

# Foundation for Mind Being Research:

DOMAIN OF UNBOUNDED POTENTIAL-THE SCIENCE OF THE ABSOLUTE

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## ABSTRACT:

The goal of this paper is to map the Absolute, the space-less and timeless domain of unbounded potential, and specify its various aspects. The paper includes a discussion of the dynamics of the co-creation process that exists between the Absolute and the world of physicality. The model will describe the role of the unknowable, the sacred symbols, and the archetypes, as sub-domains of the Absolute. Included will be a discussion of concepts developed by ancient traditions since these represent a universal wisdom which have within them aspects that are invariant through time. Next we will present the scientific evidence that supports the need for a domain of unbounded potential. We will explore how complexity theory, randomness, and the magnetic vector potential can assist our scientific understanding of the creation process. We will outline some of the research supporting the concept of the Absolute and introduce some tools for assisting mankind to tap these unbounded potentials. Then we will conclude with a look into implications for the future as mankind's ability to consciously access this domain expands.

## INTRODUCTION:

This paper is organized into two parts. Part I will discuss our ontology by briefly presenting the model we are using to describe the nature of the cosmos. The model includes a domain of unbounded potential, that we have named the Absolute. Part II will discuss the dynamics of the co-creation process that exists between the domain of unbounded potential, the Absolute, and the world of physicality.

OUR MODEL:

In our model there is an unchanging Absolute that is timeless, and a physical world in which time exists. Some have said that time is God's way of having everything happen at once. But there is a deeper meaning, **we can't have change without time. In fact, time is nothing but change** (Barbor, 1999). **Time is the mechanism by which Nature creates differences**. Without time we would only have the perfect patterns of the Absolute, with time comes imperfections. Nowhere in all Nature are any two things found to be exactly alike. By Nature we mean that which gets born, whether it be a galaxy, a planet, a plant or a person. **In Nature we perceive patterns but they are always in flux -- everything is vibrating**.

**Science agrees that everything in the universe is vibrating, therefore all forms and patterns must have a wave spectrum associated to them**. The universal differences observed in Nature are the result of the continually changing wave patterns of the whole. We, therefore, believe that waves provide the most effective way to model the cosmos. Waves create the pattern and forms of the physical, creating a holographic universe that is continually changing. **In the Absolute waves represent the physical potential of resonances. The phenomenon of wave resonance depicts the mechanism for the interaction of physical Nature with the non-physical Absolute (Gough & Dean, 2001)**.

**Since the Absolute has no time; past, present, and future are one**. Modern physics has a similar characteristic. In the fundamental equations of physics, i.e., electromagnetic, relativity and quantum, the backward and forward direction in time are not distinguishable -- there is a symmetry of time. It is only when we consider the physicality of three dimensional space from the engineering perspective of thermodynamics that time has an arrow. If one accepts relativity theory, light has "no time" since at the speed of light clocks effectively stop and time has no meaning. **It is the manifest world that gives time a meaning; in the Absolute time has no meaning, it is always the Now**.

Figure 1 is a schematic representation of our model in which we use a cosmology of multiple (seven) levels or fields of waves, related to each other, not causally, but by reflecting a common pattern (Gough & Shacklett, 1999; Gough & Brown, 2001). **In this model CONSCIOUSNESS represents the field of all fields. It interpenetrates all levels -- and could be interpreted as God**. The so called "consciousness" of an individual as described in the medical literature is but a fleeting spark in this larger all-encompassing consciousness. **This "field of all fields" when experienced by a human being results in the feelings of unconditional love (agape), peace and wellbeing**.

## DOMAIN OF UNBOUNDED POTENTIAL -- THE ABSOLUTE:

We have postulated a domain of unbounded potential, the Absolute, from which all emanations arise. **The Absolute constitutes the source of everything in the physical world.** The science of the Absolute has evolved from the ontologies developed by past cultures. These ancient traditions represent a universal wisdom since they have within them aspects that are invariant through time. In addition, such a postulate for a creative source appears necessary in modern science for two reasons: First, the creation of the universe via the "big bang" violates the conservation of energy -- a law at the foundation of modern physics. Second, all life began in non-life, therefore, every living thing could not have evolved from an ancestor. This is true since the universe started from "nothing". Since life started from matter, and all matter came from nothing, i.e., from a non-physical domain, life must have started from "nothing" also. **A well-known scientific concept for addressing this issue is Dr. David Bohm's "implicate order," an order of undivided wholeness** (Bohm, 1980).

Where in modern physics could there exist a boundary between the attributes of the physical world of space-time, locality, and separation, and the non-physical Absolute that we would perceive as space-less and timeless and characterized by non-locality and connectiveness? **In our model this "phase transition" occurs at the Planck length which has the very, very tiny dimension of 10<sup>-31</sup> centimeters.** This length is 20 orders of magnitude smaller than an elementary particle, and far beyond the reach of any probe of high energy physics. **However, physicists generally agree that the Planck length represents the "bottom" of physical space where the concept of location loses its meaning due to quantum uncertainty and fluctuation.**

**Beyond this phase transition begins the domain of unbounded potential, the Absolute.** In our model, the Absolute has three sub-domains. First there is a domain of **no form which from our perspective represents the unknowable.** Next there is a domain of **sacred symbols, the "mother alphabet" which represents the building blocks from which the physical world arises.** And last and **closest to the phase boundary is the domain of eternal forms which have often been called archetypes.** These represent the potential structures that we (\*focalized consciousness of the Absolute) are/is in resonance with.

These underlying structures are experienced as qualities or essences. The Sufi's call these the ninety nine names of Allah, other ancient cultures such as the Egyptians, Norse, Greeks, and Romans, create a pantheon of deities. They represent the bedrock for world mythology. Myths are a universal feature of civilization that represent common concerns that each society voices in its own idiom. The myths of mankind all come from one source, the flow of consciousness which is in all of us and which links us all to the Absolute. Thus, myths are attempts over the ages to map aspects of the Absolute (Leeming, 1990; Burland, 1974). New myths are in the process of being formulated in today's world. Science represents the consensual process of making observations, gathering data, inferring features in these observations,

and making new models from the disclosed patterns. Thus, science, itself, is unfolding new myths at an ever increasing rate.

