



**Evolution into the Next Paradigm -**

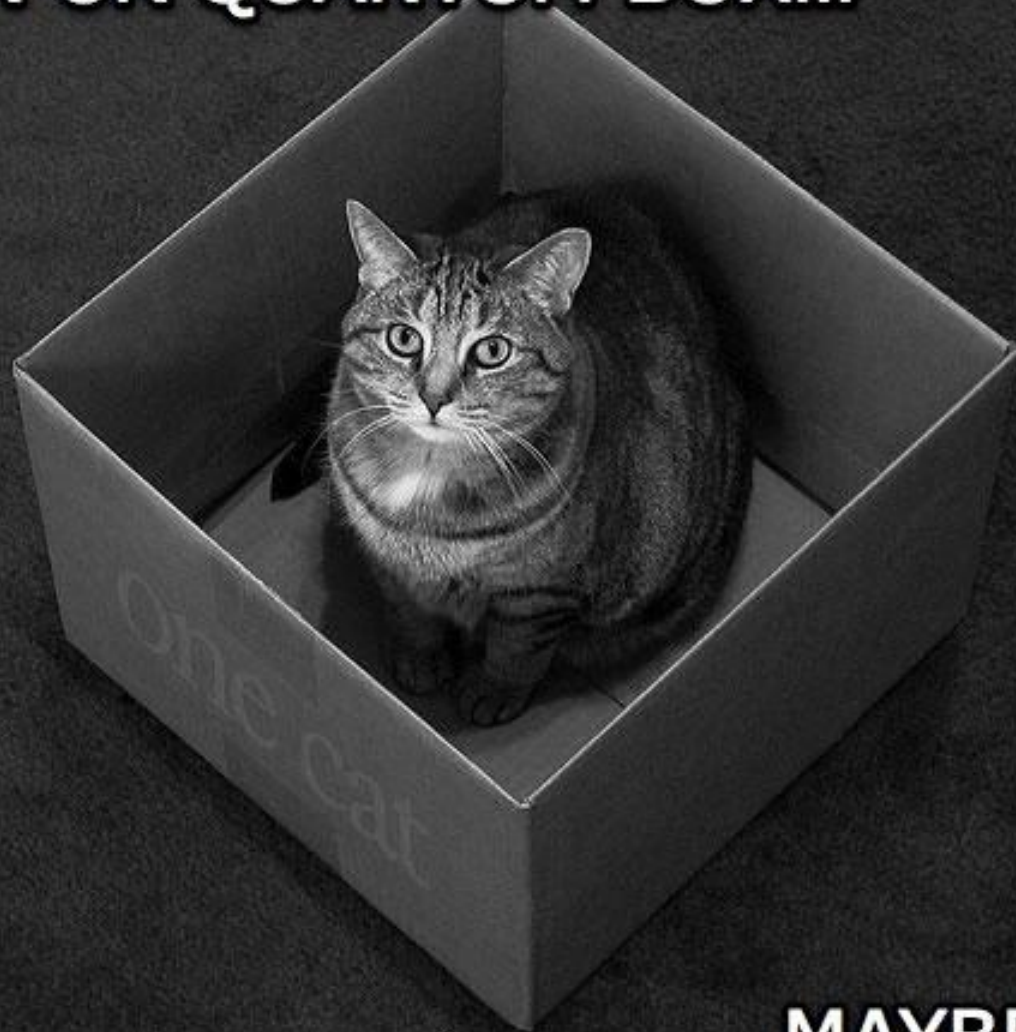
**Quantum Biology, Collective  
Consciousness, and the Proactive  
Manifestation of Future History**

**Charles Ostman**

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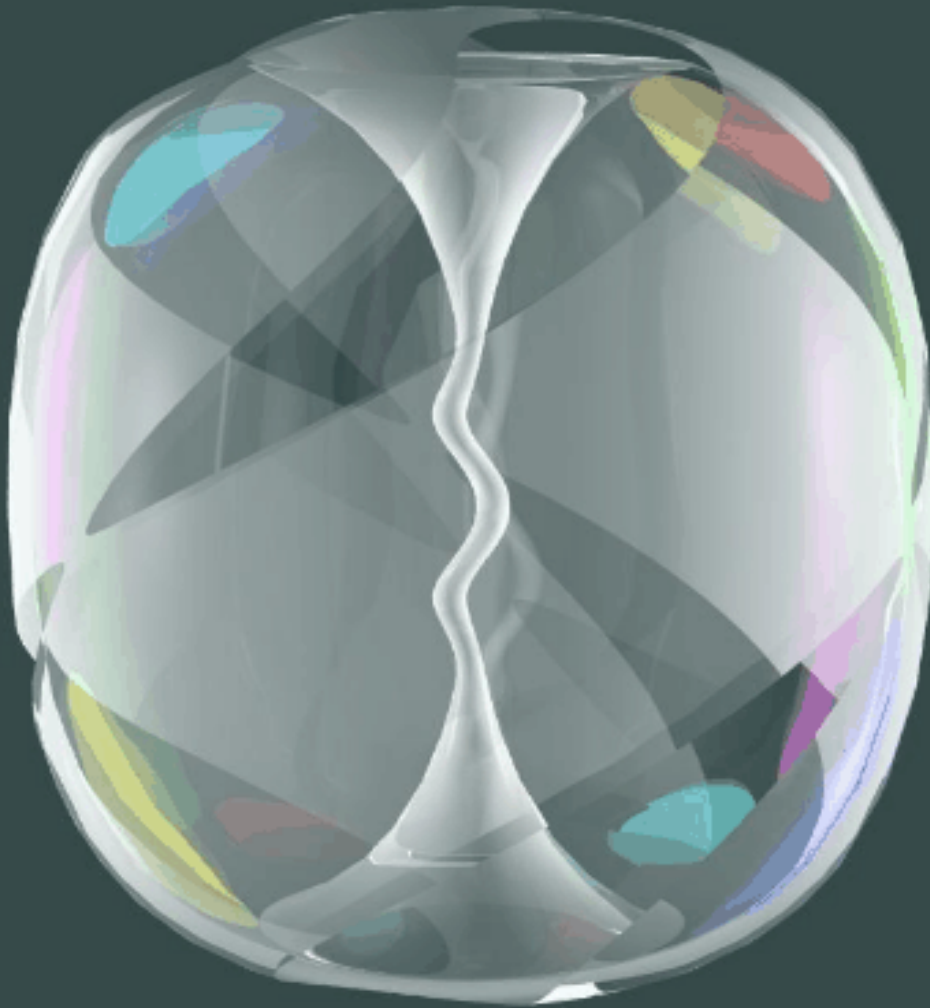
**IN UR QUANTUM BOX...**



**...MAYBE.**



# Quantum Entanglement . . . In Biology



Each photon conveys not just frequency and wavelength, but also quantum information manifest in polarization, angular and orbital momentum.

## Quantum Biology

Could such quantum information influence unconscious or conscious processes?

## Evolutionary Event horizon

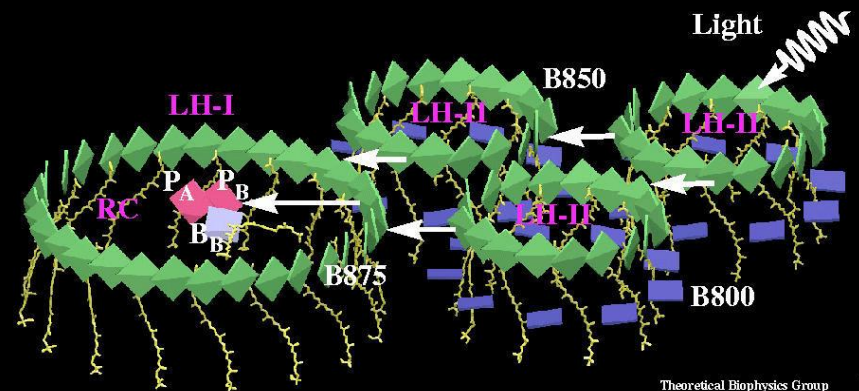
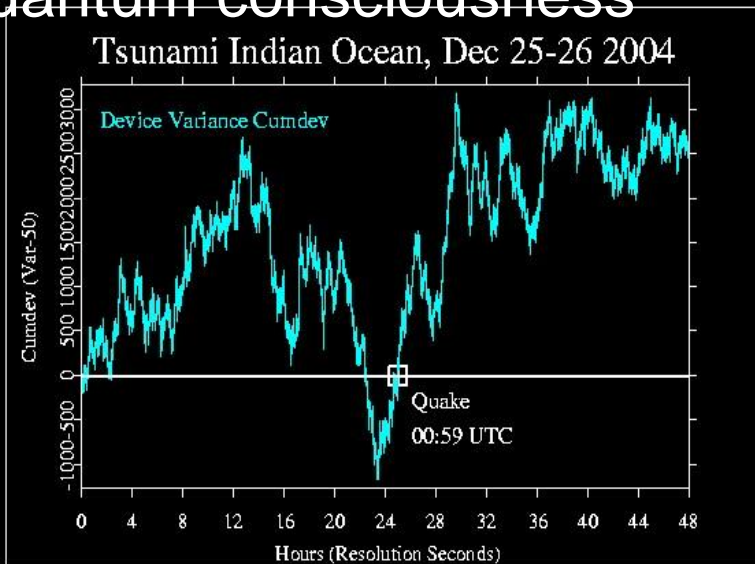
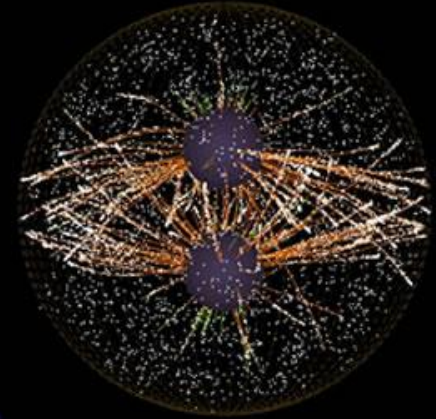
# Evolution into the Next Paradigm -

## Things and concepts presented . . .

A brief primer on Quantum Physics

A slightly longer primer on quantum biology

Current hard data and experiments in quantum consciousness



Theoretical Biophysics Group  
Beckman Institute  
University of Illinois Urbana-Champaign



# Pieces of a Complex Puzzle, Can We Assemble the Pieces into a Coherent Picture?

Things and concepts presented :

A glimpse into . . .

N-Dimensional Cosmology

Space / Time / Gravity Continuum

Cyclical Momentum, and a bit of Ancient History

Quantum Biology, the next Evolutionary Event Horizon

Holographic Perspective



# The Holographic Perspective

- All living things are systematically interconnected
- Definition of “living things” extends to systems, processes, entities which behave biologically



"Any sufficiently advanced technology is indistinguishable from magic"

- Arthur C<sup>3</sup> Clarke



# Ubiquitous Cultural Constants

- All living things are “interconnected”
- Life extends beyond the physical form
- “Something” of spectacular significance is scheduled to occur approximately “now” – 1<sup>st</sup> 3<sup>rd</sup> of the 21<sup>st</sup> century

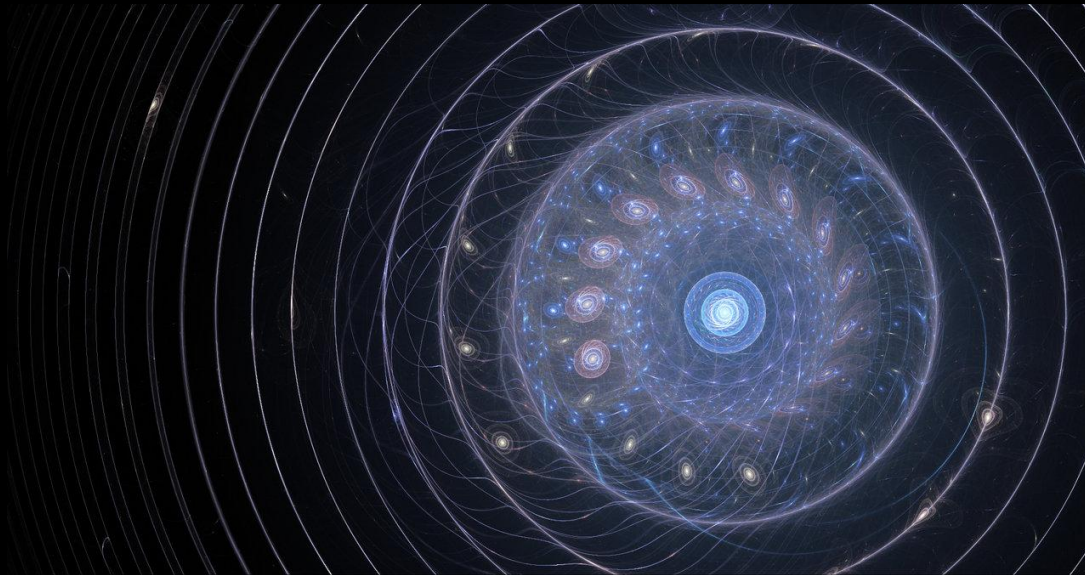


# Evolution into the Next Paradigm -

**A series of evolutionary models . . .**

**Evolution tends to be a trauma induced process.**

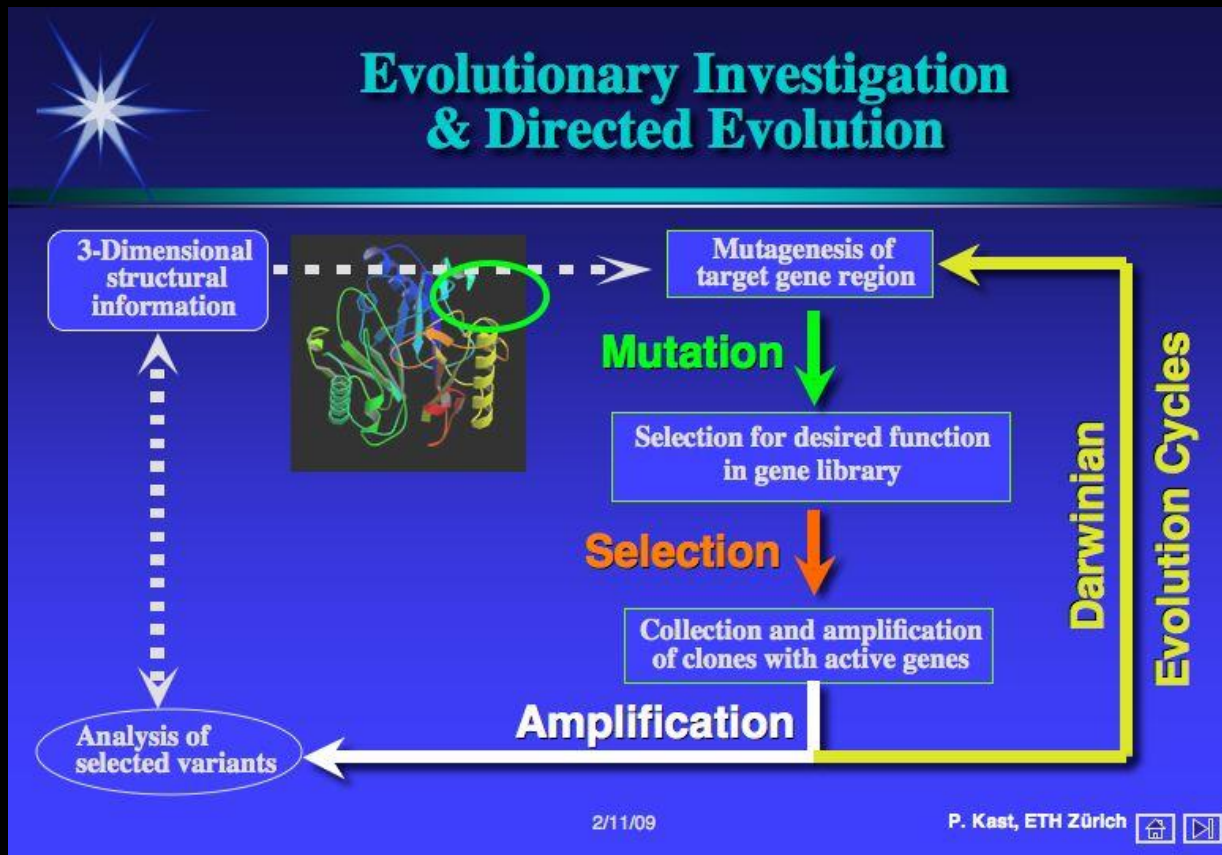
If the periodicity and amplitude of the encountered trauma cycles do not exceed the system capacity to respond, the system will evolve to a more robust form of existence.





