The farther you go, the less you know*

*Those who know are not learned  
The learned do not know*

*In the pursuit of learning, everyday something is acquired  
In the pursuit of Tao, everyday something is dropped  
Less and less is done  
Until non-action is achieved  
When nothing is done, nothing is left undone  
The world is ruled by letting things take their course  
It cannot be ruled by interfering*

The Tao also describes the path of return:

*Tao in the world is like a river flowing home to the sea*

*He who follows the Tao is at one with the Tao*

*The form of the formless*

*The image of the imageless*

*It is called indefinable and beyond imagination*

*Stand before it and there is no beginning*

*Follow it and there is no end*

*Returning is the motion of the Tao*

*It returns to nothingness*

*It leads all things back*

*Toward the great oneness*

Mu-mon describes the path of return with the gateless gate paradox, which expresses that the divided consciousness of an observer can only be present for a world of form at a point of view, or return to its true undivided, formless state of pure being:

*The great path has no gates,*

*Thousands of roads enter it.*

*When one passes through this gateless gate,*

*One walks the universe alone.*

Eugen Herrigel describes the path of return in *Zen in the Art of Archery*:

*He must dare to leap into the Origin so as to live by the Truth and in the Truth, like one who has become one with it. He must become a pupil again, a beginner; conquer the last and steepest stretch of the way, undergo new transformation. If he survives its perils then is his destiny fulfilled; face to face he beholds the unbroken Truth, the Truth beyond all truths, the formless Origin of origins, the Void which is the All; is absorbed into it and from it emerges reborn.*

Einstein refers to this mystery with the following two statements: *The eternal mystery of the world is its comprehensibility*, and *Everyone who is seriously involved in the pursuit of science becomes convinced that a spirit is manifest in the laws of the universe*. In the more poetic language of Kahlil Gibran: *I discovered the secret of the sea in meditation upon a dewdrop*. In this sense, a divided presence of consciousness dissolves back into the 'one' source of consciousness like a drop of water dissolves back into the ocean.

The final mystery is about the nature of ascension, or a higher level of consciousness. Another way to describe this is as a spiritual way of seeing things. Contrary to popular opinion and misconception, spirituality is not about the things that are seen in the world. Every experience of the world is an experience of the world, not a spiritual experience. All the things that are seen are a part of the virtual reality world. A true spiritual experience is not about the things that are seen in the world, but the spiritual way in which those things are seen. The same old things are seen, but they are seen spiritually. Those things are seen from a higher perspective, or from a higher level of consciousness.

To continue our virtual reality game metaphor, the player of the game has identified itself with its avatar in the game, and sees things from the lower perspective of the avatar. The virtual reality game is holographically defined on a viewing screen, and the player of the game is a pure presence of consciousness that is inherently outside the game, present at a point of view in the void. That presence of consciousness only identifies itself with its avatar, and sees its virtual reality world from this lower perspective. Its self-identification with its avatar is inherently related to the mental construction of its self-concept within emotionally energized self-referential thoughts. Only the avatar in the game can express self-referential thoughts, which are inherently about the fate of the avatar in the virtual reality world. Only the avatar can refer to itself in this self-referential way, but only the perceiver of this virtual reality world can emotionally identify itself with its avatar.

To see its world from a higher perspective, the perceiver must detach itself from its world and no longer identify itself with its avatar in that world. The process of its ascension to a higher level of consciousness is always a process of its detachment from that world, which is only possible if its mind becomes silent. Without the emotional expression of self-referential thoughts, the perceiver has no self-concept with which to emotionally identify itself. This silent state of mind naturally arises in a state of non-interference with the normal flow of things, which arises as the flow of energy through all things comes into alignment. In such an aligned state, feelings of connection to all things are perceived.

*Let the mind become still*

Only in a state of non-interference with the normal flow of things can the mind become silent, as there is no longer expression of personal will, but only expression of universal will. This silent state of mind is characterized by the alignment of the flow of energy and feelings of connection to all things. The Tao describes non-interference with the normal flow of things and this silent state of mind, but also expresses the necessity of detachment and non-identification with form in order to ascend to this higher level of consciousness:

*All can know good as good only because there is evil  
For having and not having arise together*

*Misfortune comes from having a body  
Without a body, how could there be misfortune?*