**The world of physicality, the world of form and pattern, emerges out of the Absolute at the Planck length phase transition.** We have proposed that this world of physicality is comprised of multiple three-dimensional spaces and times that are co-existent and interpenetrating. We suggest that the world of physicality can be modeled by seven primary levels (Gough & Shacklett, 1999; Gough & Brown, 2001). These levels of physicality are a nested hierarchy of a self-organizing system -- fields within fields, ad infinitum. However, an amazing paradox exists since the totality which includes the Absolute would be non-hierarchical because of the non-local interconnectiveness of the Oneness.

**As we progress through the seven levels towards the Absolute the degree of imperfection of forms decreases.** The forms become more "perfect", more archetypal. **Resonance between wave patterns provide the linkage between the levels, and connect us to the potentiality of the archetypal structures.** Creation occurs at all the interpenetrating levels. Over time everything vanishes at all levels of physicality as illustrated in Figure 1 as the emergent forms return to the Absolute. Organized intelligence, i.e., dynamic field patterns at the various levels, have been described as deceased entities, guides, angels, and archangels. This is a recognition of the progression toward a truer representation of the eternal forms or archetypes of the Absolute.

#### THE MOTHER LANGUAGE:

We postulate that the Absolute has a domain of sacred symbols -- symbols of the infinite that constitute a mother alphabet from which the structures of the Absolute arise. These structures we have called eternal forms or archetypes. Throughout all of human culture symbols have been used extensively and have had specific qualities associated with them. (Cirlot, 1971) **It is our premise that the patterns for all symbols in space-time have their base in the sacred symbols and archetypal structures of the Absolute, i.e., domains beyond space-time.** Thus, physical symbols we use can be considered "archetypal representations" in the material world (Gough & Shacklett, 1983). **They facilitate a resonance tuning to the qualities of the Absolute. The dynamics of the process for creating forms is based upon ordering principles such as the "Golden Ratio" or "Golden Proportion" ( $Y = 1/1.618...$ ) which, in turn, is related to the Fibonacci series.** For example, over the centuries these ordering principles have been observed in the structure of sea creatures, in the human structure, in flowers, pine cones, fruit, etc. (Cook, 1979; Ghyka, 1977).

Many different symbols and formats of symbols can be used to access and describe a given archetype. The primary archetypes have been represented by the symbols for numbers (Arabic, Roman, etc.) and by letters (Hebrew, Greek, Arabic, etc.). Thus, one can envision symbols for archetypes 1) as one dimensional such as strings of numbers or of letters as in sacred texts, 2) as two dimensional such as the matrices of quantum physics or the Chinese matrices used to represent "the total archetypal order of the unus mundus and all its conceivable contents" (von Franz, 1974, p. 141), and 3) as three dimensional such as the five Platonic solids or the knots of the modern mathematical discipline of knot theory (Kauffman, 1991).

Numbers and letters are intimately connected. For the Hebrews, Arabs, and Greeks, the letters of the alphabets were also the symbols for numbers. Thus, these languages and their alphabets are particularly intertwined with the numerical, mathematical and algorithmic thought of these ancient peoples. In addition, ancient cultures claim a universality or sacred status for traditional alphabets (Sanskrit, Islamic Arabic, Hebrew, Greek, Tibetan, etc.). In studies of the Norse people's Runic characters and the Celtic symbols, anthropologists find that the symbols of alphabets appear to have served sacred and mystical purposes hundreds of years before they find evidence of their application as a written language for the general society (Branston, 1980).

We are suggesting that the "hidden meaning" of the letter/number symbols of the ancients is really the fact that the ancients knew that numbers/letters were symbols linked to an aspect of a universal idea or quality beyond the physical, i.e., connected to a mother language originating in the Absolute. ***Thus, numbers/letters could be used as elements in a hyper-dimensional map of that higher reality.*** It follows, that any pattern such as geometric figures, mandalas, sound/music, or language can be transposed into a number format as is evident from our compact disks and computer technologies. Therefore, art, music, and poetry become representations of levels of complexity in archetypal forms beyond space-time in the Absolute. The qualities derived from a resonant coupling to a sacred symbol or archetype of the Absolute translates into feelings and emotions.

#### MODERN SCIENCE & THE MOTHER LANGUAGE:

Modern physics rests upon the foundation of mathematics, a symbolic language. But, what is the foundation upon which this magical mathematics rests? If we cannot answer these questions, our scientific explanations of the Cosmos are based ultimately upon things we do not understand.

We need to recognize that there exists a basic difference on how "numbers" are viewed when used by Western scientists versus ancient "scientists." For example, in Western science, the numbers that make up matrices such as those used in quantum physics are each considered to represent only a quantity. This is not true for the ancients. For example, in a Chinese matrix like the Lo-shu, each single element of the matrix is regarded as a quality of a "field" with each number functioning as a hierarchically regulating element (von Franz, 1974, p. 26). "The single numbers of the matrices are not subdivisions but illustrations of the 'phases of transformation' that form the time-bound aspects of the whole" (von Franz, 1974, p. 42).

Many others in more recent times have recognized that "numbers" can be considered as representations of a "mother language." Dr. Carl Jung, the famous psychologist, believed that the symbols we use in our physical world that represent "number" evolve from (and thus are representations of) the most fundamental archetypes for the order beyond space-time. Jung contended that "number serves as a special instrument for becoming conscious of such unitary patterns" of the Absolute. (von Franz, 1974, p.27). Dr. Wolfgang Pauli, a founder of quantum physics, held similar beliefs and stated that the concept of archetype "should be understood in such a way as to include the ideas, among others, of the continuous series of whole numbers in arithmetic, and that of the continuum in geometry." (Pauli quoted in von Franz, 1974, p. 18) Both the ancient literature and the work of Jung and Von Franz are in good agreement on the "qualities" inherent in the first five "number" archetypes (von Franz, 1974; Hall, 1988, p. LXXII).

This broader view of mathematical number symbols is also supported by Bertram Russell in his Introduction to Mathematical Philosophy where he denies number's aspect as a mere "quantity" and describes it, rather, as an ordering factor (von Franz, 1974, footnote p. 40, referencing London, 1956, p. 213). If we accept that certain mathematical structures rest on an archetypal basis originating in the Absolute, then the observed isomorphism of mathematics with certain physical world phenomena is not so surprising (von Franz, 1974, p.19). Thus, modern science may work because it is unconsciously making use of the same patterns of order, the mother language (the underlying geometric patterns and relationships) of the "number archetypes," that the ancients recognized as being revealed by the "gods," i.e., originating in the Absolute beyond our space-time reality.