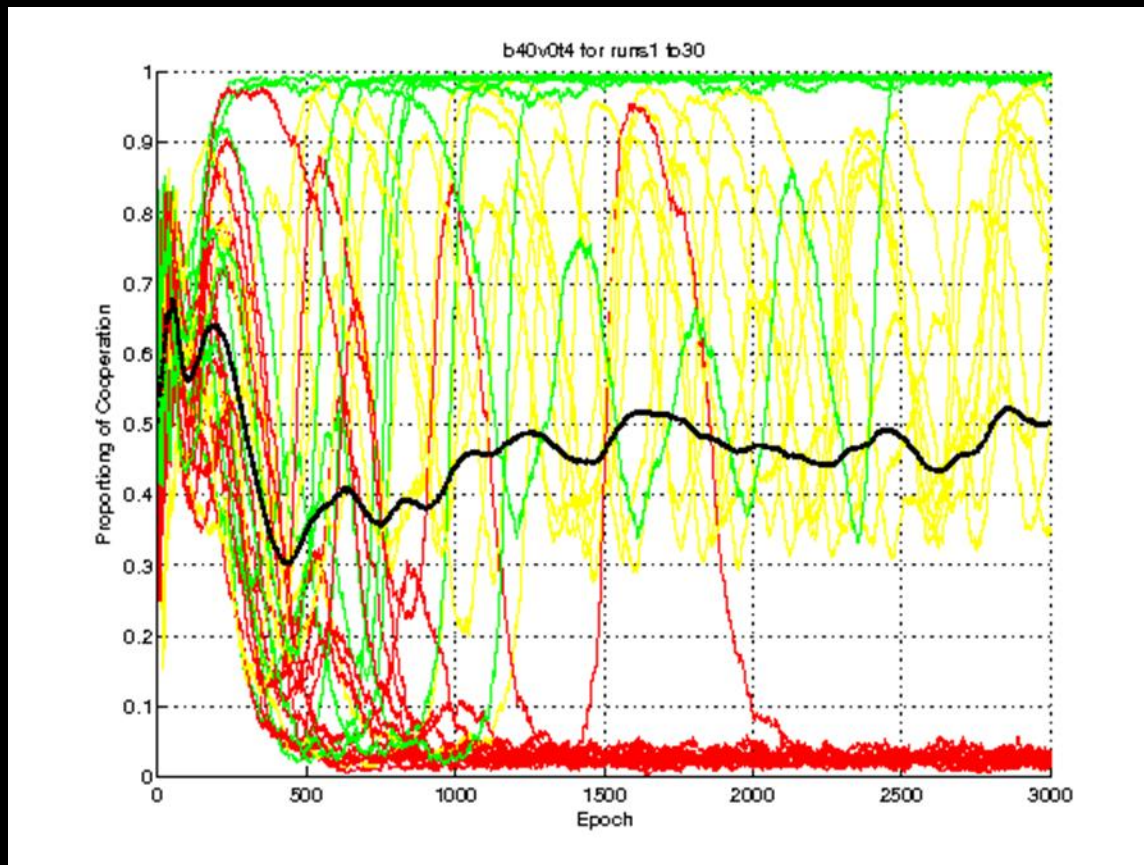
# Evolution into the Next Paradigm -

## A series of evolutionary models . . .



# Evolution into the Next Paradigm -

**A series of evolutionary models . . .**





# Evolution into the Next Paradigm -

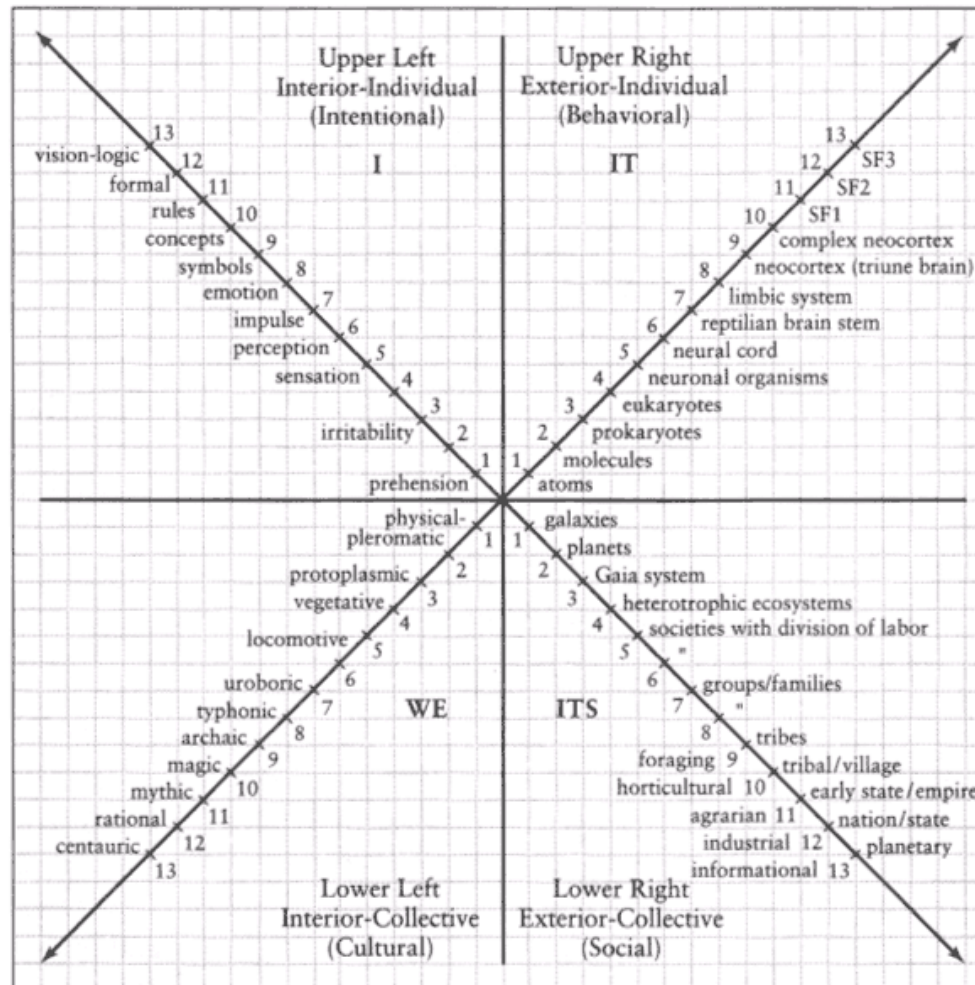
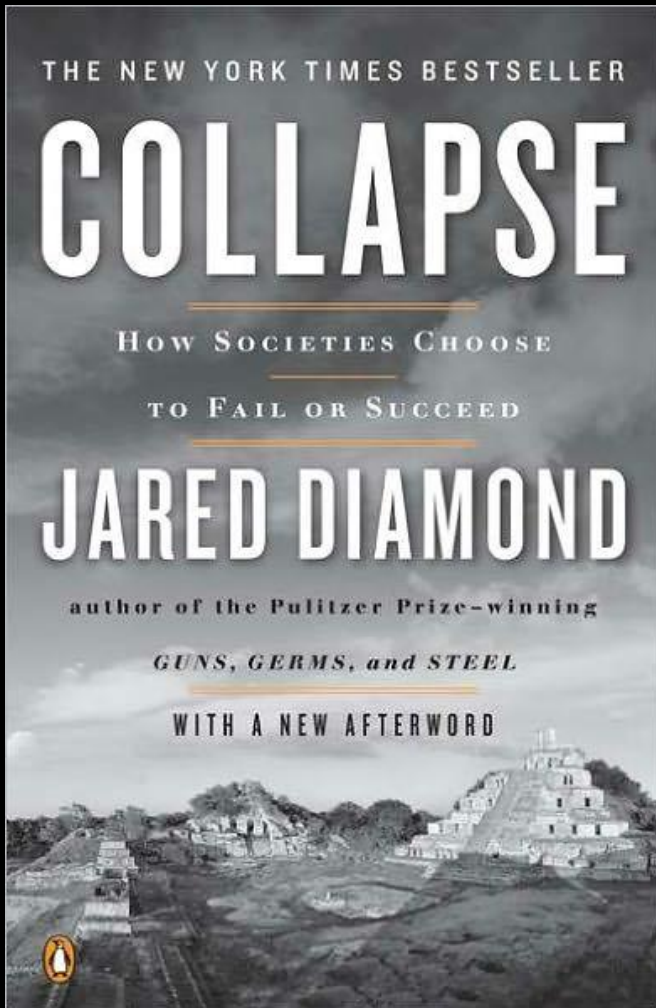
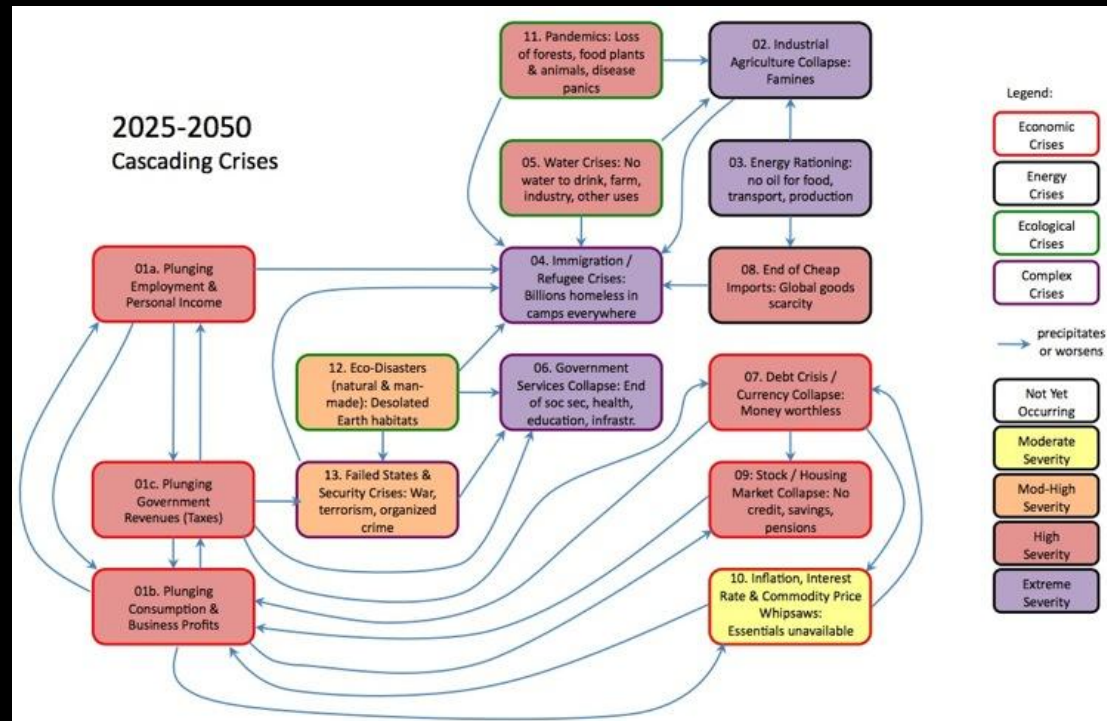


Figure 1. *Four Quadrants.*

# Evolution into the Next Paradigm -



## Intersection of chaos theory and evolutionary systems dynamics



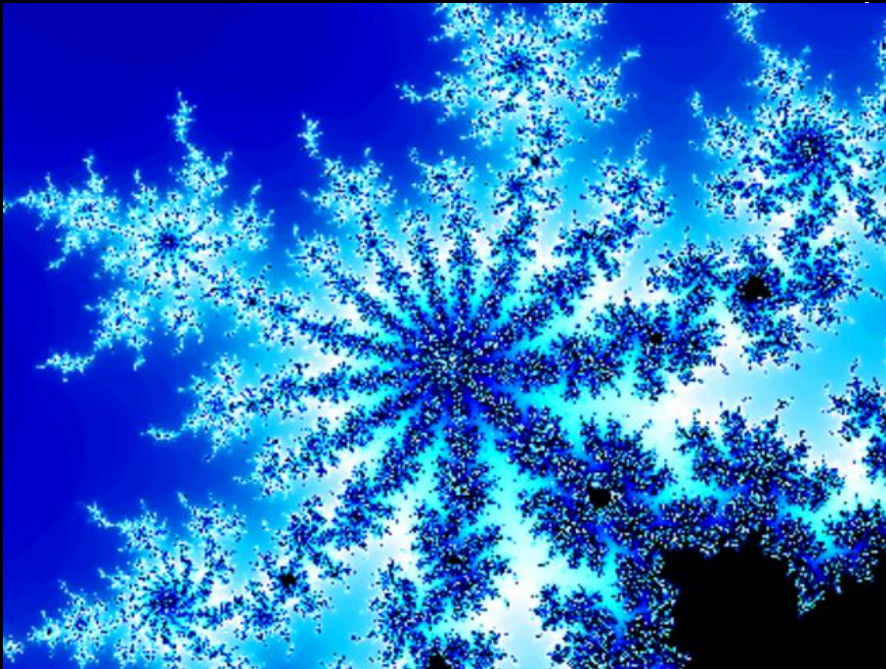


# Evolution into the Next Paradigm -

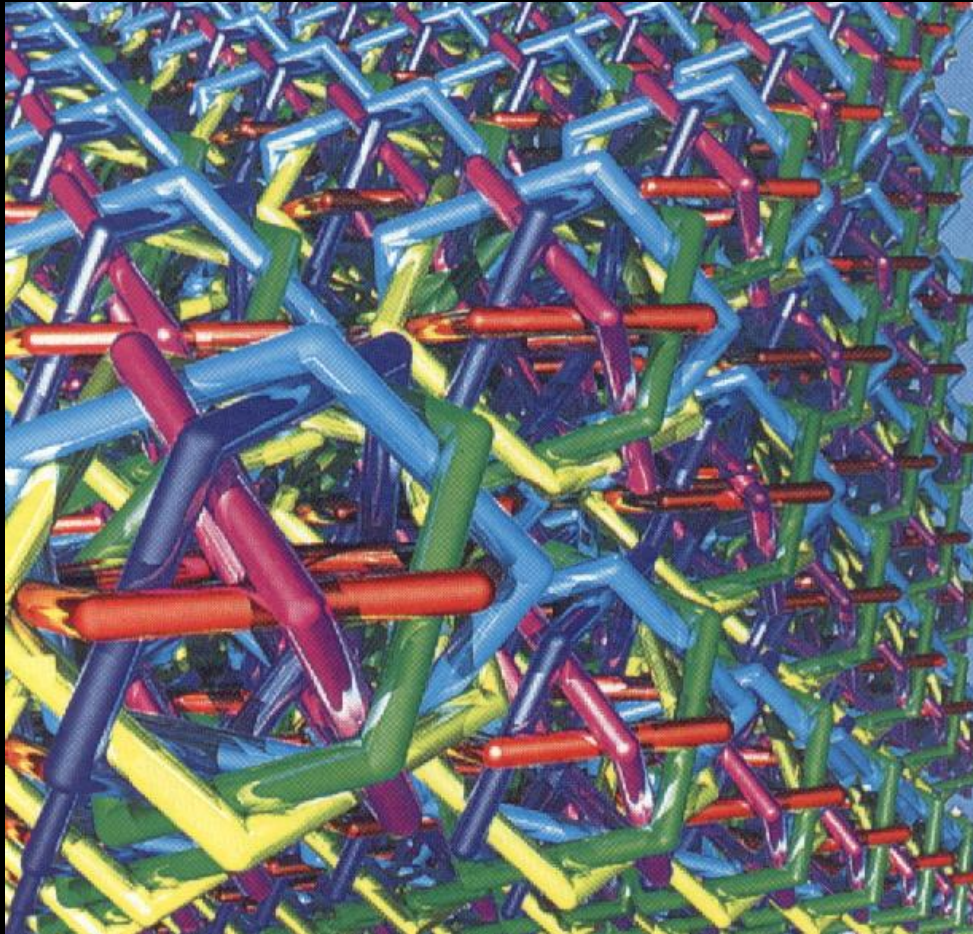
**A series of evolutionary models . . .**

**Evolution tends to operate as a type of fractal -**

Synergistically interrelated phenomena operating at multiple scales of resolution.