*He who is attached to things will suffer much*

*He who grasps loses*

*The sage stays behind, thus he is ahead*

*He is detached, thus at one with all*

*Through selfless action, he attains fulfillment*

*It is more important*

*To see the simplicity*

*To realize one's true nature*

*To cast off selfishness*

*And temper desire*

*Surrender yourself humbly; then you can be trusted to care for all things*

*Love the world as your own self; then you can truly care for all things*

*Empty yourself of everything*

*Without form there is no desire*

*Without desire there is tranquility*

*Therefore the sage seeks freedom from desire*

Only the perceiver of a world can ascend to a higher level of consciousness. The perceivable things in that world cannot ascend to a higher level, since they are intrinsically defined on the viewing screen. The avatar cannot ascend to a higher level. The avatar is stuck on the viewing screen. An observer that sees things from a higher level looks down on all the things in its world, which includes its own body, just like an out-of-body experience. An ascended observer looks down on everything in its world.

As Plato described long ago, everything in that world is seen with a sense of detachment and great distance, as though all things are only shadows displayed on a screen located far out on the horizon. Plato correctly described self-identification with form as a kind of bondage or imprisonment. The only true freedom comes through a process of detachment and non-identification with form. Only a presence of consciousness can ascend to a higher level of consciousness, as it detaches itself from its virtual reality world, and no longer identifies itself with its avatar or sees itself as existing within the form of its avatar. A detached observer sees the true undivided, formless nature of its existence.

*They see only their own shadows, or the shadows of one another, which the fire throws on the opposite wall of the cave.*

*To them, the truth would be literally nothing but the shadows of the images.*

*See what will naturally follow if the prisoners are released and disabused of their error.*

*See the reality of which in his former state he had seen the shadows; and then conceive someone saying to him, that what he saw before was an illusion.*

*His eye is turned towards more real existence, he has a clearer vision.*

Joseph Campbell referred to this spiritual way of seeing the world with the mythological image of the central mountain of the world. Campbell was fond of quoting Black Elk, who described this spiritual experience. Black Elk described seeing the whole world in a spiritual way from the central mountain, which he described as being everywhere:

*Then I was standing on the highest mountain of them all, and round about beneath me was the whole hoop of the world. And while I stood there I saw more than I can tell and I understood more than I saw; for I was seeing in a sacred manner the shapes of all things in the spirit, and the shape of all shapes as they must live together like one being.*

*The first peace, which is the most important, is that which comes within the souls of men when they realize their relationship, their oneness, with the universe and all its powers, and when they realize that at the center of the universe dwells the Great Spirit, and that this center is really everywhere, it is within each of us. This is the real peace, and the others are but reflections of this. The second peace is that which is made between two individuals, and the third is that which is made between two nations. But above all you should understand that there can never be peace between nations until there is first known that true peace, which as I have often said, is within the souls of men.*

The Bhagavad-Gita describes this true spiritual peace:

*Attaining perfect peace, one attains Brahman  
The supreme, the highest height of all*

*Freed from love and hate  
Freed from surroundings, quiet, lacking nothing  
One grows to oneness with Brahman*

*Such an one, growing one with Brahman, serene  
Sorrows no more, desires no more, his soul  
Equally loving all that lives, loves well  
Me, Who have made them, and attains to Me*

*By this same love and worship does he know  
Me as I am, so high and wonderful  
And knowing, straightway enters into Me  
And whatever deeds he does-fixed  
In Me, as in his refuge-he has won*

*Forever and forever by My grace  
The Eternal Rest*

The Bhagavad-Gita is a story of war and death, but can be understood as a metaphor for the war of self-destruction, by which process the mental construction of a self-concept comes to an end, and the mind becomes silent. In this sense, the war of self-destruction only comes to an end with a surrender, and the acceptance of ego death. This war only begins if the falseness of the self-concept is clearly seen. From that clear seeing arises discontent and the desire to destroy that false self-concept. To know the lie is to hate it. To clearly see the lie is to want to destroy it. The ego can only arise with emotional attachments to things, and with self-defensive expressions that defend those attachments, which are all expressions of personal will that interfere with the normal flow of things and the normal expression of universal will. The willingness to surrender and suffer ego death only arises with willingness to let go, sever attachments, and enter into a state of non-interference with the normal flow of things. This willingness to suffer ego death and destroy the false self-concept is expressed in the most famous line of the Bhagavad-Gita:

*Now I am become death, the destroyer of worlds*

The Bhagavad-Gita also describes the lucid state of a detached observer:

*The soul that with a strong and constant calm  
Takes sorrow and takes joy indifferently,  
Lives in the life undying. That which is  
Can never cease to be; that which is not  
Will not exist. To see this truth of both  
Is theirs who part essence from accident,  
Substance from shadow*

The lucid state is often described as the theater of consciousness in our greatest literature. In the theater of consciousness, all actions are enacted by characters upon a stage, while a presence of consciousness observes those actions from its seat in the audience.