#### LAW OF THREE:

Each "number archetype" has a "quality". "Each number must be thought of as containing a specific activity that streams forth like a field of force. From this standpoint numbers signify different rhythmic

configurations of the one-continuum," i.e., of the Absolute (von Franz, 1974, p.75). Our modeling proposes three sub-domains of the Absolute and a physicality that consists of the seven interpenetrating "three" dimensional levels with time. We, therefore, will address the reasoning behind our choice of the number "three".

The idea that three "forces or principles" of the Absolute constitute one whole is at the root of many ancient systems. In Norse mythology it was the Fates, the Three Norms, (Urd, Verdande and Skuld), who decided the destiny of human beings. In the Tree of Life of the Kabbalah of the Hebrews, the top three Sephiroths are treated as one and represent the "archetypal world" (Hall, 1988). In Hinduism it is the tri-unity of Brahma, Vishnu, and Shiva; in Christianity it is the Trinity of Father, Son, and Holy Ghost. In the writings of Plato and Plotinus the Supreme Being is also given through a tri-unity. Even, the ancient Chinese book of divination and wisdom, the I Ching, (Book of Changes), which is about 31 centuries old, is written in triplets, sets of three lines called trigrams (Pease, 1993). It is clear that the mystery of a Trinity-that-is-Unity is much older than Christianity (Kyrder, 2000).

The Law of Three applies to all life processes. Both DNA and RNA are composed of long chains of nucleotides. A nucleotide is composed of three parts: a phosphate, a sugar, and a base. DNA consists of only four types of nucleotides. This four letter alphabet of the genetic code in DNA is always written in triplets of nucleotides. Like a Morse code language, a triplet of nucleotides, three in a row, is used to specify a particular amino acid. Each position in the triplet could potentially specify up to sixty-four amino acids although only twenty are actually used by cells (Goodsell, 1993; Dressler & Potter, 1991). Interestingly, in the ancient I Ching the number of different hexagrams, and hence the number of types of situations they identify, is also sixty-four. It is becoming obvious why in numerology three is considered the number of creation.

But what can science say about why space should be three dimensional. We believe the reason for the prevalence of triplets lies in the fact that the cosmos operates under a "Principle of Least Action" -- an organizational principle at the foundation of Western science (Brown, 2002). Bertrand Russell called it "A Law of Cosmic Laziness." Thus we can ask, what is the most economical number system, where the economy of a number system is based on ten different symbols (0 through 9); the design of most computers is based on a binary system with two different symbols. One can develop a number system based on any number of symbols, including three. According to calculations by the Russian functional analyst, Prof. S.V. Fomin, "the ternary system has turned out to be the most economical" (Fomin, 1974). Thus, for whole numbers, the Law of Three is a Principle of Least Action.

Since the world of physicality is a world of patterns (symbols), a three dimensional world would appear to be the most appropriate choice. **This is the reason that our seven levels are all three dimensional interpenetrating spaces. There are many different ways to define the dimension of a space (Stewart, 1987). Usually a space refers to the number of independent coordinates (expressed as a positive integer) needed to locate a point in a "space."** A space of dimensionality greater than three is called a "hyperspace."

Then why does modern physics use multi-dimensional "hyperspaces" to describe Nature? Multi-dimensions are required due to the hierarchy inherent in the cosmos. As the modeling of science uses mathematics to go to higher and higher hyperspaces, the effect is to decrease the degree of imperfection inherent in our day-to-day physical world. The hyperspaces permit the patterns of Nature to become more archetypal. In effect the number of independent coordinates are being reduced as we move from this physical reality through the hyperspaces corresponding to the different levels. For example, we experience all snowflakes, trees, humans, etc. as being different. **As we move to higher hyperspaces these differences disappear. This is why persons who consciously access these higher hyperspaces or levels experience increasing connectiveness and oneness.**

#### STRUCTURES IN THE ABSOLUTE:

We have described the Absolute as a domain of unbounded potential with three sub-domains. The first was the domain of no form -- the unknowable. Then we described the domain of sacred symbols, the mother alphabet -- the building blocks of our reality which Carl Jung and Wolfgang Pauli have called "number archetypes." Next we would like to address the evidence for the third domain of eternal forms that are often called archetypal structures.

It is the archetypal structures that provide the foundation from which arise the laws of Nature, ethics, logic, and esthetics. The "Perennial Philosophy," that can be observed at the core of the great religions of the world, also indicates the presence of such archetypal structures in the Absolute (Harman & Rheingold, 1984). **The laws of science emerge from the study of Nature's patterns that reflect the structures of the Absolute.** Dream analysis in psychology and shamanic practices are based upon the existence of such structures. Over the centuries humans have developed divination tools such as the I Ching, Tarot Cards, and the Runes that resonate with the Absolute's structures to provide guidance. **All living creatures are tuned to these archetypal structures.** The nurturing from a mother to a child is a universal phenomenon that occurs across species.

Great mathematicians, musicians, and artists that provide the scientific and esthetics infrastructure acknowledge their existence. An example would be the dramatic emergence into mathematical prominence in 1915 of the Indian genius Ramanujan. This young man was only exposed to the barest

elementary mathematical concepts in his very limited formal schooling. Yet his formulas and theorems went far beyond the ability of advanced mathematicians of his day to prove, and are only now being proved using methods completely unknown to Ramanujan.

His biographer makes this comment on Ramanujan's philosophy regarding mathematical reality:

In the West, there was an old debate as to whether mathematical reality was made by mathematicians or, existing independently, was merely discovered by them. Ramanujan was squarely in the latter camp; for him, numbers and their mathematical relationships fairly threw off clues to how the universe fit together. Each new theorem was one more piece of the Infinite unfathomed. (Kanigel, 1991, p 66)

The mathematics of geometry and topology represent absolutes. For example, the sum of the angles of a planer triangle always equal 180 degrees. The reason that the physical world conforms so well to the mathematical pictures created in the mind is precisely because **there exists a causal linkage between the patterns of the physical and the archetypal structures of the Absolute. Humans can "understand" Nature by experiencing it through those mathematical structures. Structures which harmonize or "resonate" with the patterns of Nature.**

THE UNKNOWABLE:

The first of the three Domains of Unbounded Potential of the Absolute we called the Sub-Domain of No-Form: The Unknowable. We thus have implied that science will encounter unanswerable questions. Here are a few questions that we believe will fall into that category. What is the purpose of the universe? Why is everything that science has observed in the universe vibrating? Science says that all matter sits in a sea of unlimited "energy", but how is that energy manifested? **Can we ever explain the fuzziness at the gap between the world of physicality and the Absolute, the world of potentiality?** How does the living come out of the non-living? What is the source and nature of the life thrust? The life trust constitutes a focusing of energy by everything in Nature on propagation -- the process of going from ascendant to descendant. The process of the life trust is intimately related to the purpose of time and space.