# Michio Kaku Civilization Hierarchy



**Type 0** fixed localized resources

**Type 1** renewable planetary resources

**Type 2** invulnerable to planetary phenomena

**Type 3** interstellar travel

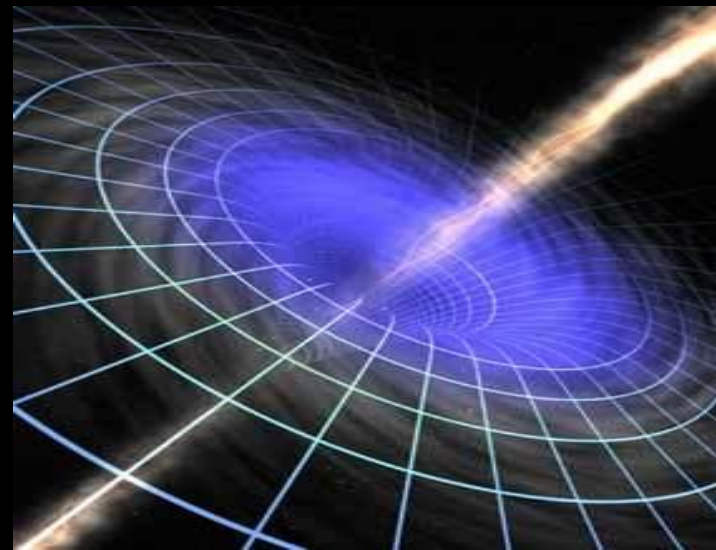
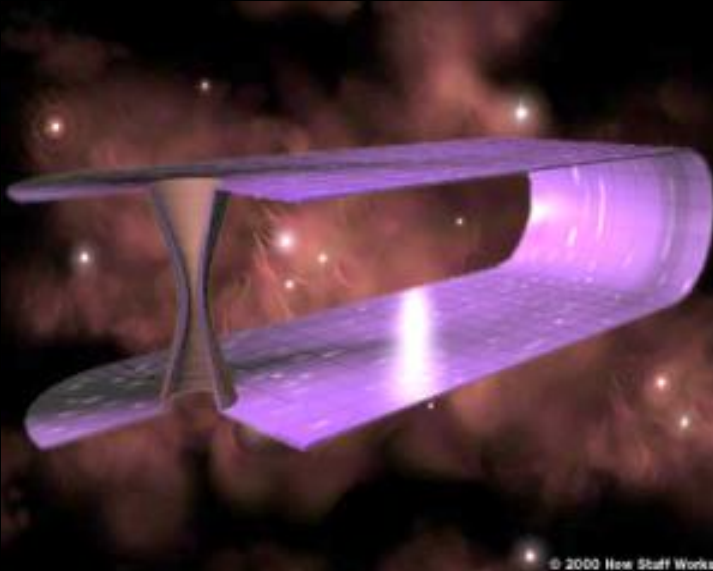
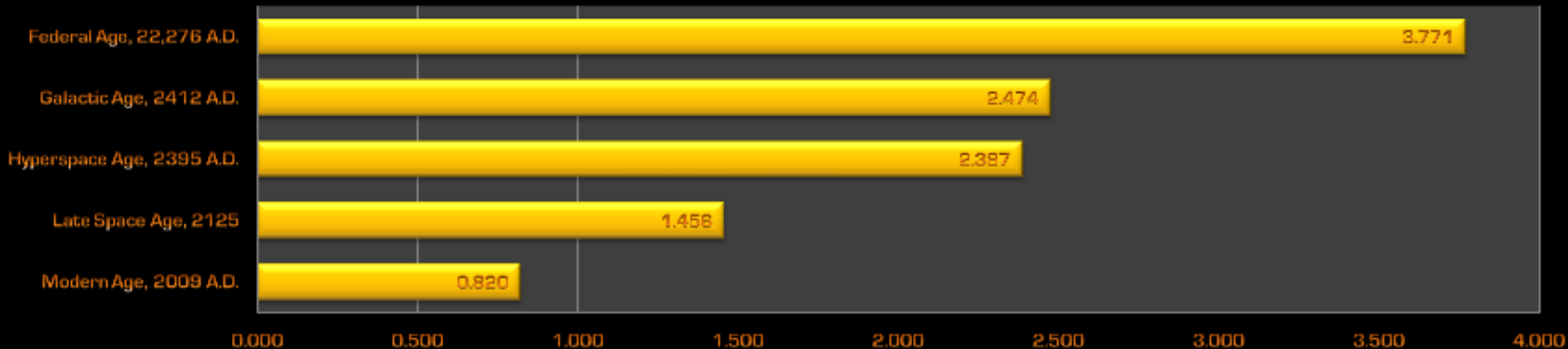
**Type 4** wormholes — transdimensional access to multiple universes



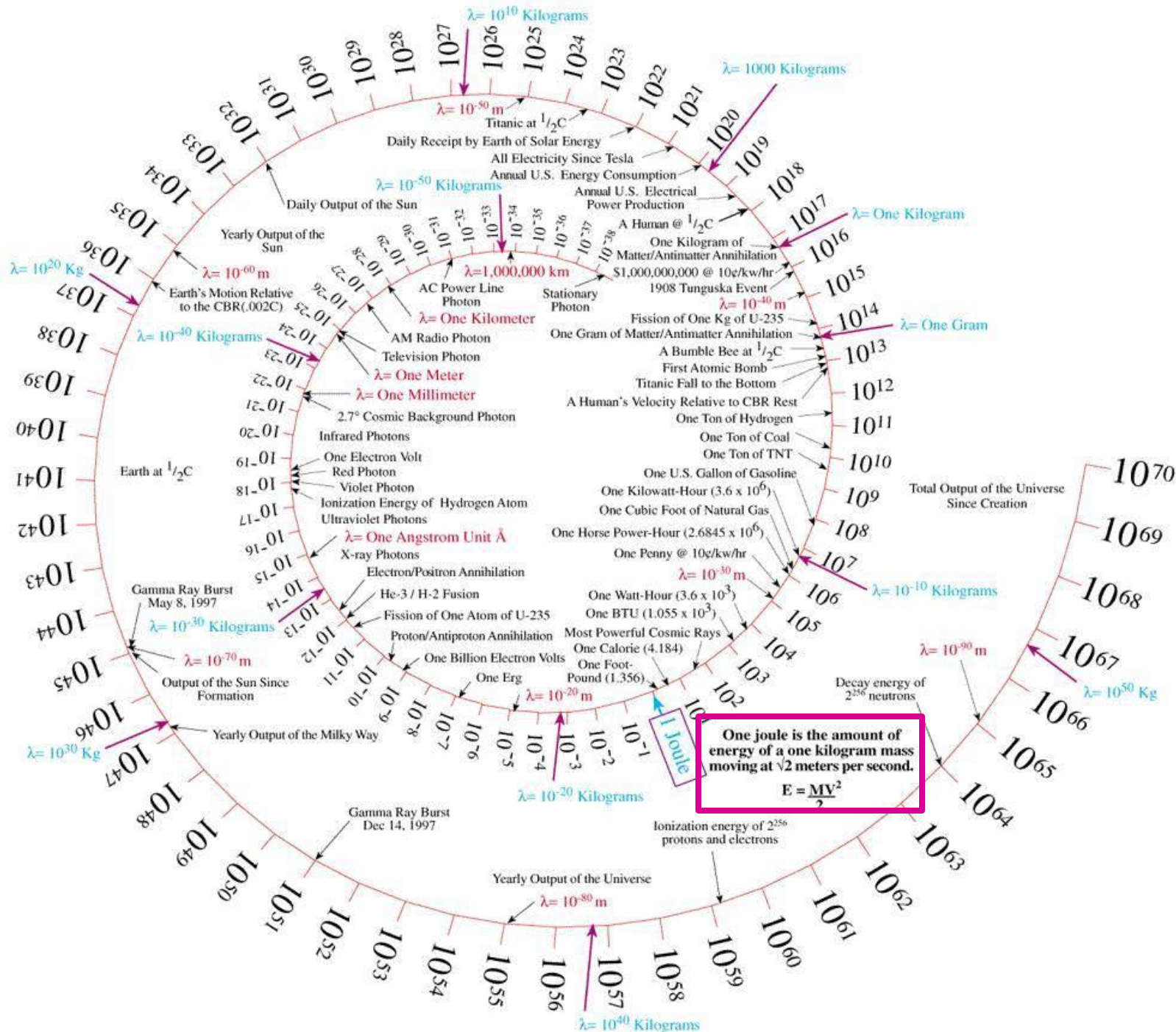
# Nikolai Kardashev Scale

## Evolutionary Energy Access Civilization Hierarchy

Kardashev scale of human civilisation







# Nikolai Kardashev Scale

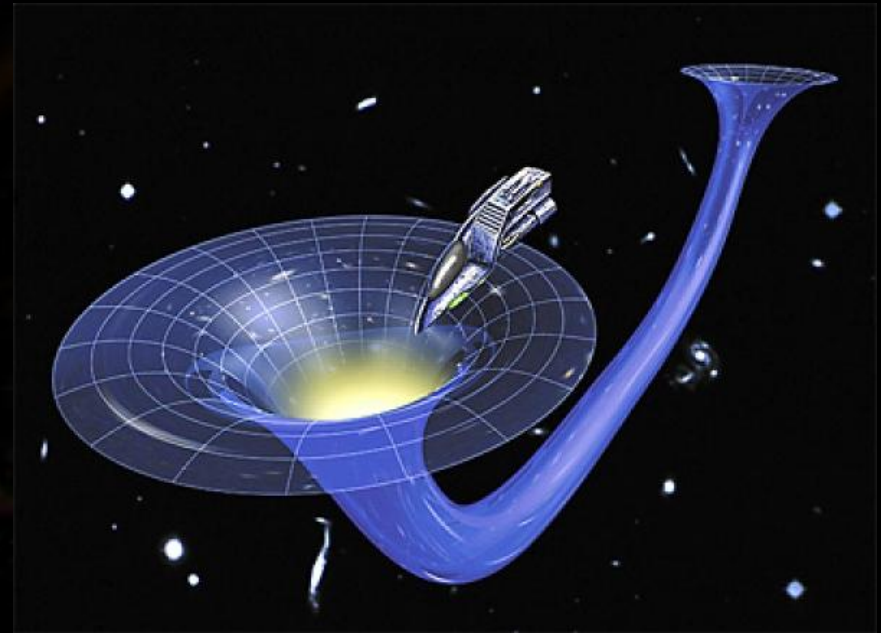
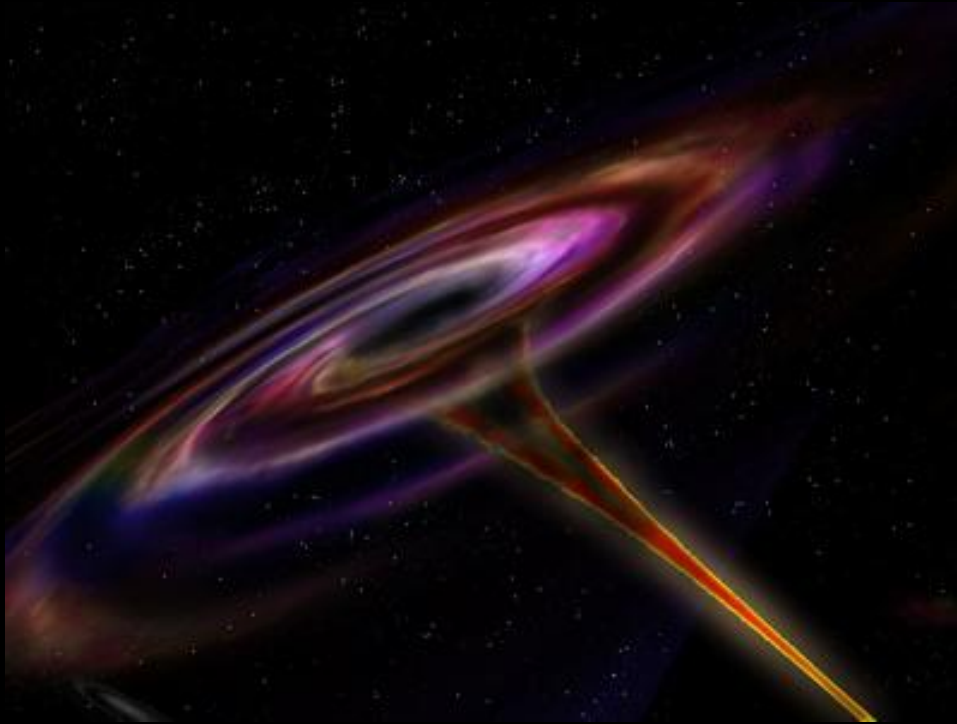
## Evolutionary Energy Access Civilization Hierarchy



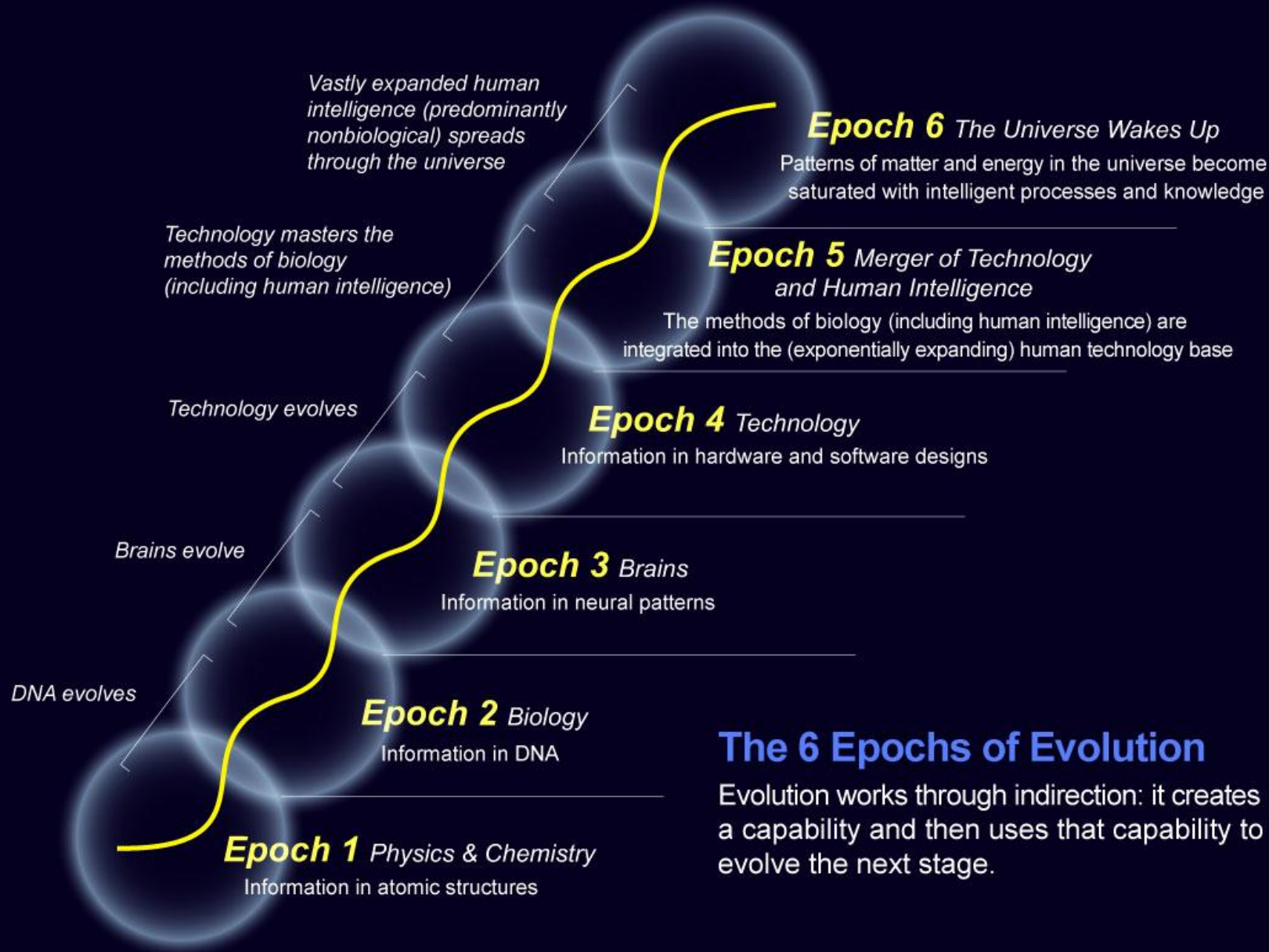
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# Kardashev Scale

## Evolutionary Energy Access Civilization Hierarchy







## The 6 Epochs of Evolution

Evolution works through indirection: it creates a capability and then uses that capability to evolve the next stage.

# 6 EPOCHS OF EVOLUTION

Evolution works through indirection: it creates a capability and then uses that capability to evolve the next stage.