Shakespeare refers to the world as a stage, populated by actors on the stage:

*All the world's a stage  
And all the men and women merely players*

Who is out there in the audience of the theater of consciousness, watching this play? Shakespeare does not give an answer, but does describe the futility of everything that can be done in the world:

*Life is but a walking shadow, a poor player  
That struts and frets his hour upon the stage  
And then is heard no more. It is a tale*

*Told by an idiot, full of sound and fury  
Signifying nothing*

Shakespeare refers to shadows the same way Plato describes the shadows of images displayed on the wall of the cave, just like animated images displayed in a movie. Plato describes prisoners who observe the shadows, and mistake those shadows for their true nature. The prisoners believe something about themselves that is untrue. The prisoners believe they are the shadows they perceive. The prisoners only believe false beliefs about themselves since that is the way it feels as they perceive it, and feeling is believing.

Perceiving is believing, which is another way to say 'to act is to give meaning'. Only the perceiver of actions can give meaning to those actions. That meaning is the nature of belief. The meaning we give to the things we perceive in the world arises with emotional actions, which we perceive as body feelings. Only emotional expressions make beliefs believable, and are inherent in all self-concepts. Belief is not possible without a body.

Chuang Tzu expressed this idea with the concept of no-self:

*The man of Tao remains unknown  
Perfect virtue produces nothing  
No-self is true-self  
And the greatest man is Nobody*

Beliefs only come to an end with the end of the emotional expressions that make those beliefs believable, which is the end of belief in a body-based self-concept as emotionally constructed within self-referential thoughts. Only a perceiver without a self-concept can know its true nature. Socrates expressed this idea with his famous saying *Know thyself*. This saying is the motto for the movie the Matrix, which is a retelling of the Allegory.

The Matrix is about a virtual reality world created within the theater of consciousness. The story is about a prisoner self-identified with its character, or avatar, in that virtual reality, and the journey that allows for escape from that prison. The Matrix demonstrates that escape from the prison of self is the end of belief in a false self-concept.

The Matrix is a metaphor for the war of self-destruction, and clearly indicates the end of that war is a process of ego death. Only that journey allows a knower to know its true nature, and no longer believe it is the form of a self-concept it perceives. That knower only believes it is the animated form of an image it perceives since that is the way it feels, and feeling is believing. Of course, the thing one leaves is not just the prison of self, but self itself, so the freedom thus won is something of a joke. One is left with nothing.

*Freedom is just another word for nothing left to lose*

The central character of the Matrix is told 'you are the one', but is also told 'you've been living in a dream world', and when given the chance to awaken is told 'all I'm offering is the truth, nothing more'. Shakespeare also tells us that 'life is but a dream':

*Our revels now are ended. These our actors,  
As I foretold you, were all spirits and  
Are melted into air, into thin air:  
And, like the baseless fabric of this vision,  
The cloud-capped towers, the gorgeous palaces,  
The solemn temples, the great globe itself,  
Ye all which it inherit, shall dissolve  
And, like this insubstantial pageant faded,  
Leave not a rack behind. We are such stuff  
As dreams are made on, and our little life  
Is rounded with a sleep.*

In this quote Shakespeare refers to actors on the stage (the characters), the spirits (the presence of consciousness), the dream-like illusion of the world (the baseless fabric of this vision), and the disappearance of the world (the great globe itself-shall dissolve). It makes one wonder if Shakespeare was enlightened.

*To sleep: perchance to dream: ay, there's the rub;  
For in that sleep of death what dreams may come  
When we have shuffled off this mortal coil,  
Must give us pause*

What does it all mean? To speak in colloquial terms, meaning is just a figment of your imagination. Animated images are the nature of the virtual reality world, where all things appear real, but nothing is true. Things appear real since they feel real, due to emotional actions. All things are only images, which are coherently organized perceivable forms of information displayed on the viewing screen. The true nature of the perceiver is not.

There is a scene in the Matrix that expresses the incredible, almost fantastic nature of the world, which truly seems to be beyond belief. After Neo escapes from the Matrix, he returns with Morpheus and Trinity to see the Oracle. As they ride together, and Neo looks upon the virtual reality of the Matrix with awe, Morpheus says "Unbelievable, isn't it".

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