PART II: THE DYNAMICS OF THE PROCESS - CO-CREATION:

## SYMBOLS:

To understand the dynamics of the creation process that originates from the Absolute we must explore the concept of symbols. We postulated that the Absolute contains two symbolic potentials, both of which are timeless. The first are the sacred symbols. The second are the eternal forms or archetypes that are built from the sacred symbols. In the physical world we apply the word symbol to time bound objects. The first are Nature's field patterns that have evolved over time. The second are cultural symbols that are species specific and remain unique for a given time and region.

The power of symbols in the physical arises from the combination of the Absolute and physical symbols. Sacred symbols, the timeless symbols, are embedded in cultural symbols. Communication represents a symbol exchange. All species manipulate symbols. However, the human species has developed a special talent in symbol manipulation through the co-evolution of language and the brain. The human brain reflects language in its architecture the way birds reflect the aerodynamics of flight in the shape and movements of their wings (Deacon, 1997). From this special talent of symbol manipulation came perhaps the human's greatest invention -- writing. Without writing there would be no history, and no civilization as we know it (Robinson, 1995).

An example of a cultural symbol that incorporates the power of a symbolic archetype is the swastika. The swastika is found in almost every ancient culture. It was used by the Etruscans, Celts, Germanic peoples, Hindus, Jains and Buddhists. It is found in the Christian catacombs, in Britain, Ireland, Mycenae and Gascony. It was a part of the cultures of China, Japan, and Pre-Columbian America (Cirlot, 1971). Long before Adolf Hitler's Nazi party adopted this symbol, a cigar brand that survived for over thirty years was promoted in the United States using the swastika symbol. On the cigar box were the symbol and the following words: "The Swastika is the oldest symbol known to man. Since time began, it has been considered a sign of welfare by primitive tribes and races; from the Norsemen of Iceland, to the Brahmins of India; from the Ancients of China, to the Aborigines of America. To the smoker of the Swastika Cigars will come from the four winds of Heaven; Good Luck, Long Life, and Prosperity." (Davidson, 1997). Yet, the swastika became infamous in the 20th century due to its use by Nazi Germany.

Why would a single symbol be used over the centuries with so many different purposes? The symbol of the swastika when used in a society incorporates within it a cultural overlay. **The underlying power of the swastika comes from its Sanskrit root -- self-reference. Self-reference represents a feed-back process. It means that whatever cultural intention is infused upon the symbol will feed back upon itself. Thus, this symbol enhances whatever the culture puts in and provides that intention power.**

The resulting power can personify good or evil. In Sanskrit it makes no difference whether the swastika is right-handed or left-handed since this depends only upon whether one is looking up or down. The same power enhancing ability remains in the symbol (MacDonell, 1954).

#### THE CREATION PROCESS:

We have hypothesized that **Nature's patterns are created in the Absolute from sacred symbols that create archetypal structures.** The sacred symbols that represent the building blocks of the timeless archetypes in the Absolute then manifest as three dimensional forms in the physical world of space-time as shown in Figure 1. In turn, these created space-time **patterns of the physical then resonate in a feedback process with the archetypes and sacred symbols (\*Quantum Potentials) of the Absolute (Gough & Brown, 2001).** The space-time patterns include not only material structures, but thoughts and emotional fields. This resonance is often experienced by individuals as subjective feelings or qualia. Qualia represent the issue of "sense of self" and in effect define "you". They have qualities distinct to an individual, create your personal moods, and are below the threshold of awareness (Gough, 2000).

#### COMPLEXITY THEORY:

Can science model this creation process and describe the natural phenomena in mathematical terms? Can simple structures such as the sacred symbols be used to produce highly complex and random-looking patterns? A new branch of science known as complexity theory recognizes that the physical universe is greater than the sum of its parts (Lewin, 1992; Coveney & Highfield, 1995; Waldrop, 1992). It proposes that there is an innate tendency within matter to self organize. We believe that this self organizing property exists for the field patterns at all seven levels of physicality in our model.

Most complex systems exhibit what mathematicians call "strange attractors," states to which the system eventually settles, depending on the properties of the system. The behavior of the system settles into a particular "chaotic" pattern as though attracted by some strange influence. These characteristic patterns represent the signature of particular kinds of chaotic behavior. However, the same combination of variables never occurs twice. **Thus, in a strange attractor there exists an infinite number of possibilities, yet they are confined to a finite region.** This phenomenon can be observed in Figure 2, a picture of the famous Lorenz attractor. **The strange attractor is a fractal, a geometry used to describe an irregular pattern. Fractals display the characteristic of self-similarity among scales. This gives us a "holographic" universe in which every part contains information of the whole.**

Chaotic behavior permeates the world of our experience. Some examples are: the dripping of a faucet, the global weather, a moon of Saturn, fibrillation of the heart, predator-prey population dynamics, and

trends in the price of cotton. There is immense sensitivity to initial conditions. This translates into what is only half-jokingly known as the Butterfly Effect -- the notion that a butterfly stirring the air today in Peking can transform storm systems next month in New York (Gleick, 1987, p.8). Thus, we can envision a chaos creation process which is globally organized and controlled, but locally unpredictable. Differences would be created due to the great sensitivity of the process to changes in initial conditions. The process is non-linear and time dependent and, hence, would maintain great flexibility within the system. This is the way we experience the physical world!

In traditional complexity theory, local interactions produce emergent global structures that feed-back to the local level. In other words the emergent global properties feeds back to influence the behavior of the individuals that produce it in a closed system. In our model, we are applying complexity theory to an open system by relating the process to the timelessness of the Absolute. This is illustrated in Figure 3.