## EPOCH 6 The Universe Wakes Up

Patterns of matter and energy in the universe become saturated with intelligent processes and knowledge

Vastly expanded human intelligence (predominantly nonbiological) spreads through the universe

## EPOCH 5 Merger of Technology and Human Intelligence

The methods of biology (including human intelligence) are integrated into the (exponentially expanding) human technology base  
*Technology masters the methods of biology (including human intelligence)*

## EPOCH 4 Technology

Information in hardware and software designs  
*Technology Evolves*

## EPOCH 3 Brains

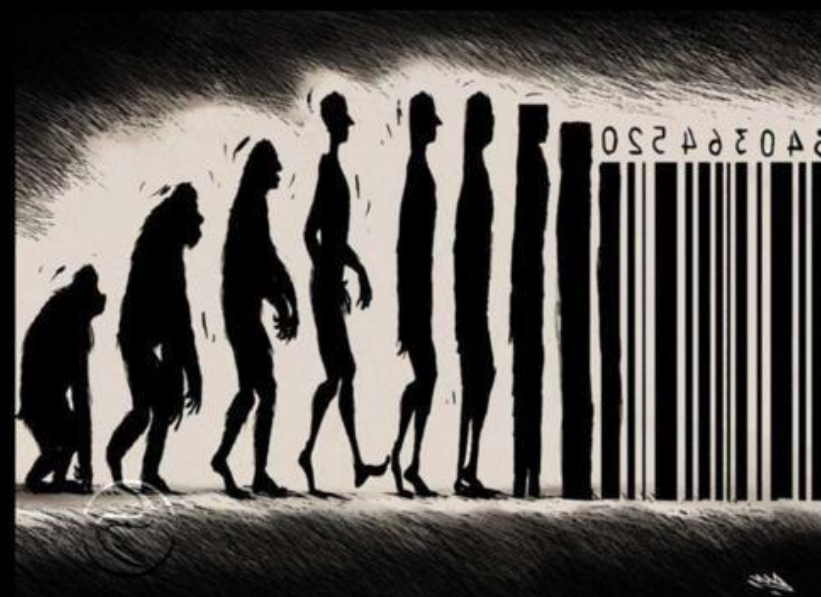
Information in neural patterns  
*Brains Evolve*

## EPOCH 2 Biology

Information in DNA  
*DNA Evolves*

## EPOCH 1 Physics & Chemistry

Information in Atomic Structures



Cyclical evolutionary process dynamics -

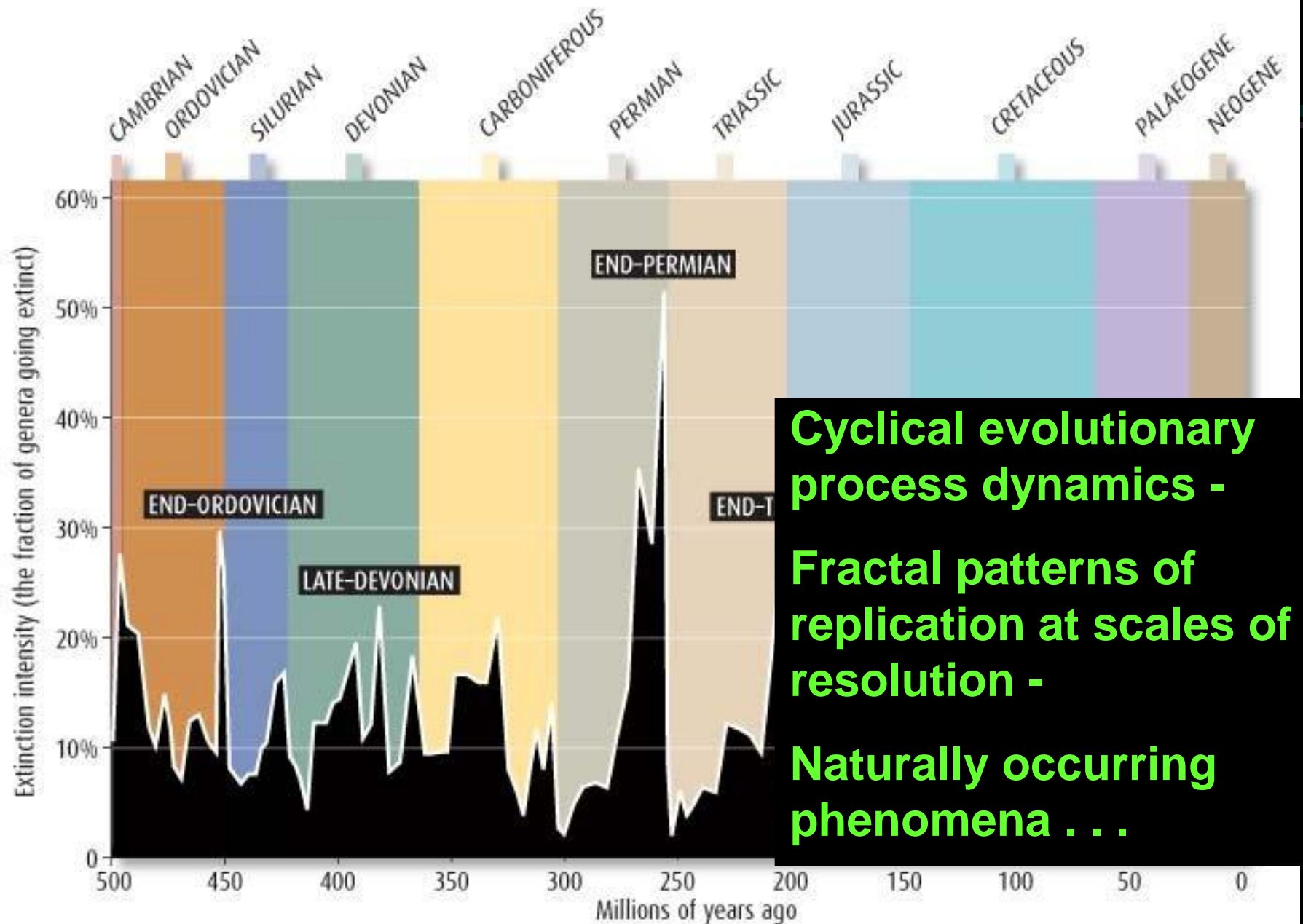
Fractal patterns of replication at scales of resolution -

Naturally occurring phenomena . . .



# MASS EXTINCTIONS

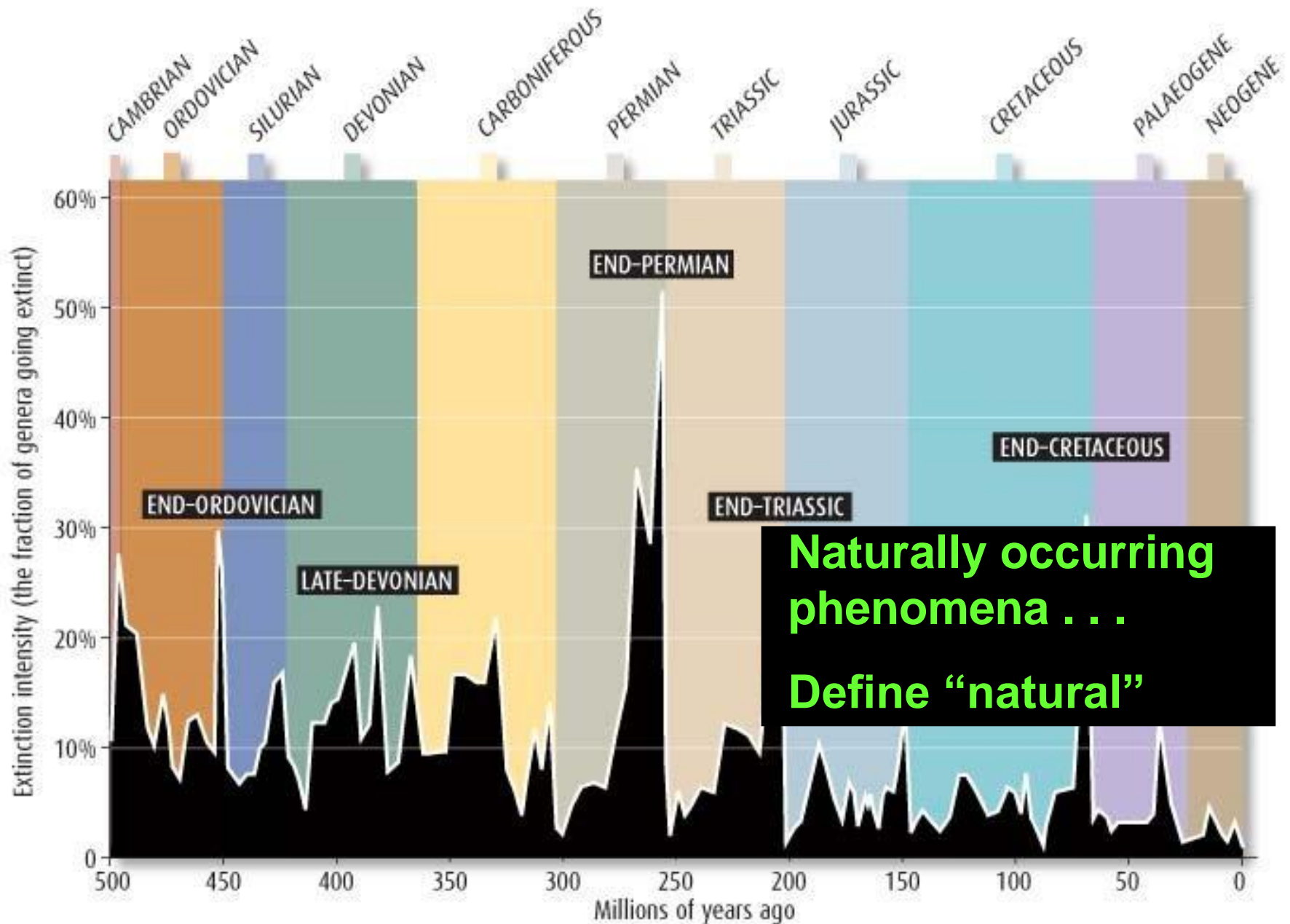
The main extinction at the end of the Triassic had almost as great an impact on life on Earth as the event that wiped out the dinosaurs at the end of the Cretaceous





# MASS EXTINCTIONS

The main extinction at the end of the Triassic had almost as great an impact on life on Earth as the event that wiped out the dinosaurs at the end of the Cretaceous



# Nature is beautiful to behold . . .



Nature is beautiful to behold . . .  
But can also be brutally harsh

“Corrective Processes”





**Complexity  
Acceleration**

**Evolutionary  
Eventhorizon**

**Time  
Compression**

**Connectivity  
Increase**



**Complexity  
Acceleration**

**Convergence  
Syndrome**

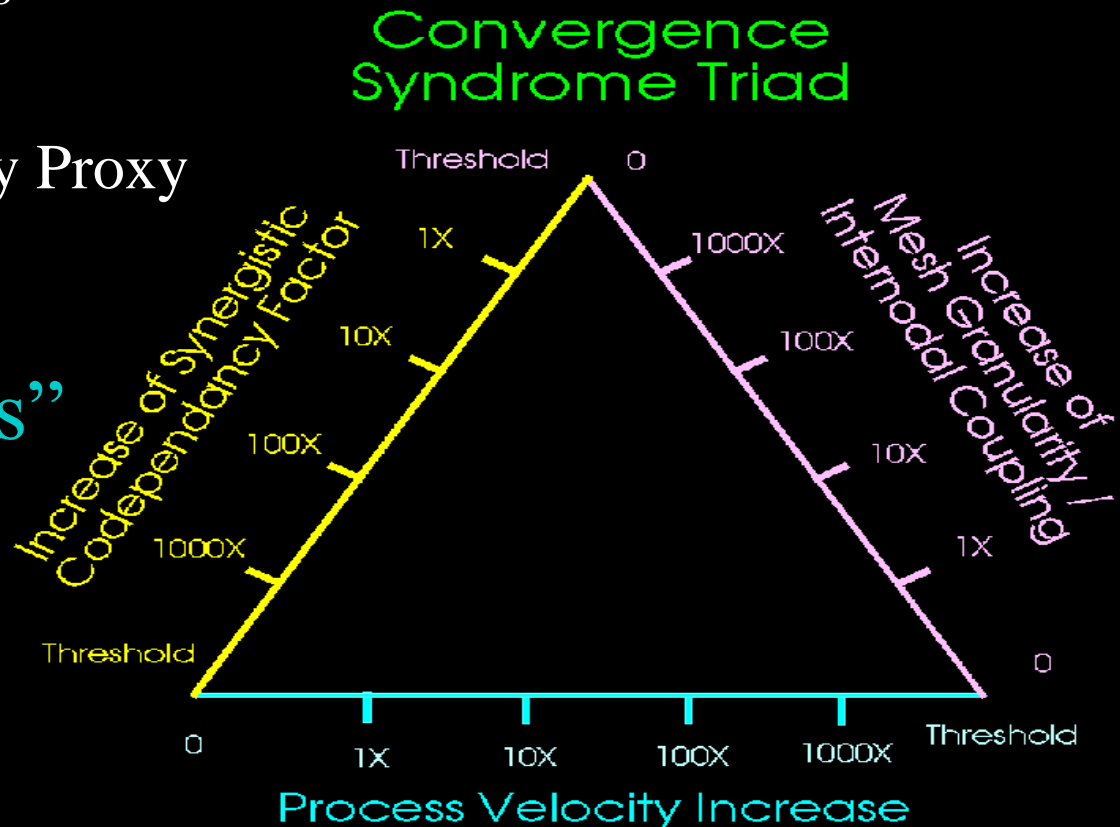
**Time  
Compression**

**Connectivity  
Increase**

# Artifacts of the Convergence Syndrome Paradigm

- Retreat into Fundamentalism
- Apparent “Unlikely” Alliances
- Toxic Belief Pathologies
- Commoditized Chaos
- Controlled Disruption by Proxy
- Existence as Software

“Corrective Processes”





# What is the “Singularity”?

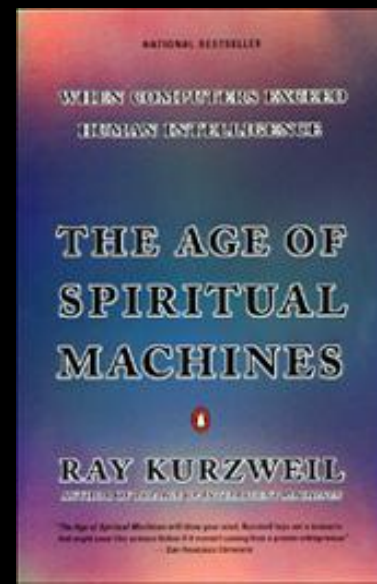
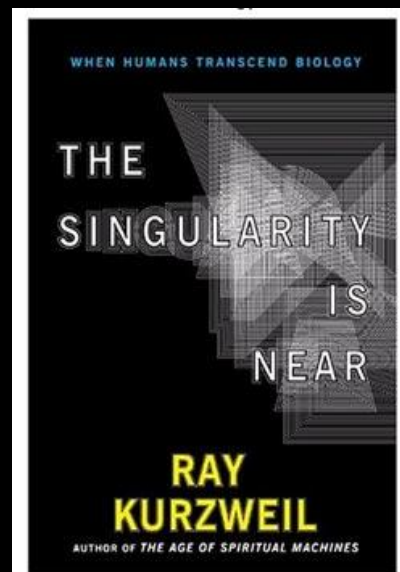
In the next few years or decades, humanity will become capable of surpassing the upper limit on intelligence that has held since the rise of the human species. We will become capable of technologically creating smarter-than-human intelligence, perhaps through enhancement of the human brain, direct links between computers and the brain, or Artificial Intelligence. **This event is called the "Singularity"**

