

# Subjective "I" Requires Extension of Information Paradigm

Doug Matzke

1516 Copper Creek Drive  
Plano, TX 75075

[matzke@dallas.net](mailto:matzke@dallas.net)  
<http://www.dallas.net/~matzke>

## Abstract:

Ken Wilber's theory of holons clearly describes why subjective and objective realities are distinct. Traditional information theory exclusively deals with objective reality while missing or ignoring subjective reality altogether. Yet, both subjective and objective existences exhibit informational characteristics. This paper will enumerate these two kinds of informational properties and distinguish how they both must coexist.

This understanding is based on modern research relating information theory and quantum gravity. Current public understanding and mindset regarding the nature of information theory is not keeping pace with this highly technical field. The new unified quantum gravity theories are implicitly linked with thermodynamics and information theory. These theories imply that information and energy have a duality relationship resulting in paradoxical understanding just as earlier in this century particle-wave duality was seen as paradoxical. For example, a black hole's event horizon entropy measure is really an information metric more than an energy metric, since a quantum "bit" thrown into a black hole actually increases surface area by a minimum amount [1]. Bits are not purely mathematical anymore, but also not purely energy/matter either.

This duality leads to the possibility, as proposed by others [2], that information is more fundamental than energy. This approach says a lot about

the nature of the information-energy duality, especially the interdependence of these two distinct properties. If information is truly more primitive than energy or matter, then it must also naturally be more fundamental than time and space. Informational like structures supporting quantum gravity theories must predate energy/matter and space/time encodings, yet impact physical reality.

This non-local and atemporal information understanding and thought process is the key to comprehending informational properties for subjective realities. This informational infrastructure must not only be the basis for all of physical nature (including quantum mechanics) but also the basis of all "hard problems" of consciousness. The modern information-energy duality will be explored in relationship to the subjective-objective nature of consciousness and information theory. Understanding and accepting this duality is the key to comprehending that paradoxical nature of consciousness and presumed mind/matter interaction.

## 1 Modern Information Theory

Information theory has been changing dramatically over the last decade. The traditional information theory from 50 years ago was primarily focused on communication theory. This focus leads to an emphasis on communications energy, especially related to signal to noise ratios. Many scientists and

layman therefore mistakenly believe information is synonymous with energy. Modern quantum gravity research [3] and its relationship to thermodynamics has uncovered a slightly different view of information and its measure as "bits".

The primary difference between communication theory and modern information theory is the primary unit of information the "bit" must be comprehended in physics as well as mathematics. This should be no surprise since the mathematics of entropy and information theory always used the same formulas.

A bit has meaning even in quantum mechanics and can be represented as either spin up or spin down. This encoding of a bit must be consistent with the physics of quantum gravity and thermodynamics, even though it does not represent a true energy encoding. Any quantum encoding of a bit has been shown to increase the size of a black hole (by Planck's area), when that bit is thrown into a black hole [4]. In fact, a black hole can actually be thought of as a bit bucket or bit blender since its bit related surface area is its entropy measure.

What this all means is a bit represents an equivalent energy but requires a separate information accounting ledger since encoding of bits using quantum states are separate from energy balance sheets. These quantum states can affect energy but are not energy, nor are even limited by the normal energy constraints of space and time. In fact, because of these properties, quantum states can be thought of as "subjective" since there are not directly measurable unless they interact with other quantum states to form objectively measurable energy patterns. Of course, these states are statistically repeatable.

Information theory applied to purely energy systems therefore represent traditional objective information metrics as found in communications theory. Systems such as quantum mechanics that represent pre-energy

encoding of bits (such as quantum states) require another model of information theory. This alternative "subjective" paradigm for information bits is not restricted by normal spacetime or normal objective energy metrics and can be viewed from a more purely mathematical view.

## 2 Subjective Information Theory

The term "subjective" was chosen for this discussion to build on the holon model promoted by meta-theorist Ken Wilber. This model suggests that everything can be viewed from four perspectives organized as a two by two grid of four quadrants as seen in figure 1 below. The two rows are labeled individual-collective and the two columns are subjective-objective.

Subjective Individual I	Objective Individual it
Subjective Collective We	Objective Collective it

Figure 1. Holon Quadrants

Wilber discussed in his book "A Brief History of Everything" [5] how traditional information theory can be mapped onto the objective or external view of the world. He says traditional objective bits do not deal effectively with subjective states such as emotions or values. Scientists that take a reductionist view of internal states produce a category error that incorrectly collapses the four quadrants onto only two. This is an error since Wilber's holon model deals with both quantum states as well as consciousness experiences.