**The physical unfolds out of domains of the Absolute, beyond space and time. The patterns and symbols in the physical world evolve out of "seeds" from the archetypal or "formless forms" of the Absolute in a self-referential feedback process.** In the mathematics of complexity theory the strange attractors can exist as higher dimensional attractors beyond space-time. We envision that such attractors could act like a "chaos pump" for the physical world. A process that would bring microscopic fluctuations up to a macroscopic expression. For example, from microscopic changes in atomic structures, to changes in molecules, to macroscopic changes in one's body and one's mental and emotional states. **In turn, the timeless Absolute will react via self-referential feedback to our reaction to such changes. This feedback process arising from one's actions, thoughts, and emotions, produces changes in both form and information in our world of physicality.**

RANDOMNESS (AN UNKNOWABLE):

If we flip a coin a very large number of times, we would expect to observe an approximately equal number of heads and tails. This is an indication of physical randomness. If instead we obtain a significant excess of heads over tails, we seek a cause for the variation from randomness. However, randomness remains a very controversial subject in mathematics. In fact, there is no true "randomness" in the physical only degrees of randomness (Stewart, 1987; Seife, 1997). If true randomness does exist then it would only be in the Absolute and would be unrecognizable. There is no way in the physical to look at a sequence say of numbers and prove that it is random.

We have been discussing complexity theory and chaos. "Chaos inhabits the twilight zone between regularity and randomness" (Stewart, 2001). But randomness is the soil from which chaos and then order arises. Randomness plays a key role in the emergence of complex behavior. "The dynamical system generating chaos acts as an efficient selector that rejects the vast majority of random sequences and keeps only those compatible with the underlying rate laws", i.e., attractors (Nicolis & Prigogine, 1989). In a similar manner we are suggesting that creation relies upon order arising from the "randomness" present in the world of physicality. We postulate that it is the presence of this "randomness" that facilitates input from the Absolute and from our intentions which operate via the Absolute.

We are treating randomness as a limiting case of order -- hence strict determinism and chance (i.e., randomness) represent processes that are at opposite ends of the general spectrum of order (Bohm & Peat, 1987). The evidence suggests that our intentions, thoughts, and emotions can produce non-local effects -- a change that results in a shift from randomness to greater coherence or vice versa. As a system becomes more random, the presence of patterns and structures increasingly decrease. **The greater the degree of randomness, the easier it will be to introduce new form or information into a system.**

**In modern physics the quantum vacuum can be considered the transition region between the size of measurable particles and the Planck length which constitutes the boundary to the Absolute.** The quantum vacuum was originally considered random but now is recognized as having structure within it. This means that properties of the Absolute should be observable in the physical. Thus, there should exist examples of how randomness has facilitated the infusion of pattern and order into physical situations.

1) Randomness and Precognition:

**Assuming an Absolute in which past, present, and future are non-existent, then by conscious or unconscious intention we should be able to obtain information regarding the future via the Absolute.**

Lets explore some research data that supports this idea.

At least eleven double-blind experiments in three laboratories with over 280 participants have been conducted that confirm that your body knows in advance when an emotional stimulus will occur. A standard set of pictures that evoke either an emotional response (i.e., bad auto accident, violent sex act, attacking animal, etc.) or a calm response (i.e., beautiful nature scene, pretty flower, friendly animal, etc.) are used. The subject sits in front of a computer while the skin conductance on their finger is

monitored. They view a blank computer screen and then press a start button. In five seconds a randomly chosen picture appears from the set of emotional and calm options. They view the picture for three seconds and then the screen goes blank. The process is then repeated.

The data measuring the person's response before, during, and after the picture appears indicates that the person's body registers an unconscious precognitive awareness that an emotional picture will be the next random photo to appear on the computer screen. These research results imply that everything is interconnected -- you, the computer, and the randomly chosen pictures (Radin, 1997, Biernan & Radin, 1997, Radin, 2000). **It is our belief that this interconnection is occurring in the Absolute, not in three dimensional physical space-time.** Thus, synchronicity, coincidence and chance emerge with a deeper meaning that includes the Absolute (Peat, 1987).

2) Randomness and Retroactive Intention:

**Assuming an Absolute in which past, present, and future are non-existent, then by unconscious or conscious intention via the Absolute we should also be able to influence the past.** Lets explore some theories and research data that supports this idea.

Can we exert real influences on what is "past"? Cosmologists have been seriously considering this possibility. **The theory is known as the anthropic principle" and is based on the idea that life in the Universe "can set constraints on the way the Universe is now, and how it got to be the way it is now" (Gribbin, 1996).** There exists only an extremely narrow range of values within the laws of Nature that would permit life to exist. The anthropic principle would provide an explanation why this is so (Breuer, 1991).

Many years of experiments on the existence of retroactive intentional influence have been conducted and are summarized in an article by Dr. William Braud (Braud, 2000). **These studies show that mental intentions in the present could have direct, observable influences on the past.** For example, consider the following experiments done by Dr. H. Schmidt.

A random number generator is activated to produce a string of binary numbers (heads or tails). These numbers are automatically recorded on a reliable recording medium. Nobody is present during this generation and recording, and nobody looks at the data until they are played back for the first time to a subject. During the slow playback each recorded head or tail makes a red or green lamp light up while the subject tries through mental intention to enforce an increased lighting rate of the red lamp. Since

the decision on how many heads or tails was randomly made before the test session, a change from randomness would imply that the subject was affecting the past. The research found that time-displaced influences of prerecorded but previously unobserved target events were indeed possible. In addition, the likelihood or strength of such influences did not differ appreciably from that of real-time experiments done without any prerecorded data (Schmidt, 1976).

3) Randomness and a Field of Consciousness:

**Since everything in the universe is vibrating, all forms and patterns have a wave spectrum associated to them. These waves produce fields. Consciousness represents the "field of all fields" and arises from the Absolute. It produces a cosmos in which everything is interconnected. Thus, focused mental intention by one or more individuals should produce field effects that can influence the overall physical world without regard to distance. These effects are non-local since intention operates via the Absolute.** Lets explore some research data that supports this possibility.

Experiments using random number generators have been carried out to explore field consciousness effects. **These experiments have shown that environments that foster a relatively intense subjective coherence or resonance among the participants show the largest deviations from the mean of random chance expectations. For example measurements at a workshop of Holotropic breathwork and at a Shoshone shaman healing ceremony both indicate a shift from randomness to a more coherent situation (Radin, 1997, Nelson, et.al., 1998).** Whereas those measurements generated in more pragmatic assemblies of people like a typical business meeting or conference show no change in randomness.