The

## Singularity Summit

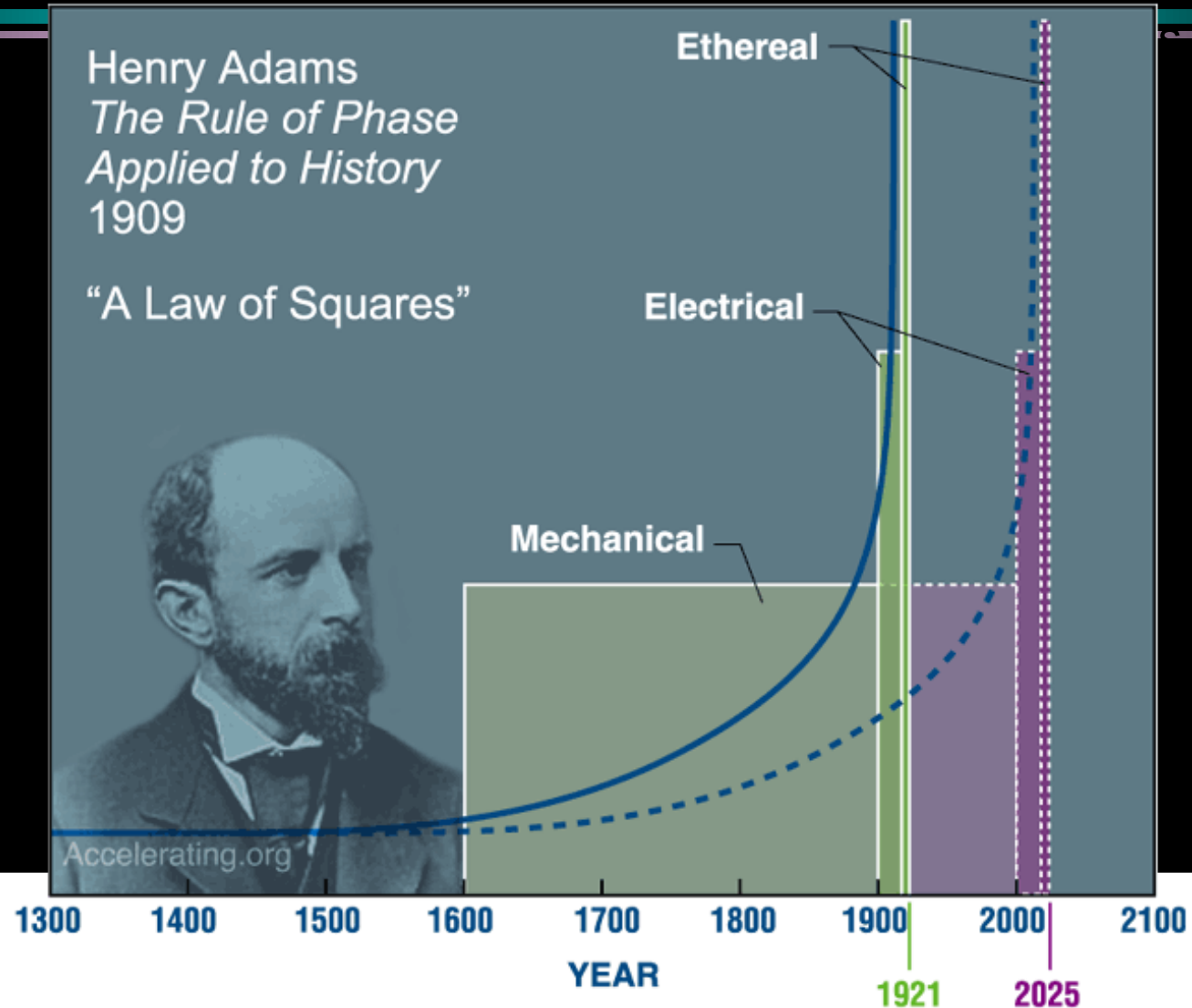
<http://sss.stanford.edu>

<http://www.singularity.org/>

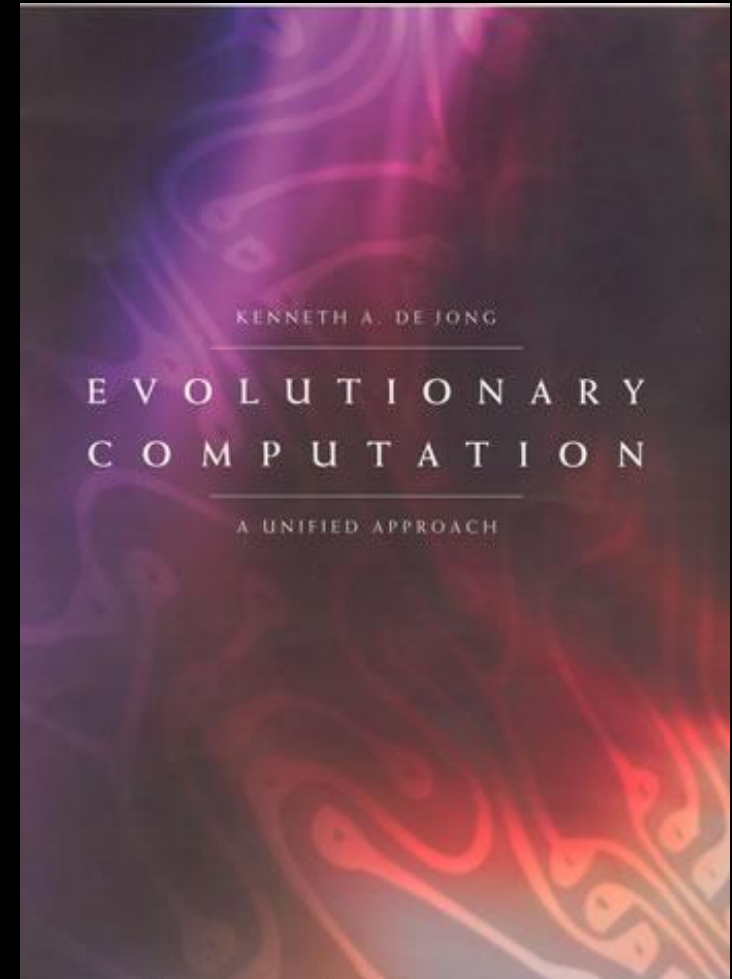
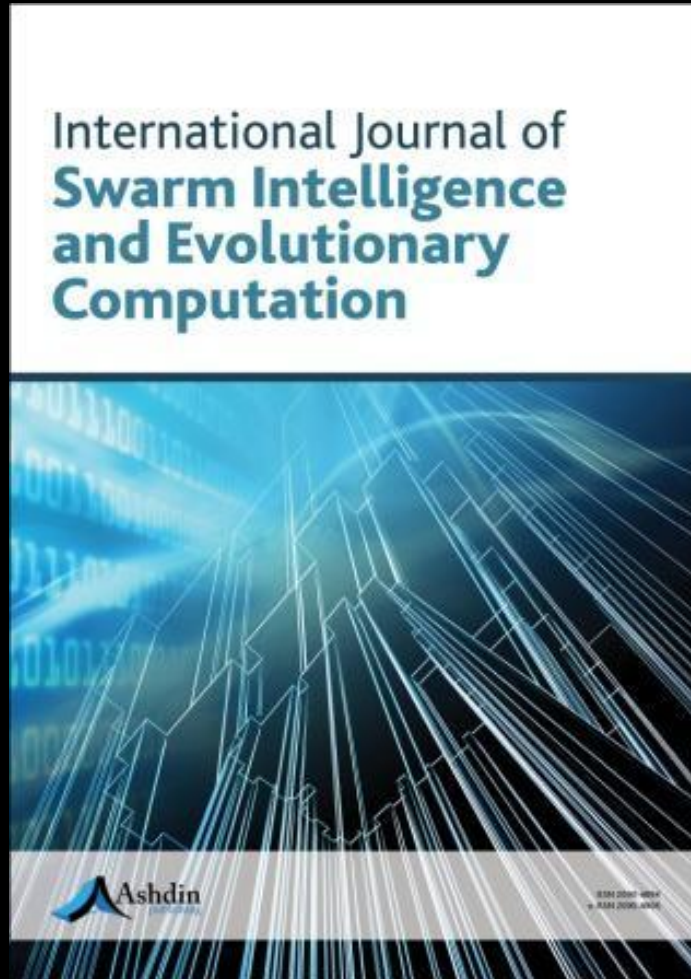


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# Henry Adams, 1909: Our First “Singularity Theorist”



# Cultural Imperatives of the Evolutionary Eventstream - Emergent



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# Cultural Imperatives of the Evolutionary Eventstream - Emergent

Artificial Intelligence?

Not exactly . . .

Artificial Life –

Synthetic Biology -

Emergent Synthetic Sentience ?

**Yes**

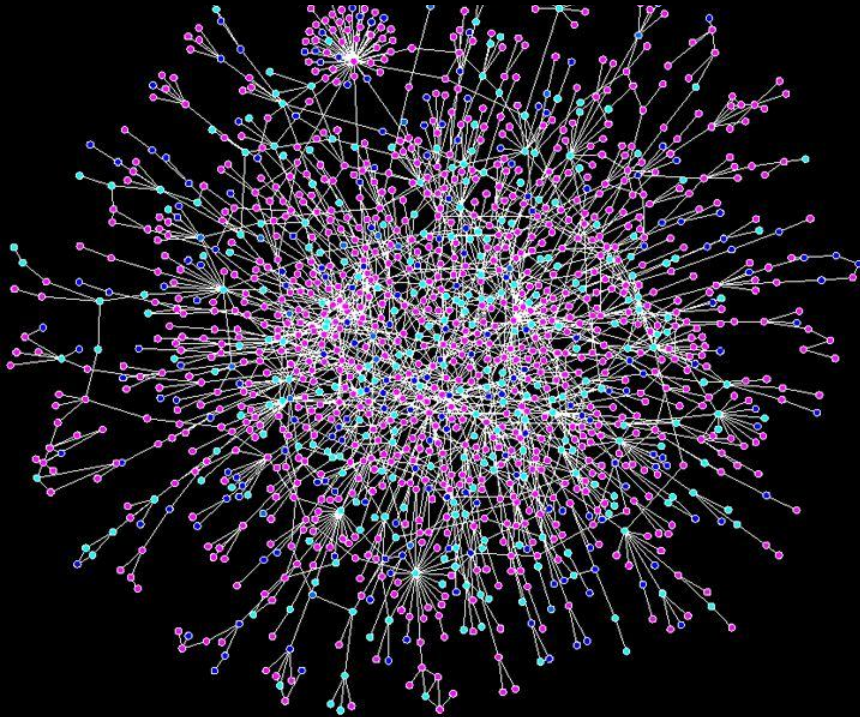


July 07 -11, 2012  
Philadelphia, USA  
Genetic and Evolutionary  
Computation Conference



# Cultural Imperatives of the Evolutionary Eventstream - Emergent

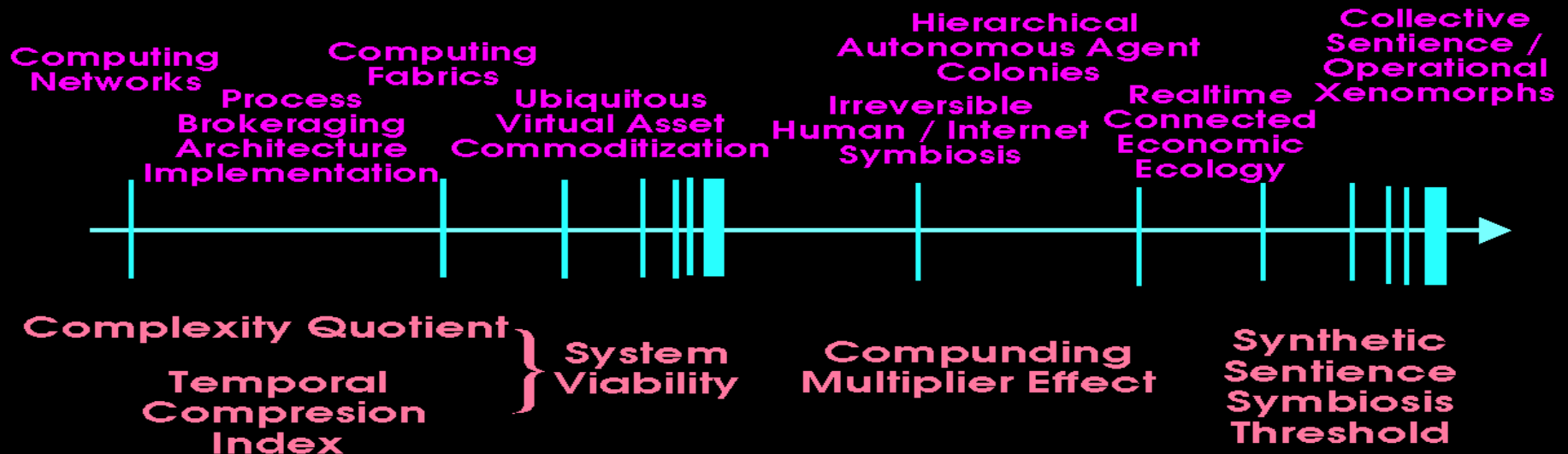
- Knowledge complexity, scale, and velocity is exceeding human capacity for mission critical decision rendering compressed into ever shortening time scales.
- Define Life, Consciousness, Existence . . .



# Technology Driven Socio-Anthropological Evolutionary Threshold Domains



## Evolutionary Eventstream Seminal Markers





# The Next Evolutionary Eventhorizon Hybrid Forms of Consciousness -

## Access to the Quantum Foam

Access to the “empathic web” infrastructure –  
Integration of focused intentionality, technical  
amplification, and spiritual maturity

# Quantum access – the next increment of n-dimensional evolution

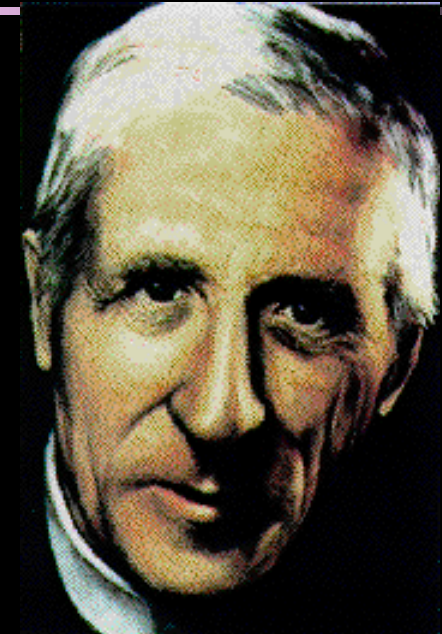


# Cosmic Embryogenesis (in Three Easy Steps)

**Geosphere/Geogenesis**  
(Chemical Substrate)

**Biosphere/Biogenesis**  
(Biological-Genetic Substrate)

**Noosphere/Noogenesis**  
(Memetic-Technologic Substrate)



Pierre Teilhard de Chardin  
(1881-1955)

*Le Phénomène Humain*, 1955

Jesuit Priest, Transhumanist,  
Developmental Systems Theorist





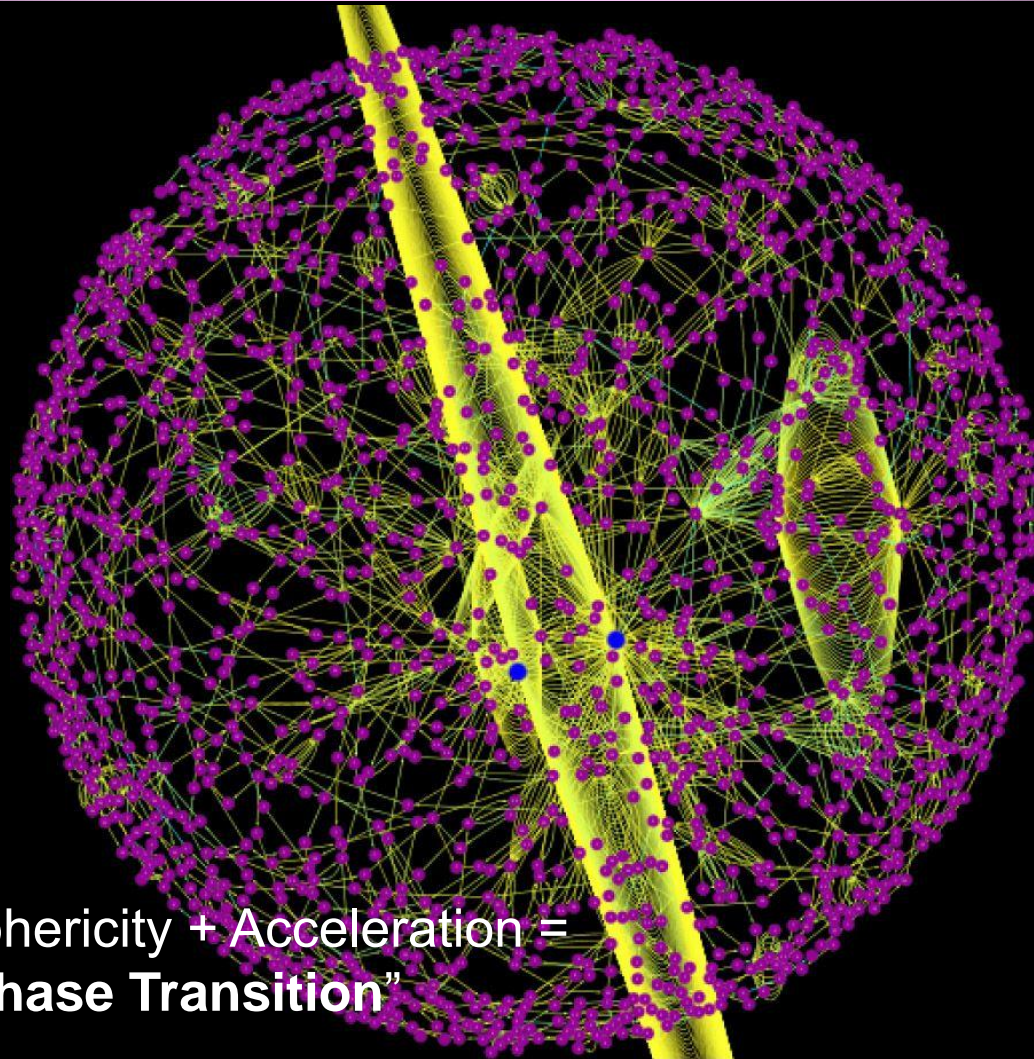
# De Chardin on Acceleration: Technological “Cephalization” of Earth



"No one can deny that a network (a world network) of economic and psychic affiliations is being woven at ever increasing speed which envelops and constantly penetrates more deeply within each of us. **With every day that passes it becomes a little more impossible for us to act or think otherwise than collectively.**"

**“Finite Sphericity + Acceleration =  
Phase Transition”**

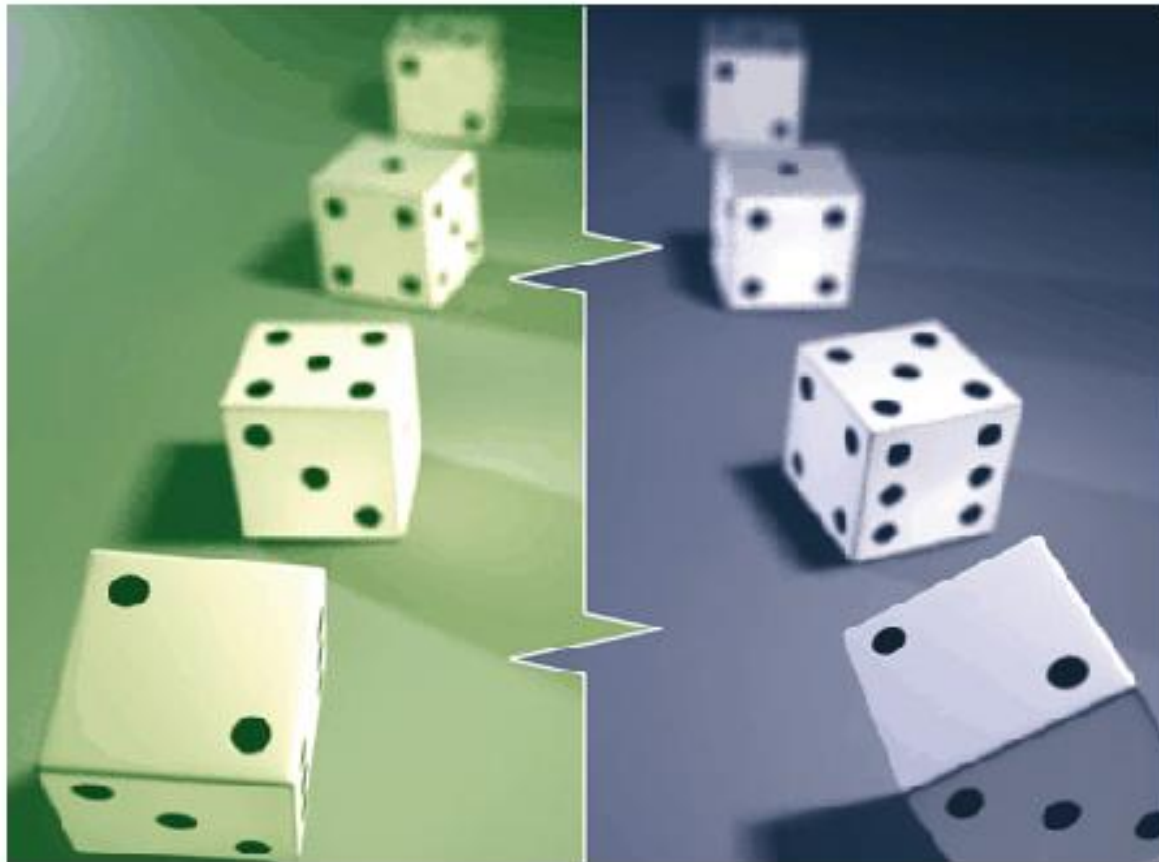
# Quantum Entanglement . . . In Biology



“Finite Sphericity + Acceleration =  
**Phase Transition**”

5/10/2013

# Quantum Entanglement . . . In Biology



*Two entangled dice would show random but always identical numbers (below). Unlike dice, it should be possible to entangle two mirrors suspended on quartz threads (left).*

*Graphic: A. Franzen, Albert Einstein Institute*



## Quantum biology

Neill Lambert, Yueh-Nan Chen, Yuan-Chung Cheng, Che-Ming Li, Guang-Yin Chen & Franco Nori

[Affiliations](#) | [Corresponding authors](#)

*Nature Physics* **9**, 10–18 (2013) | doi:10.1038/nphys2474

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### Abstract

[Abstract](#) • [Introduction](#) • [Quantum coherent energy transport in photosynthesis](#) • [Avian magnetoreception](#) • [Other quantum biological systems](#) • [Conclusions](#) • [References](#) • [Acknowledgements](#) • [Author information](#)

Recent evidence suggests that a variety of organisms may harness some of the unique features of quantum mechanics to gain a biological advantage. These features go beyond trivial quantum effects and may include harnessing quantum coherence on physiologically important timescales. In

this brief review we summarize the latest results for non-trivial quantum effects in photosynthetic light harvesting, avian magnetoreception and several other candidates for functional quantum biology. We present both the evidence for and arguments against there being a functional role for quantum coherence in these systems.