This paper adopted his model and terminology since internal or subjective states (such as within a black hole or human consciousness) can **not** be directly probed to discover its contents. This strongly suggests that the information paradigm for inaccessible subjective (or internal) states may be distinct from objective energy dominated information models. Of course, this does not mean these states cannot be studied.

This non-energy information model is also the pre-time and pre-space representation for information. Both quantum mechanics and consciousness have produced examples of non-local and atemporal effects [6]. Yet both have information like properties and laws.

Physical laws are really consistency relationships that must be maintained instantly without actually using energy transfer. Conservation of energy is such a consistency law. Conservation of quantum states is also a non-energy consistency relationship. Even human behavior can be viewed as consistency with prior learned behaviors. Modern physics laws are heavily dominated by consistency relationships rather than conservation laws.

Consistency relationships are in reality an information term whereas conservation is a term biased towards an energy perspective. This is particularly true for the quantum EPR experiment where describing it from an energy perspective makes it completely paradoxical because of the atemporal and non-local consistency properties being maintained.

This energy versus information paradox is very similar to the well known particle-wave duality (and paradox) from the beginning of the century. This paradox was resolved by realizing that both perspectives are present all the time. What question a scientist asks determines the kind of response one receives.

Likewise, the information and energy

paradox is also always present due to internal non-energy quantum states and external energy states. As in EPR, these quantum states can intermingle with other states and then later produce energy effects that are separated in both space and time. This paradox maps identically to the holon model were subjective information states are non-energy (or non-time or non-space) constraints where as objective states are identical to the traditional objectively visible communications model.

This line of reasoning is naturally related to human consciousness because internal non-energy, information-like, states of quantum mechanics have been proven to impact the energy results of the external physical world, just as what must be going on to support non-energy based consciousness mechanism. In fact internal information-like consistency is just another physical law in addition to normal physical energy conservation.

This is particularly interesting to the Tucson conference in the face of quantum models of consciousness proposed by others. Subjective information theory must cooperate with energy models, such as quantum gravity, but information in general can have non-energy encoding. Most likely this encoding takes on the form of higher dimensional topological structure as proposed by modern quantum gravity theories [7].

This "subjective" information model suggests highly intermingled internal states that can not be easily observed from an external view. In fact, these internal states are not localized in space nor time like traditional energy based objective databases. In addition, full access to internal (or quantum) states has been proven impossible.

In an effort to duplicate these non-local effects, many scientists have proposed holographic memory to mimic this style of information organization [8]. Unfortunately, this solution only

mimics the spatial part of the solution and not the atemporal properties. Conversely, quantum computation [9] obtains access to the quantum time attributes leading to the new complexity class of quantum polynomial time solutions to exponential problems using quantum computers. This is so significant that quantum computers can do something that conventional computers are not capable of, that a large amount of research has spawned in this area, including the idea of biological based quantum computing to explain consciousness [10].

This section concludes by restating that subjective information theory is distinct from traditional objective information theory because internal state is maintained using a non-energy encoding. Subjective states are inaccessible to objective information systems because a "bit" is encoded as a non-local and atemporal constraint, similar to qubit in quantum mechanics. This non-energy memory/communication mechanism can not be simulated using energy systems and has no parallel outside a real, high dimensional, topological fabric supporting the presumed quantum gravity based universe.

### **3 Subjective Information Domain Properties**

The previous section outlines why the information properties pertaining to subjective information states (and consciousness) are different than energy dominated information models. This was built on Ken Wilber's holon theory that clearly defines why subjective and objective views of reality are distinct. His personal experience with expanded states of awareness is folded into his model.

Several consciousness related puzzles are now more understandable as a result of this subjective information domain orientation.

A. Subjective states and quantum states appear to share many similar

information properties. Quantum gravity theories must include information theory as well as thermodynamics. Why not have such universal mechanisms also include non-local properties exhibited by humans.

- B. All quantum gravity theories have concluded that spacetime is ultimately discrete at the size of Planck's length. This shows that quanta, bits and consistency rules dominate all of physics.
- C. Subjective states are not directly accessible by energy measurement systems, which is consistent with both holon and quantum theories. Until his death early this year, Willis Harmon [11] lectured on this theme stating the importance of cataloguing subjective states requires an expansion of scientific method to include statistical methods of inquiry, versus the denial of the validity of non-physical internal (or subjective) states.
- D. Consciousness research teams should ultimately include technical people on the teams along side the biologists, neurologists, doctors and psychologists. Likewise quantum gravity theories that excluded consciousness will most likely be incomplete.
- E. If human consciousness and information mechanisms rely on quantum-like states, then it is no wonder that nobody has ever "measured" consciousness. Likewise, chi is known to be generated by conscious intent, so it may also be implicitly not "measurable" by standard physics energy approaches [12].
- F. If consciousness is related to quantum-like mechanisms, then perhaps consciousness could directly interact with a quantum experiment. This is similar to

random event generator PK experiments, except use quantum states [13]. Things to potentially observe would be the coherence or decoherence time changes, additional quantum noise, or change in quantum statistics influenced by conscious intent [14].