In addition experiments have studied changes in physical randomness when as many as a billion people all focus on the same event. Global television broadcasts when the world's attention is captivated by the same event provide the opportunities to explore such changes in field consciousness (Radin, 1997). There now exists a worldwide net of random number generators as part of The Global Consciousness Project which started in 1998. The project seeks evidence of a communal, shared mind in which we are unknowing participants. In effect, our individual intentions, thoughts, and emotions may interact and combine to create a non-local field that ultimately has a global presence. This project now has about 40 sites around the world, each recording second-by-second data from random event generators (REG's). The data is sent for archiving and analysis to a dedicated computer server in Princeton, NJ (Nelson & Radin, 2001).

Global-scale events that bring great numbers of us to a common focus with a coherence of thought and feeling have been found to correlate with anomalous structures in the random data. For example there

have been striking results for the Turkish earthquake, the billion person meditation, Islamic Month of Ramadan, New Year's Eve, NATO's start of bombing Yugoslavia, and, of course, the September 11th terrorist attacks on the U.S. For this horrendous event there was indication that the effects registered might have begun several hours prior to the first attack.

New experiments being conducted on the World Wide Web (<http://csl.lfr.org/bi/gotpsi.htm>) now involve over 17,000 participants and more than 2.7 million trials from 91 countries. Effectiveness was highly correlated with participants who meditated, believe in psychic phenomena, or are spiritual. Non-effectiveness was correlated with those who had received scientific training or adhered to an organized religion. **This indicates that a belief system can either facilitate or hinder a person's access to the intelligence of the Absolute (Radin, 2001; Gough, 2000).**

#### 4) Randomness and Non-Human Intention:

If the concepts regarding the Absolute are true then they must apply to the use of intention by non-human systems. Let's explore an example. Studies with animals indicate a "field" effect in which coherence is introduced into the "randomness". An interesting experiment between chicks and a mechanical robot demonstrate how a mental intention field can be created in living systems that affects the material world. A robot driven by a random event generator conditioned chicks emerging from the egg. The chicks take the robot to be their mother, since it is the first thing they see moving. Such "imprinting" is a well studied phenomena (Llinas, 2001, pp.197-199). When the conditioned chicks are removed, the robot continues to produce a random pattern. However, when the one day old chicks, who took the robot to be their mother, are returned to a coop near the robot, they affect the robot's movement. The chicks' intentions were enough to constrain the robot's random movements and keep the robot close to their coop. It was therefore the chicks' unconscious desire, their expectations, which controlled the movements of a non-living random robot (Sheldrake, 1999, p.p.271-274).

#### 5) Randomness and Divination:

We have assumed that the randomness inherent in the quantum vacuum serves as the interface between space/time and the intelligence of the spaceless/timeless Absolute. In the past, systems have been developed to facilitate our obtaining guidance from the intelligence of the Absolute. These include the I Ching, Tarot, Runes, etc. that are all based upon a "random" selection process. In all of these tools the human intention (both conscious and unconscious) is an integral part of the process.

A "machine" method of bio-communication with the Absolute is "radionics" equipment. Radionics was originated by an American physician, Dr. Albert Abrams, who was born in San Francisco in 1863. Abrams devised an instrument with calibrated dials which enabled him to measure disease reactions and intensities in his patients. A radionics practitioner in making his analysis uses the principles of dowsing by applying his intuitive and extra-sensory faculties to the problem of detecting disease in much the same way that a dowser detects the location of water, oil, or mineral deposits (Tansley, 1975).

A recent variation on the radionics concept is being carried out at the m-tec AG company in Munich, Germany. It involves their "Quantec" software program -- a computerized radionics device using a random event generator (white noise diode) with the ability to access many data bases (they have 55 including the World Health Organization's "ICD-10" and homeopathy). ***The conscious intent of the questioner is an integral part of the process. To tease the answer out of the randomness***, the computer asks each question 10,000 times -- "to remove the electromagnetic smog" (von Buengner, 2001).

The Quantec system creates computer digital pictures of the objects which require balancing (rather than use samples as was common in older radionics devices). In a joint project with Mundus GmbH the company claims to have successfully brought a small highly polluted lake in Berlin back into biological balance. ***The belief is that every copy of an object keeps in "contact" with the original. In a holographic universe in which everything is interconnected, working with a picture would in theory be possible since every part keeps in touch with the whole and every picture is a part***. This is why natives of Africa, Asia, etc. often objected to having their picture taken. Data on the Quantec and the research appears on the World Wide Web ([www.mtec-ag.com](http://www.mtec-ag.com)).

6) Randomness and Instrumental Trans-communication:

***If the universe consists of organized intelligences at other levels as we have proposed, then communication with them would be via the Absolute (Gough & Shacklett, 1999)***. Let's look at an example of how randomness was used to facilitate such instrumental trans-communication. Dr. Konstantine Raudive, the Latvian psychologist, claimed that he could receive voices from the dead. He did this by developing a process that used certain radio frequencies plus introducing a background randomness through the use of "white noise." In physics noise is a synonym for chance fluctuations. The most random noise is "white noise" which can be produced by a pseudo-random generator and is completely uncorrelated from point to point. Subsequently George Meek studied the electronic voice

phenomenon (EVP experiments) that had been done in Europe which had produced the so-called Raudive voices. Meek decided that "their use of the diode or interfrequency method was very important because what entities there were, were able to use this energy. We did a lot of experimenting to create these artificial background noises. They make it hard to hear, but they are critically important" (Fuller, 1986).

7) Randomness and Non-local Digital Biology:

**We tend to think that communication of data must occur via electro-magnetic waves. Once we accept the Absolute then the possibility of non-local effects must always be considered as a possibility in any experiment.** The following story illustrates why this is true.

In June 1988 there was published in Nature an article by a highly respected French biologist, Jacques Benveniste, M.D. The research had been replicated in four laboratories and had twelve additional co-authors. The article stated that an aqueous solution of an antibody retains its ability to evoke a biological response even when diluted to such an extent that there existed essentially zero chance of there being a single molecule of the original antibody remaining in any sample (Benveniste, 1988). The popular press took notice. Newsweek headlined "Can Water Remember? Homeopathy Finds Scientific Support" (Begley, 1988). A violent reaction from the mainstream scientific community occurred and Dr. Benveniste paid a high price in funding, prestige and position for challenging the prevailing scientific belief system. Never-the-less he persevered and continued working on research to support his original findings.