# Quantum Entanglement . . . In Biology

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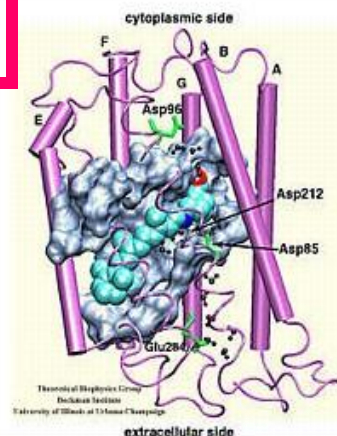
### Research Projects - Quantum Biology

Many important biological processes taking place in cells are driven and controlled by events that involve electronic degrees of freedom and, therefore, require a quantum mechanical description. An important example are enzymatically catalyzed, cellular biochemical reactions. Here, bond breaking and bond formation events are intimately tied to changes in the electronic degrees of freedom. Key events during photosynthesis in plants and energy metabolism in eucaryotes also warrant a quantum mechanical description - from the absorption of light in the form of photons by the photosynthetic apparatus to electron transfer processes sustaining the electrochemical membrane potential. Because of the importance of sensing light to both plants (for regulating vital functions) and animals (for vision), the interaction between light and biological photoreceptors is widespread in nature, and also requires a quantum mechanical description. A prime example is the protein rhodopsin which is present in the retina of the human eye and plays a key role in vision. Our computational tool are combined quantum mechanical/molecular (QM/MM) simulations, that allow to combine an electronic level description of the active region with a classical model of the environment provided by the remainder of the biomolecular system and solvent. This allows us to study the electronic level processes underlying these systems in their natural cellular environment.

#### Spotlight - Quantum Dynamics of Photoreceptors

The all-*trans* retinal protonated Schiff base (RSPB) is the chromophore of bacteriorhodopsin (bR), a transmembrane protein that acts as a light-driven proton pump in *Halobacterium salinarum*, converting light energy to a proton gradient. Upon absorption of light, the chromophore undergoes photoisomerization (all-*trans* → 13-*cis*) that eventually provides the driving force for the translocation of protons. This elementary photoisomerization process proceeds on multiple coupled potential energy surfaces and we have modeled it using a formally exact quantum-mechanical procedure: the full multiple spawning method. Currently, we are studying the first excited electronic state of the chromophore using an isolated retinal analog model and *ab initio* CASSCF methods. The characterization of the first excited state (minima and conical intersections associated with isomerization around different double bonds) will enable us to extend and improve the aforementioned quantum-mechanical studies of the photoreaction dynamics in the protein.

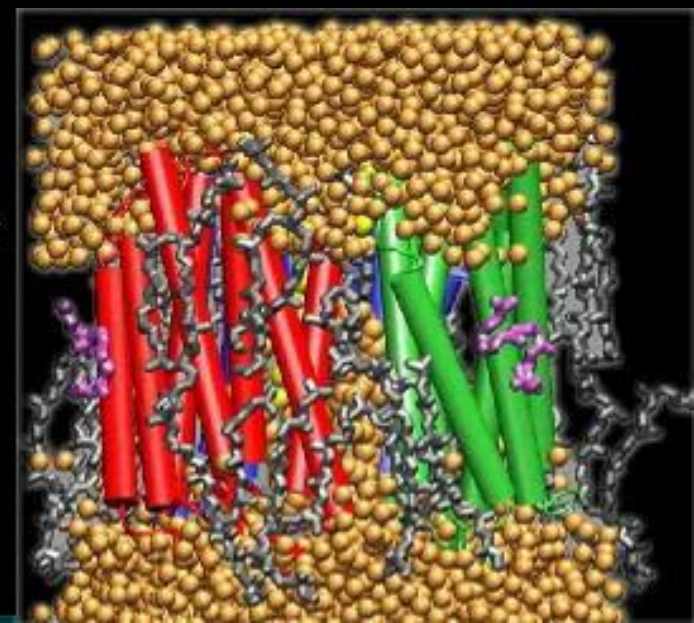
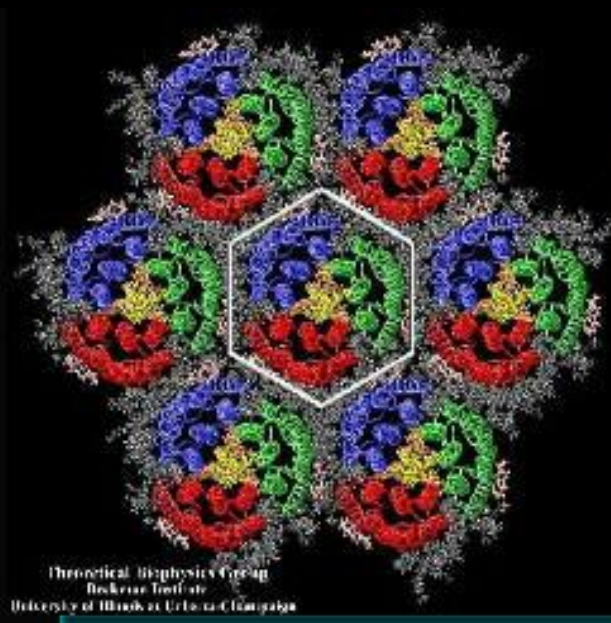
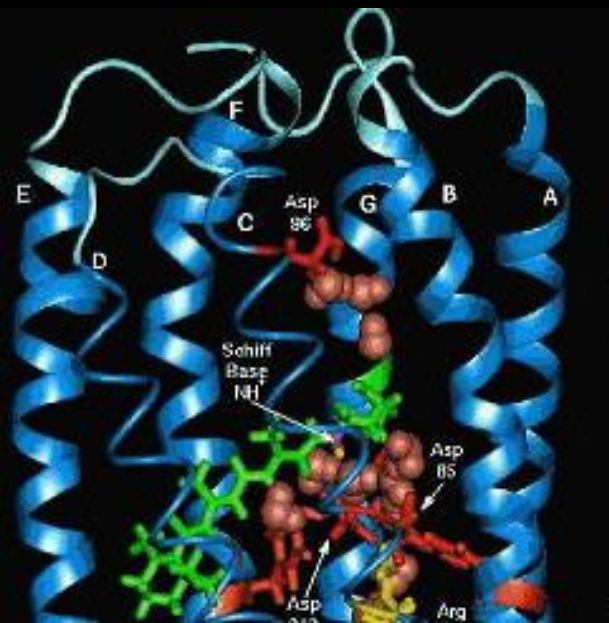
#### All Spotlights





# Nanostructured biomaterials as a dynamic interface for quantum entanglement interaction

- Rhodopsins, other nanobiological - organic material systems
- Engineered electro-photonic transition properties





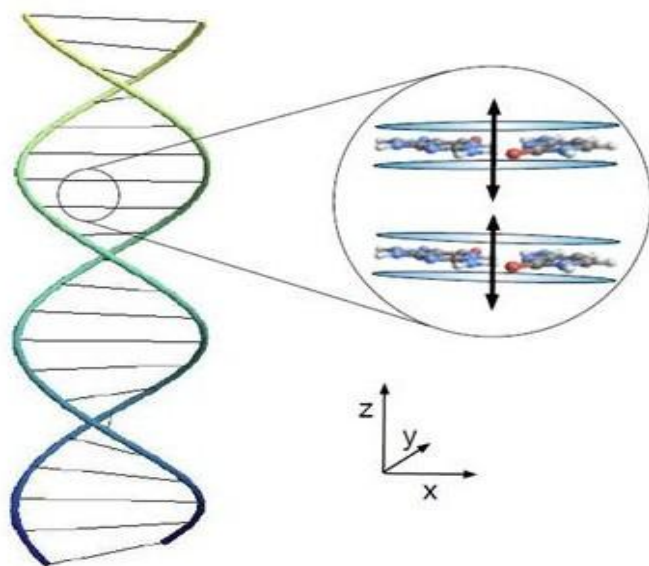


The Physics arXiv Blog  
June 28, 2010

MIT  
Technology  
Review

# Quantum Entanglement Holds DNA Together, Say Physicists

A new theoretical model suggests that quantum entanglement helps prevent the molecules of life from breaking apart.



There was a time, not so long ago, when biologists swore black and blue that quantum mechanics could play no role in the hot, wet systems of life.

## Confirmation: Quantum entanglement in photosynthesis

News: *Quantum Physics* MAY 12, 2010

The discovery that every-day, 'normal temperature', biological systems – plants – use quantum effects in the process of photosynthesis has been advancing for several years. For physicists and biologists this is becoming something of a revelation. Physicists in particular, accustomed to observing quantum effects only at extreme cold (approaching absolute zero), find the idea that Nature has adapted quantum effects to the warm and chaotic environment of living things almost shocking. Yet the evidence is mounting. In 2007 researchers led by Greg Engel at the University of Berkeley California (USA) and Graham Fleming at the Lawrence Berkeley National Laboratory (USA) demonstrated that quantum coherence existed in the so called antenna proteins (sunlight receptors) in green sulfur bacteria. In late 2009, researchers led by Greg Scholes at the University of Toronto (Canada) used laser pulses to set protein molecules spinning, and observed that the energy patterns fluctuated in a way that showed there were connections between them – connections called quantum entanglement. [[SciTechStory: Quantum mechanics in photosynthesis, oh my](#)]

Now a new collaborative team, including Graham Fleming, has added confirmation that the photosynthetic process uses quantum entanglement to utilize nearly 100% of the sun's energy in the conversion of sunlight to carbon-based (sugar) energy.

The new study published in the journal *Nature Physics* in May, provides confirmation of quantum effects in a specific photosynthetic mechanism, and according to Mohan Sarovar, one of the authors:



## Is Quantum Mechanics Controlling Your Thoughts?

Science's weirdest realm may be responsible for photosynthesis, our sense of smell, and even consciousness itself.

by Mark Anderson

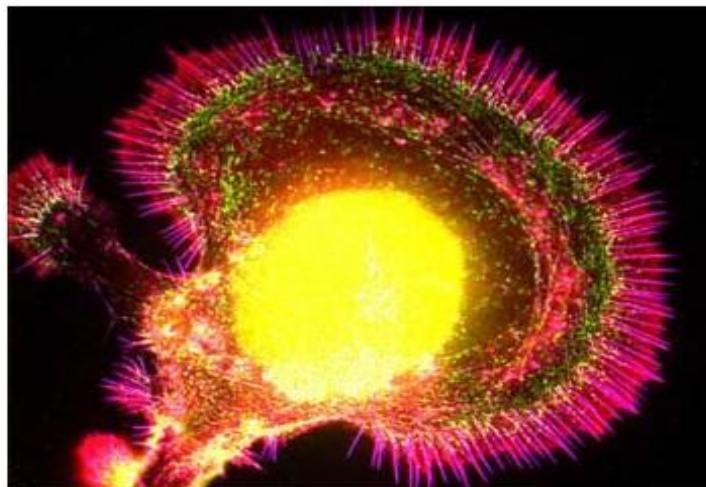
From the **February 2009 issue**, published online January 13, 2009

Yahoo! Buzz

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A A A



A sea slug neuron may tap quantum forces to process information. In humans quantum physics may be integral to thought.

Dylan Burnette/Olympus Bioscapes Imaging Competition

key step in [photosynthesis](#), the process by which plants and some microorganisms convert water, carbon dioxide, and sunlight into oxygen and carbohydrates. More efficient by far in its ability to convert energy than any operation devised by man, this cascade helps drive almost all life on earth. Remarkably, photosynthesis appears to derive its ferocious efficiency not from the familiar physical laws that govern the visible world but from the seemingly exotic rules of [quantum mechanics](#), the physics of the subatomic world. Somehow, in every green plant or photosynthetic bacterium, the two disparate realms of physics not only meet but mesh harmoniously. Welcome to the strange new world of quantum biology.

[Graham Fleming](#) sits down at an L-shaped lab bench, occupying a footprint about the size of two parking spaces. Alongside him, a couple of off-the-shelf lasers spit out pulses of light just millionths of a billionth of a second long. After snaking through a jagged path of mirrors and lenses, these minuscule flashes disappear into a smoky black box containing proteins from green sulfur bacteria, which ordinarily obtain their energy and nourishment from the sun. Inside the black box, optics manufactured to billionths-of-a-meter precision detect something extraordinary: Within the bacterial proteins, dancing electrons make seemingly impossible leaps and appear to inhabit multiple places at once.

Peering deep into these proteins, Fleming and his colleagues at the University of California at Berkeley and at Washington University in St. Louis have discovered the driving engine of a

On the face of things, quantum mechanics and the biological sciences do not mix. Biology focuses on larger-scale processes, from molecular interactions between proteins and DNA up to the behavior of organisms as a whole; quantum mechanics describes the often-strange nature of electrons, protons, muons, and quarks—the smallest of the small. Many events in biology are considered straightforward, with one reaction begetting another in a linear, predictable way. By contrast, quantum mechanics is fuzzy because when the world is observed at the subatomic scale, it is apparent that particles are also waves: A dancing electron is both a tangible nugget and an oscillation of energy. (Larger objects also exist in particle and wave form, but the effect is not noticeable in the macroscopic world.)



## The robin flies with quantum coherence

News: *Quantum Physics* JANUARY 24, 2011



The quantum coherent robin red-breast.....Credit: NWFS

In a sense most science and technology news is made up of tidbits, bits and pieces of research. Some of the tidbits are choice morsels, others are insight resistant gristle, and perhaps even more are pure confection. What's generally missing in the news is how (or if) the tidbit fits into a larger piece or the whole enchilada (to use an expression). This fitting into a whole is difficult, even the experts in a field don't always know how all the various pieces of research integrate – if they do at all. So consider this piece of news as a tidbit that *may* be part of a potentially very important whole: Robins use quantum physics for navigation.



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## Quantum Biology of the PSU

It is through photosynthesis that earth's biosphere derives its energy from sunlight. Photosynthetic organisms, i.e., plants, algae and photosynthetic bacteria, have developed efficient systems to harvest the light of the sun and to use the light energy to drive their metabolic reactions, such as the reduction of carbon dioxide to sugar. The ubiquitous green color of plants is testimony to the key molecular participant in the light harvesting of plants, chlorophylls. More hidden in this respect, but no less widespread, is a second participating molecule, carotenoid. In green leaves the color of the carotenoids is masked by the much more abundant chlorophylls while in red ripe tomatoes or petals of yellow flowers, the carotenoids predominate. Chlorophyll molecules exist in slightly different chemical structures in various photosynthetic organisms, as chlorophyll a or b in plants or algae, and as bacteriochlorophyll a (BChl-a) or b in photosynthetic bacteria. Molecules such as chlorophyll and carotenoid that absorb light and impart color to living matter and other materials are called pigments.

In general, biological pigments are non-covalently bound to proteins, forming the so-called pigment-protein complexes. The pigment-protein complexes are organized as the photosynthetic unit (PSU). The bacterial PSU consists of two types of pigment-protein complexes: the photosynthetic reaction centers (RCs) and the light-harvesting complexes. The main function of the light-harvesting complexes is to gather light energy and to transfer this energy to the reaction centers for the photo-induced redox processes. In most purple bacteria, the photosynthetic membranes contain two types of light-harvesting complexes: light harvesting complex I (LH-I) and light harvesting complex II (LH-II). While LH-I is tightly bound to the photosynthetic reaction centers, LH-II is not directly associated with the reaction centers, but transfers energy to the reaction centers via LH-I.