- G. Any choice has an information theoretic basis. Any human choice due to volitional free will must represent an internal state space change. This internal choice could cause a physical action and suggests an information-to-energy mechanism. This is similar to bits impacting black holes.
- H. Causality is a temporal concept so pre-time or non-time domains alternatively suggests a bidirectional information "constraint" system as basis for physical laws, rather than one-way causal relationships.
- I. Memory and communication are conceptually the same, since each requires transport of information thru "space-time". Communication is primarily associated with "space" transport and memory associated with "time" transport even though spacetime is inseparable. Notions of pre-time and pre-space information encoding would suggest a unity of both terms into one.

Other informational ideas can be recast into this non-energy, pre-space, pre-time, information-encoding framework for internal, subjective states in future research.

## 4 Conclusions

Quantum states and subjective states of consciousness are both are very real, implicitly **not** observable, but still exhibit informational characteristics. Standard energy dominated communications theory is not complete to deal with these informational domains, especially since they exist outside normal spacetime. Non-energy

information encoding theories and mathematics must be developed to act as the informational accounting systems for these internal domains. Excluding information theoretic notions (and consciousness) from unified quantum gravity theories will most likely give incomplete solutions.

## 5 References

- [1] M. Schiffer, 1993, "*The Interplay between Gravitational and Information Theory*", Proceedings of the Workshop on Physics and Computation, PhysComp92, IEEE Computer Society Press, Los Alamitos, CA.
- [2] L. Kaufman and H. P. Noyes, 1996, "*Discrete Physics and the Derivation of the Electromagnetism from the Formalism of Quantum Mechanics*", Proc. of the Royal Society, A 452, pp. 81-95.
- [3] R. Landauer, 1993, "*Information is Physical*", PhysComp92, Proceedings of the Workshop on Physics and Computation, PhysComp92, IEEE Computer Society Press, Los Alamitos, CA.
- [4] J. Wheeler. 1989. "*It From Bit*", Proceedings 3rd International Symposium on Foundations of Quantum Mechanics, Tokyo.
- [5] Ken Wilber, "*A Brief History of Everything*",
- [6] D. Matzke, 1996, "*Information is Protophysical*", PhysComp96, New England Complex systems Institute, Boston, MA, pp. 223-225.
- [7] Michio Kaku, 1994. "*Hyperspace, A Scientific Odyssey Through Parallel Universes, Time Warps, and the Tenth Dimension*". Oxford University Press
- [8] Pentti Kanerva, 1988, "*Sparse Distributed Memory*", MIT press, Cambridge, MA.
- [9] P. W. Shor, 1994, "*Algorithms for Quantum Computation: Discrete*

*Logarithms and Factoring*", In Proceedings of 35th Annual Symposium on the Foundations of Computer Science, IEEE Computer Society Press, Los Alamitos, CA, p 124.

[10] S.Hameroff, 1998, "*Pan-experientialism and physical reality*", Tucson III, University of Arizona, Consciousness Research Abstracts, Journal of Consciousness Studies.

[11] W. Harman, 1994, "*Toward a Science of Consciousness: Addressing two Central Questions*", Toward a Science of Consciousness, The First Tucson Discussions and Debates, MIT Press.

[12] Y. Khronos, D. Chen, D. Matzke, V. Porter, 1996, "*Direct Conscious Awareness of Chi: Case Study*", Presented at Towards a Science of Consciousness, Tucson II, University of Arizona, Consciousness Research Abstracts, Journal of Consciousness Studies, pg. 148.

[13] G.E.R.Schwartz, L.G.S.Russek, Z-SSheL.Z.Y.X.Song, Y.Xin, 1998, "*Anomalous organization of random events during an international Qigong meeting: Evidence for group consciousness or accumulated Qi fields?*", Tucson III, University of Arizona, Consciousness Research Abstracts, Journal of Consciousness Studies.

[14] D. Matzke, 1996, "*Prediction: Future Electronic Systems Will be Disrupted due to Consciousness*", Presented at Towards a Science of Consciousness, Tucson II, University of Arizona, Consciousness Research Abstracts, Journal of Consciousness Studies, pg. 161-162.