In 1999, Dr. Benveniste "suggested that the specific effects of biologically active molecules such as adrenalin, nicotine and caffeine, and the immunological signatures of viruses and bacteria, can be recorded and digitized using a computer sound-card. A keystroke later, and these signals can be winging their way across the globe, courtesy of the Internet. Biological systems far away from their activating molecules can then, he suggested, be triggered simply by playing back the recordings." (Milgrom, Lionel, 1999).

One test of this concept were experiments done by Benveniste on the metamorphosis of larvae to tadpoles to tree frogs. Tree frogs were chosen because the end point of when the feet breakout of the membrane can be measured precisely. The experiments showed that the process can be either accelerated or inhibited depending upon the dilutions of the homeopathic solution that are added to the water. Information from the coherent structures in the homeopathic solution spread throughout the

water that the larva are swimming in and was communicated to the water in the lava's body and changed its normal behavior.

Could this same homeopathic information be transmitted using electromagnetic waves over the Internet? The homeopathic solution contained in a sealed glass vial was attached to an oscilloscope and amplifier. The digitized frequencies sent on top of random noise were then transmitted to another sealed glass vial containing pure water. This vial which has absolutely none of the original homeopathic solution was inserted into the water with the larva. The same results were obtained on accelerating and inhibiting the time when the lava's feet breakout of their membrane!

The U.S. Department of Defense became interested in the possibility that information for electromagnetic signals that were stored in a solution might be transmitted to any location in the world. A DOD grant to replicate Dr. Benveniste's research was awarded to Dr. John Ives, Director for the Neuroprotection Project of the Samuelli Institute. They used a homeopathic solution of IgE to get an immunization response. To eliminate possible operator effects, Benveniste had developed a robot to make the solutions. The robot was randomized so that anyone could push the button to start the process. Working with the Benveniste team in the U.S. a pre-pilot test using the robot gave a reproducible 25% effect for the homeopathic solution which was better than what is usually obtained with solutions prepared by humans only.

Next came the pilot experiments for electronic transmission of the information in the homeopathic solution. The signal was sent on top of random noise using Benveniste's equipment and people. The transmitted signal resulted in an astounding 21-28% effect. Now the U.S. team was ready to run the replication experiment. The French team including Benveniste returned to Europe. Then the replication experiments started using only a U.S. team. Twenty two experiments were run but with no effects being observed. The homeopathic information was not being successfully electronically transmitted even though different operators were used.

The French team returns and Jamal, a Moroccan, again runs the experiment. The non-local homeopathic effect returns! It appears that the results are operator dependent. Dr. Ives talks to Jamal who has two Ph.D.'s and spent two years of continuous work to develop the robot equipment. Jamal tells Ives that he comes from a family of healers in his Moroccan community. His grandfather was a healer and in every other generation the male has been a healer. When asked if he was a healer he replies "No I am a scientist." Dr. Ives concluded that the "electronic" transmission of the homeopathic information appears to be a non-local operator effect (Ives, 2002). Thus, intention and the Absolute would be involved.

## MAGNETIC VECTOR POTENTIAL

**The results of Dr. Ives experiments suggest that there may exist a non-local operator effect on molecules based upon the operator's intention.** How might this coupling be introduced into our physics? **The theory of electromagnetic waves contains quantities called the electric and magnetic potentials.** These quantities served as a mathematical convenience in the classical theory. They were not regarded as important as the "real" fields and forces of electro-magnetism. The physical implications of the potentials were ignored by physics until a crucial experiment suggested by Aharonov and Bohm was performed and showed the magnetic vector potential to have physical consequences outside of the conventional, classical field effects (Bohm & Hiley, 1993). **Together with other scientists, we believe the magnetic field via the magnetic vector potential serves as the electro-magnetic bridge to the non-local aspects of reality (Gough & Shacklett, 1995, p.26; Tiller, 1997, p.303; Bohm & Hiley, 1993, 50-54).**

Dr. James Robert Brown, a philosopher of science, answers the question **"What is the Vector Potential?"** He concludes that "There is a third kind of thing in the universe: it is not mathematical, but it is abstract; **it is not physical, but it plays a causally determining role in how the physical world works. --- Being outside of space-time the vector potential does not transmit signals at any velocity" (Brown, 1994, pp. 158-159).** **In this process the magnetic vector potential, being "outside of space-time," provides the mechanism for introducing our intentions into the physical via non-local magnetic effects. In other words, the relationship between parts in the physical can be influenced via linkages to the non-physical Absolute which is "non-local" in nature.** Randomness in the physical facilitates this information transfer.

An interesting conformation comes from Dr. Benveniste's laboratory in France. When Benveniste returned from working with Dr. Ives a Korean lady volunteered to help in his research. However, whenever she was about three feet from a successfully treated homeopathic sample, the effect would disappear. The provocative fact was that her "negative" non-local effect could be shielded against by surrounding the sample with mu-metal, which is an effective shield against magnetic fields.

**How does this non-local process work? We predict that one's intentions will manifest in physical matter at the atomic level as a change in spin state. A change in spin state is the minimum that we can do to put information into a system, since the spin is the most basic state that you can change in the physical. The result can be represented as a modification of the vector potential as described by electromagnetic field theory. Variations in the electromagnetic field can be observed at the molecular level as a change in quantum state. Such a change in the quantum state results in a movement of charge which produces an alteration in the shape of the molecules. Such shape changes correspond to a modification of the spectrum of electromagnetic radiation being produced by that molecule, i.e. it**

**modifies the set of vibration frequencies of the molecule (its spectrum)(\*and shifts into a new phase of harmonies through feedback).**

This latter point, the correspondence between shape and spectrum and vice versa, is an exciting new field of mathematical research known as drum theory. Science agrees that everything in the universe is vibrating. **Objects that vibrate, be they drumheads or atoms, have characteristic vibration frequencies -- they each are putting out a different tune.** In principle, there appears to be no fundamental problem standing in the way of determining the characteristic vibrations of a "drumhead" no matter what its shape (Gordon & Webb, 1996; Peterson, 1998).