Purple bacteria are great masters of harvesting light. Nearly all the energy gained by the absorption of a photon is transferred on to the reaction center. To illustrate how purple bacteria achieve such high efficiency, we trace the way of a photon (and its excitation energy, respectively) through the light-harvesting system. On this way we will point out the remarkable geometrical features that serve the process of harvesting light. It is the goal of our research to understand how these geometrical features translate into physical properties that ideally support the biological function. It will be shown that purple bacteria exploit elegant quantum physics, the working of which were only fully understood recently after the discovery of the structures of light-harvesting complexes and investigations into their electronic excitations.

## Primary Absorption of a Photon

Light is absorbed either by bacteriochlorophylls or carotenoids in different spectral regions. Two kinds of bacteriochlorophylls absorb at slightly different energies and at different angles. The ring structure enhances absorption and generates an energy trap.

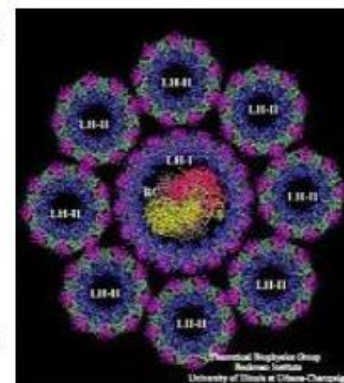


image size: 208k; made with  
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Figure produced with VMD





Condensed Matter > Disordered Systems and Neural Networks

## Quantum biology on the edge of quantum chaos

Gabor Vattay, Stuart Kauffman, Samuli Niiranen

(Submitted on 29 Feb 2012)

We give a new explanation for why some biological systems can stay quantum coherent for long times at room temperatures, one of the fundamental puzzles of quantum biology. We show that systems with the right level of complexity between chaos and regularity can increase their coherence time by orders of magnitude. Systems near Critical Quantum Chaos or Metal-Insulator Transition (MIT) can have long coherence times and coherent transport at the same time. The new theory tested in a realistic light harvesting system model can reproduce the scaling of critical fluctuations reported in recent experiments. Scaling of return probability in the FMO light harvesting complex shows the signs of universal return probability decay observed at critical MIT. The results may open up new possibilities to design low loss energy and information transport systems in this Poised Realm hovering reversibly between quantum coherence and classicality.

Subjects: **Disordered Systems and Neural Networks** (cond-mat.dis-nn); Molecular Networks (q-bio.MN); Quantum Physics (quant-ph)

Cite as: [arXiv:1202.6433](#) [cond-mat.dis-nn]  
(or [arXiv:1202.6433v1](#) [cond-mat.dis-nn] for this version)

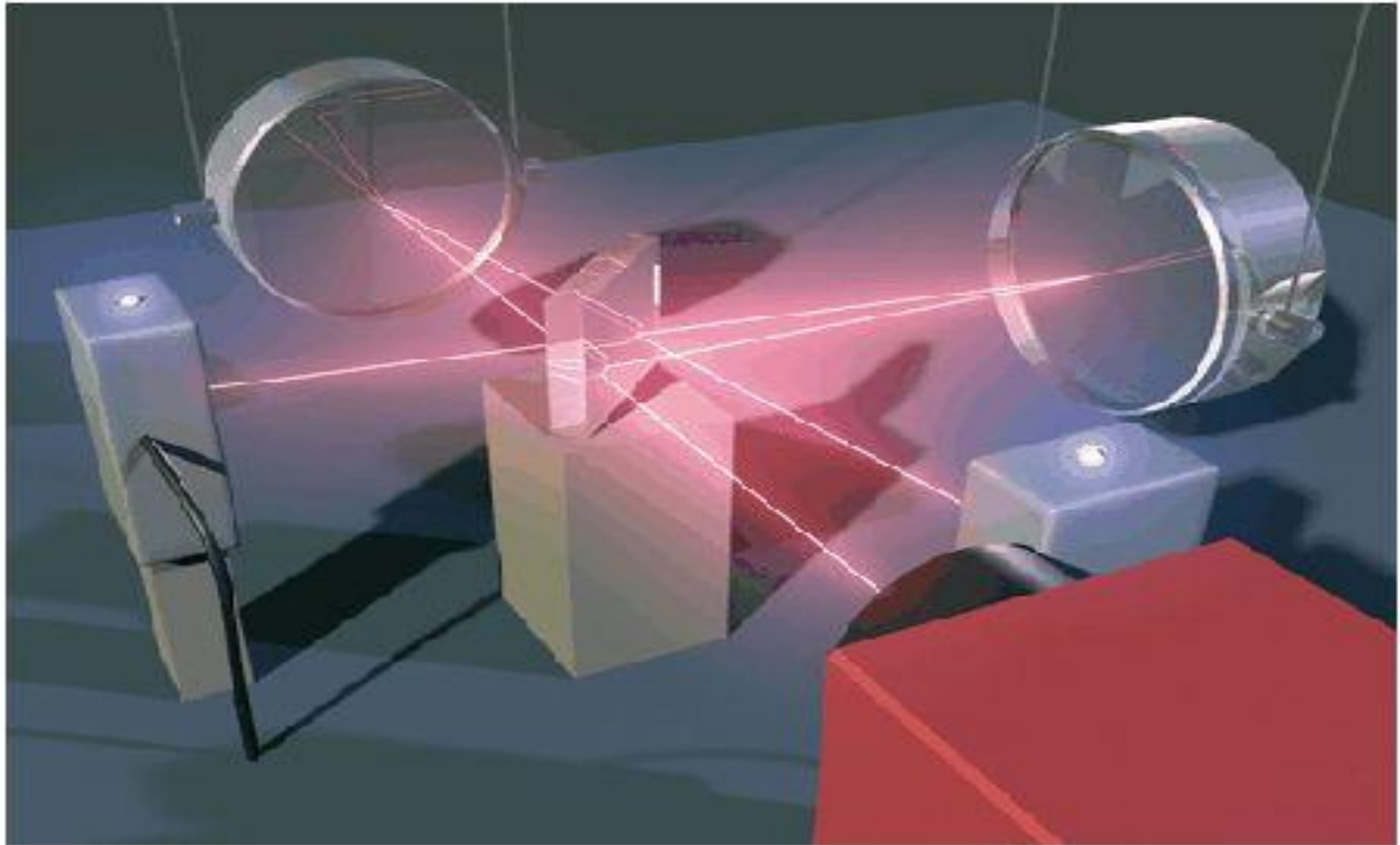
### Submission history

From: Gabor Vattay [[view email](#)]

[v1] Wed, 29 Feb 2012 04:15:22 GMT (566kb,D)



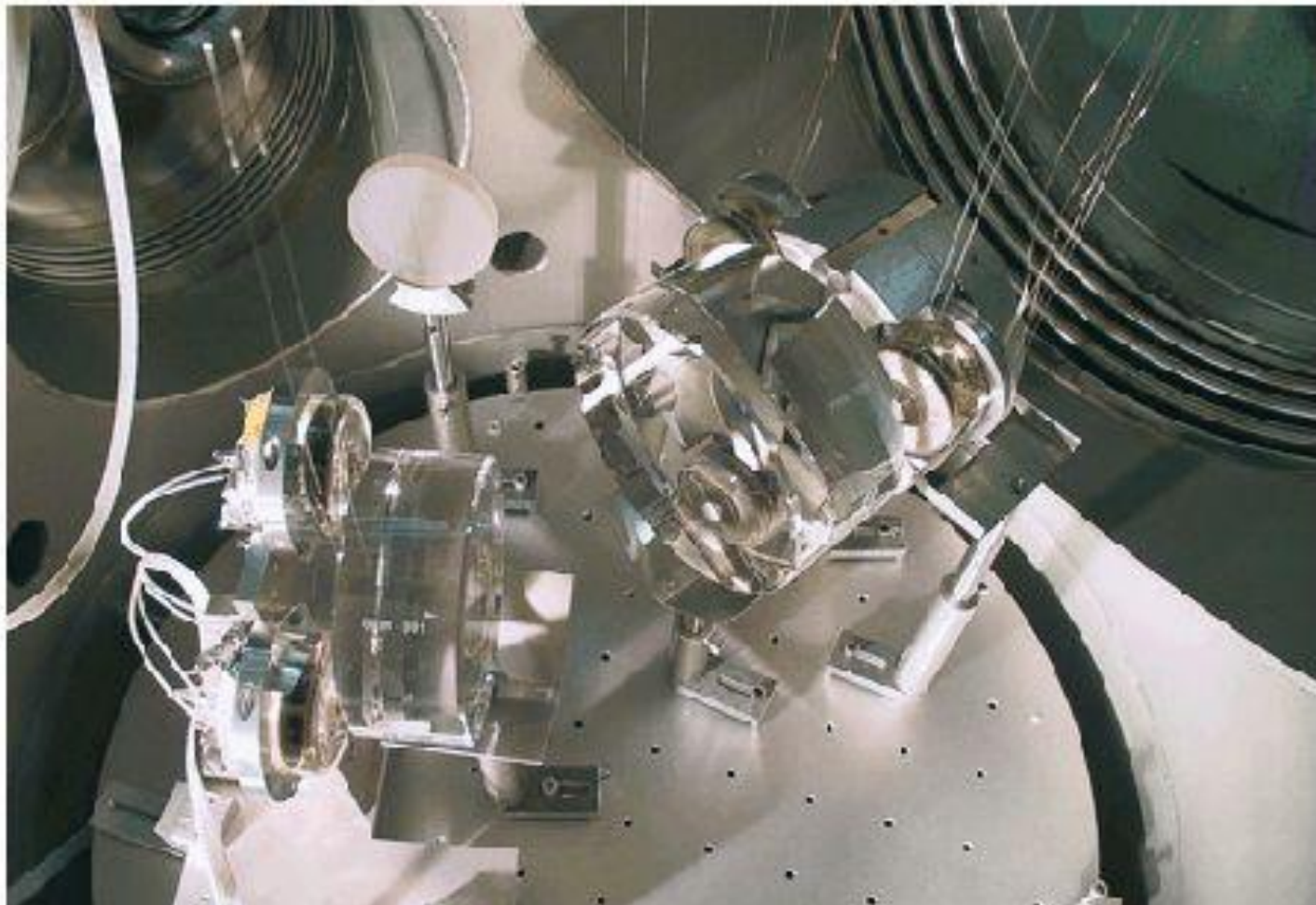
# Quantum Entanglement



*A laser beam split by a semitransparent piece of glass entangles the mirrors and measures their motion.*

*Graphic: A. Franzen, Albert Einstein Institute*

The properties of one particle can determine those of another even though the two are miles apart and don't exchange any information. What appears to be a spooky phenomenon is what physicists call entanglement, and they have already observed it in small particles. Now Roman Schnabel, a professor at Leibniz University Hannover and at the nearby Max Planck Institute for Gravitational Physics (Albert Einstein Institute), aims to entangle two heavy mirrors.





# Australian scientists claim to have 'teleported' data

June 22, 2002 | By Peter O'Connor, Associated Press

**2002-06-22 04:00:00 PST Canberra, Australia**

-- Australian scientists said Monday they had successfully "teleported" a laser beam encoded with data, breaking it up and reconstructing an exact replica a yard away.

Their work replicates an experiment at the California Institute of Technology in 1998, but the Australian team believes their technique is more reliable and consistent.

Although the research brings to mind the way "Star Trek" characters were beamed around on TV and in film, scientists at the Australian National University said their technique's main use will be as a way to encrypt information and for a new generation of super-fast computers.

At this stage, the process perfected by Australian physicist Ping Koy Lam and his 12-member team can only teleport light by destroying the light beam and creating an exact copy at the receiving end from light particles known as photons.



Physicist Ping Koy Lam, right, and doctoral student Warwick Bowen used a process known as quantum entanglement to achieve the teleportation of a laser light beam in Canberra, Australia. News Ltd photo via Associated Press



## Penrose and Quanglement Entanglement and the New Physics



*In the past, teleportation has only been possible with particles of light Image: Rainer Blatt*

*By taking advantage of quantum phenomena such as entanglement, teleportation and superposition, a quantum computer could, in principle, outperform a classical computer in certain computational tasks.*

*Entanglement allows particles to have a much closer relationship than is possible in classical physics. For example, two photons can be entangled such that if one is horizontally polarized, the other is always vertically polarized, and vice versa, no matter how far apart they are. In quantum teleportation, complete information about the quantum state of a particle is instantaneously transferred by the sender, who is usually called Alice, to a receiver called Bob. Quantum superposition, meanwhile, allows a particle to be in two or more quantum states at the same time*

# Quantum crypto – the next increment of secure system evolution

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- All networks are vulnerable



Alice's Key



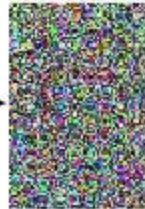
Bob's Key



Original: (a)



Encrypted: (b)

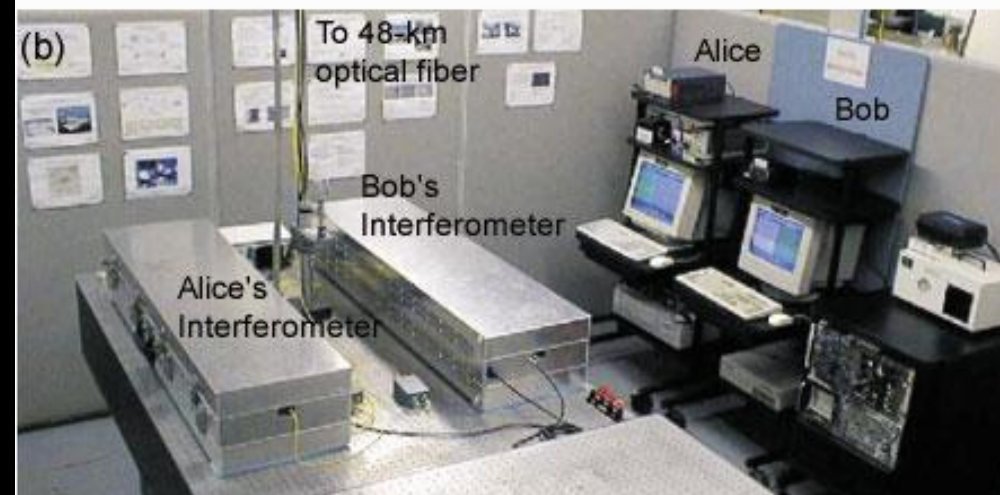
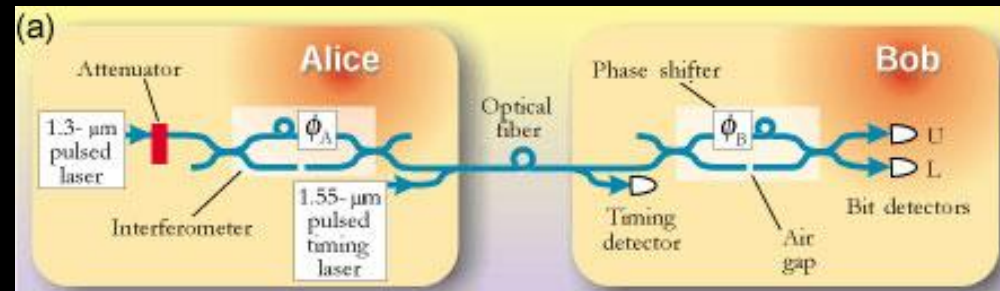


Decrypted: (c)



Bitwise  
XOR

Bitwise  
XOR



5/10/2013



# Quantum teleportation achieved over record distances

The secure method of speedy communication of information could lead to space-based transmission.

John Matson

13 August 2012

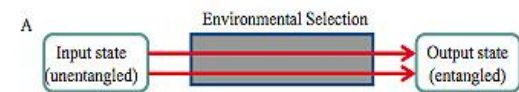
An article from Scientific American.

Two teams of researchers have extended the reach of quantum teleportation to unprecedented lengths, roughly equivalent to the distance between New York City and Philadelphia. But don't expect teleportation stations to replace airports or train terminals — the teleportation scheme shifts only the quantum state of a single photon. And although part of the transfer happens instantaneously, the steps required to read out the teleported quantum state ensure that no information can be communicated faster than the speed of light.