OBSERVING THE PROCESS OF CHANGE:

Is there any scientific evidence that **intention** might create changes at the molecular level via a process of first introducing randomness. If such randomness existed it could be **the precursor for facilitating input from the Absolute.** We have postulated that such a process could **arise when intention creates a non-local interaction.**

In December of 1990, the Foundation for Mind-Being Research conducted an experiment on the effect of external "chi" upon the molecular structure. Raman spectroscopy was used and the experiment was performed at the private laboratory of Louis C. Wang in Fresno, California. The projection of "chi" was preformed by Dr. Leonard Laskow, M.D. who is a "healer" in his own right and author of the book *Healing with Love: The Practice and Principles of Holenergetic Healing*. Dr. Laskow has participated in a series of successful "healing" experiments on biological systems with scientists including Dr. Beverly Rubik, Marcel Vogel, and Dr. Glen Rein. This was his first time for using his healing techniques on inanimate material.

Minor impurities appear not to alter the Raman spectrum in any significant way. To have observable changes in the Raman spectrum, the properties of a large number of the molecules in liquids to be treated must be simultaneously altered. Therefore, our Operator and Raman Expert were puzzled with the extent of the "noise" on the spectrum of the treated distilled water compared to its base line. The Operator suggested that the quartz container used for the measurement on the treated distilled water had been contaminated with fingerprints. Thus, a second measurement was made on the treated

distilled water by filling a clean new container. The Raman spectrum for the rerun of the treated distilled water again showed the same strong "noise" signal.

The Science Director, Executive Director and Dr. Laskow recommended to the Operator that a Raman spectrum for the control sample of distilled water be taken to determine if the "noise" was a problem with the Raman spectrometer or due to an effect of the "healer." The Operator and owner of the equipment was convinced that the phenomenon being observed was equipment "noise." The Operator chose to change the resolution on the Raman spectrometer to remove the "noise" even though the "noise" had only appeared on treated samples in both the preliminary and dry runs. No control or base line sample had ever showed "noise."

When systems are operating far from equilibrium, externally generated noise, under appropriate circumstances, can induce a more structured behavior of the system. This phenomenon is called "noise-induced transitions" (Horsthemke & Lefever, 1984). We suggest that this may be the underlying mechanism for the anomalous behavior that was observed -- assuming that the observation was not an artifact of the equipment.

The Raman spectrum measures the rotational and vibrational modes of a molecule. To the extent that the individual units of H<sub>2</sub>O are bound into clusters the Raman spectrum mainly addresses the bending of the O-H bond. The observed Raman spectrum then becomes the average of the spectra of the individual bonds. We believe for a series of reasons that the system can be regarded as embedded in an environment that is subject to random variations -- i.e., meets the conditions that can lead to noise-induced transitions. Furthermore, because of the nature of water, transitions caused by such noise would be closely coupled to the O-H bond that is being observed through Raman spectroscopy.

One possible connection to the focused intention of sending "chi" is that the distribution of cluster size and type are affected. If, for example, the effect was to confine the cluster types to some class that provide a fairly common environment for the O-H bonds, this would narrow the spectrum of the effective environmental noise. However, the magnitude of the effective noise power would remain more or less constant. This, in turn, would increase the power in some of the noise bands. Such an increase might be sufficient to induce the desired transitions. Thus, water may be a peculiarly susceptible medium for weak influences, and Raman spectroscopy may be an appropriate technique for detecting and demonstrating the influences of focused intention (Pease, 1991).

During the question period after his keynote address at the 12th Annual ISSSEEM Conference, Dr. John Ives discussed an experience he had sending samples of healer influenced material to MIT for analysis. He sent MIT three samples of solutions of which one had been potentized. All were sent up totally blind so that those doing the tests could not tell which one the healer had influenced. MIT was to conduct nuclear magnetic resonance (NMI) analysis on the samples. They called back and said they were getting spurious signals on one of the samples, and assumed that their equipment was malfunctioning. After trying to fix it themselves they called in the manufacturer. The manufacturer checks the machine and informs MIT that nothing is wrong with the equipment. However, MIT still gets a spurious result -- one sample has an extra peak for water. MIT is then told that this was the sample potentized by the healer (Ives, 2002).

What the above two examples suggest is that we should be very careful when observing the appearance of "noise" or spurious results in measurements involving healers. The randomness observer could be the seeds from which a non-physical change might evolve or be an actual change due to a non-local influence. We should avoid the instinctual response that there "must be something wrong with the equipment."

#### CONCLUSIONS -- THE FUTURE

We are all co-creating whether we know it or not! The goal is to become an intentional co-creator. **This requires that a person have a conscious connection to the Absolute.** There are three ways that this usually comes about. Sometimes the person has a strong "knowingness" and connection as a child, or in later life an event such as an accident or serious disease creates the conditions in which the person encounters "God" or his messengers. Other individuals go to the Absolute through desire of the heart and intent of the head -- a conscious process. Some persons enter a sacred field and experience a spontaneous event in the presence of a highly evolved person, at a holy place or at a sacred site. Of course, one's conscious connection to the Absolute can result from any combination of the above.

We believe that the scientific process will produce new and deeper understanding of the Absolute. This will result in greater recognition of the nature of the sacred symbols, the mother alphabet of creation. Tools to enhance direct transmission from the Absolute will become more effective. This will accelerate the learning process and assist our comprehension of purpose. As our scientific mapping of the Absolute improves, the increased awareness will enable individuals to produce more subtle and effective fields. **Such intentional fields can change how events manifest in the physical world.** We predict that modern society's propensity for killing its own kind -- the current cycle of violence that human society has

remained in for centuries -- can then be broken. This will occur as humans understand the Absolute and the unconditional love that constitutes its "consciousness" field, i.e., the field of all fields.

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FIGURES:

Figure 1: A Schematic of a Model for a Holistic Belief System. The Absolute is the source of the physicality of space-time. In the Absolute space and time have no meaning. The left-hand side

represents the emergence of form into the physicality of space-time. The right-hand side represents the return over time of everything that is in the physical back to the Absolute. The physicality of space-time is divided into seven levels. The "dense body" (the physical world of material experience) is shaded and the remainder is not shaded to indicate that we are normally unaware of most of space-time.

Figure 3: Illustrates that local interactions create new field structures at all levels of physicality. The emergent field structures, in turn, resonant with the structures of the Absolute. The feedback alters the world of physicality at all levels -- the material, the emotional, and the mental. Therefore, from complexity and chaos arise a different order within the constraints of the laws of Nature.

Figure 2: The behavior of a complex system sometimes settles into a particular "chaotic" pattern. The Lorenz attractor represents the signature of a characteristic kind of indeterminate behavior. The same combination of variables never occurs twice. Thus, in a "strange" attractor there exists an infinite number of possibilities, yet they are confined to a finite region.

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