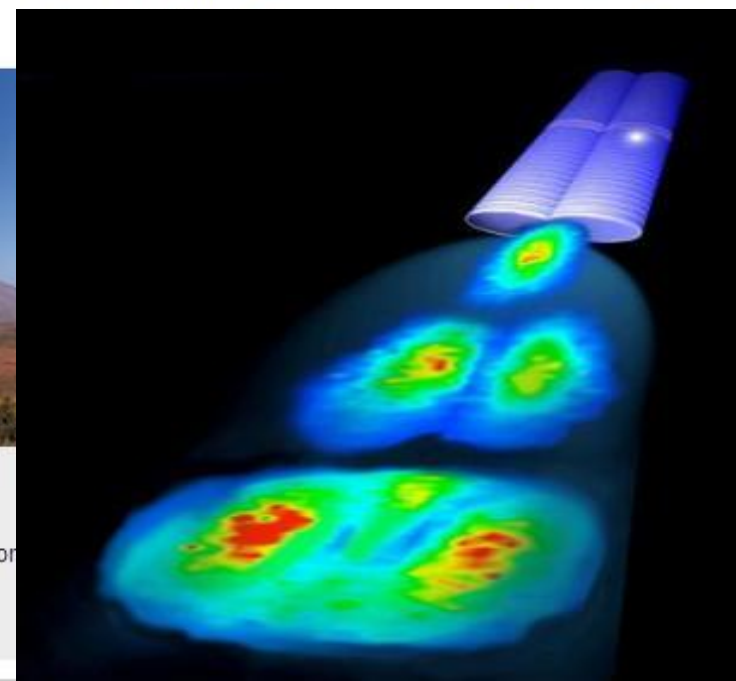
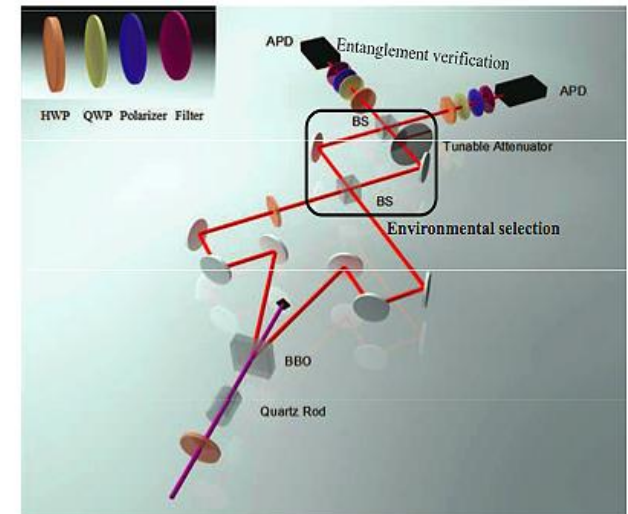


The European Space Agency's Optical Ground Station on Tenerife in the Canary Islands was used as a receiver in recent quantum teleportation experiments.

ESA



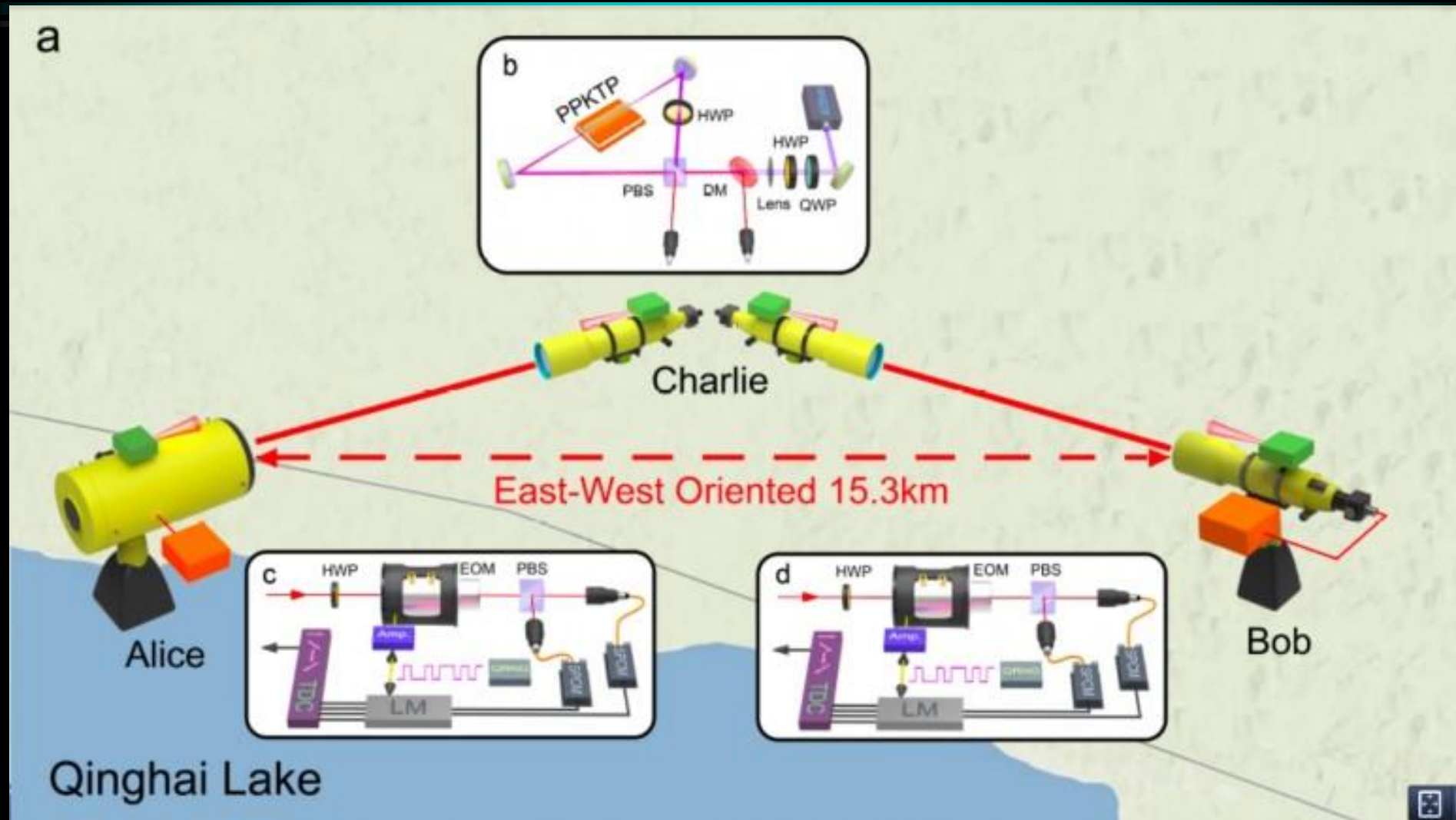
B





# Quantum Informatics . . .

## Quantum Encryption



# Spooky Experiment on ISS Could Pioneer New Quantum Communications Network

by JOHN WILLIAMS on APRIL 12, 2013



ISS022E080014

*The cameras mounted in the ISS's cupola could serve as the platform for the first-ever quantum optics experiment in space. Image credit: NASA*

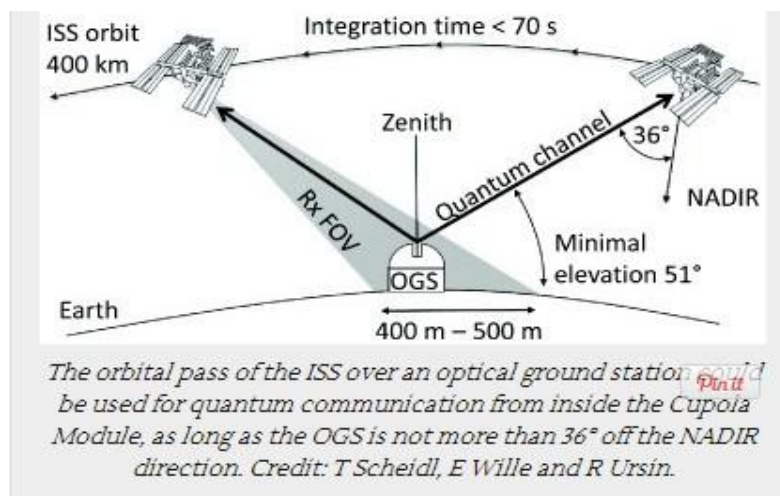
[Pin it](#)

# Quantum encryption keys obtained from a moving plane

A technical demonstration shows that an exchange with satellites is possible.

by [John Timmer](#) - Apr 2 2013, 11:30am PDT

- [Physical Sciences](#)



The ISS experiment proposes using a “Bell experiment” to test the theoretical contradiction between predictions in quantum and classical physics. For the Bell experiment, a pair of entangled photons would be generated on the ground; one would be sent from the ground station to the modified camera aboard the ISS, while the other would be measured locally on the ground for later comparison. So far, researchers sent a secret key to receivers just a few hundred kilometers apart.

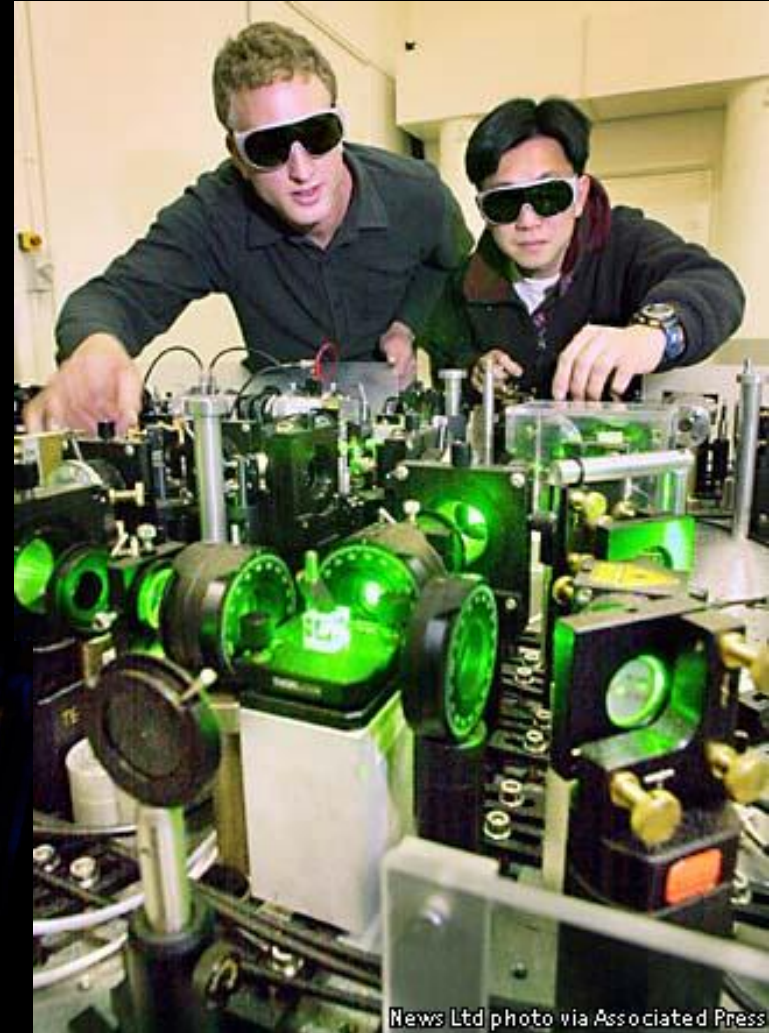
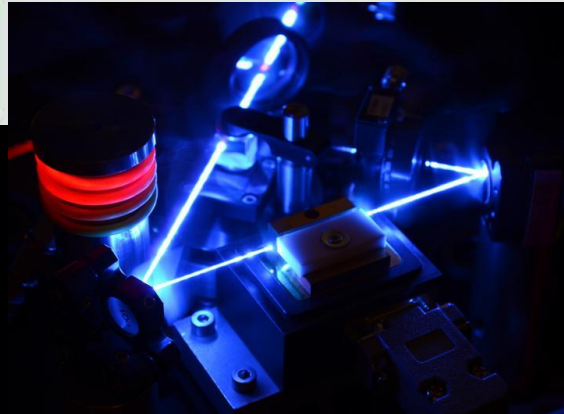
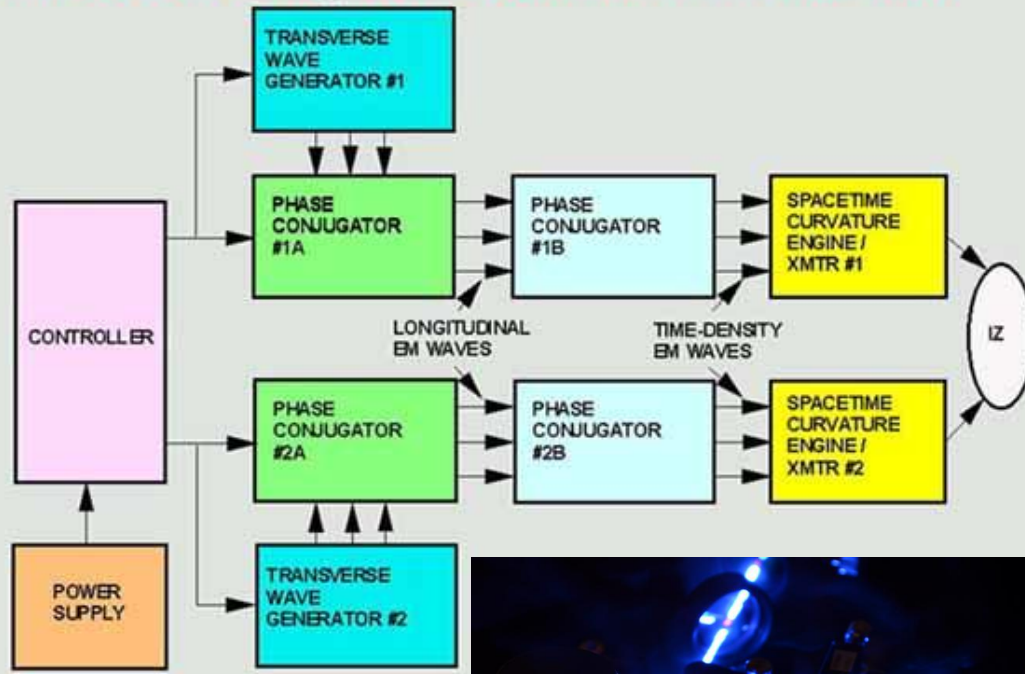
“According to quantum physics, entanglement is independent of distance. Our proposed Bell-type experiment will show that particles are entangled, over large distances — around 500 km — for the very first time in an experiment,” says Ursin. “Our experiments will also enable us to test potential effects gravity may have on quantum entanglement.”



# Quantum Informatics . . .

## Quantum Encryption

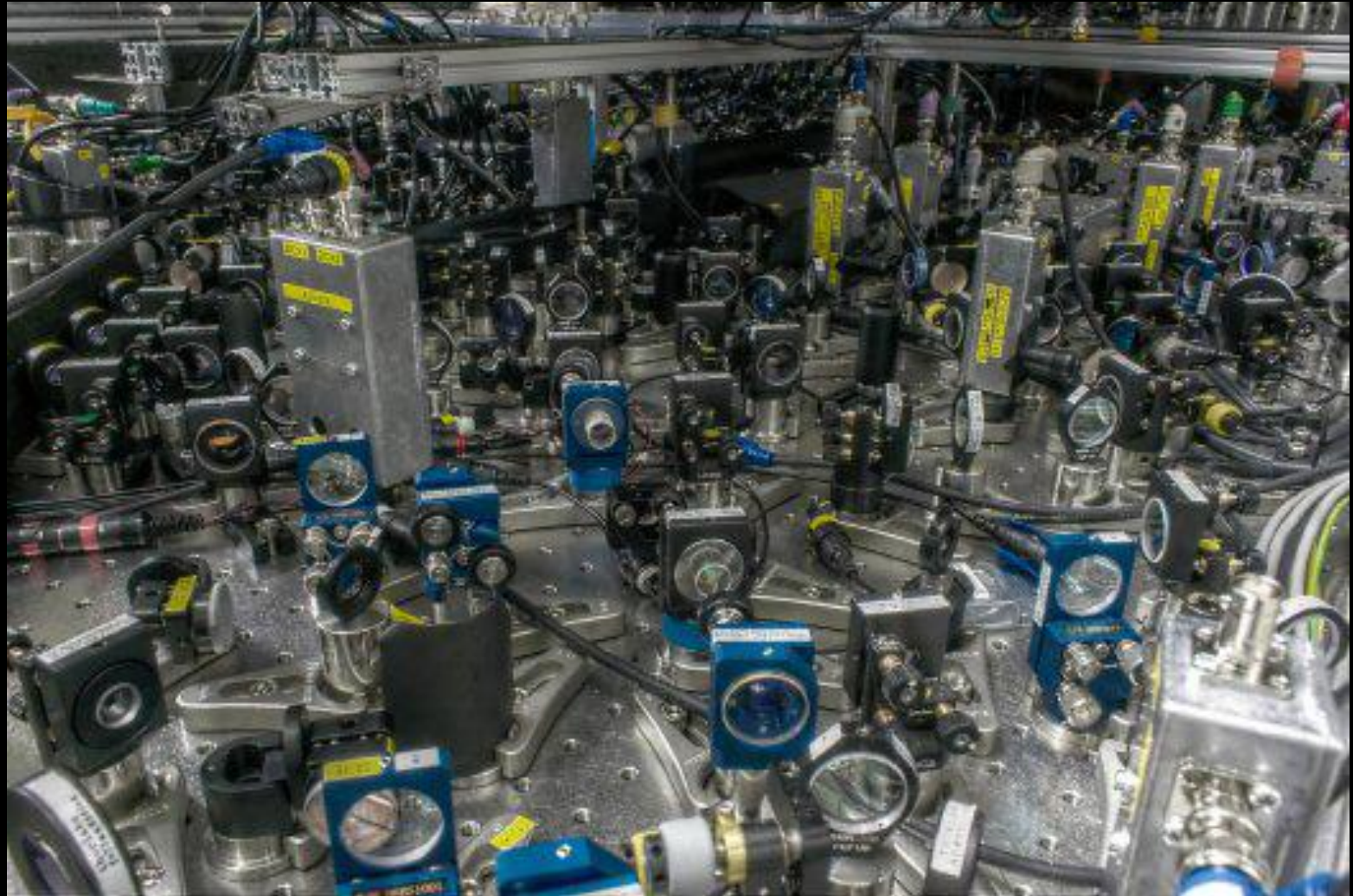
***Time-Polarized EM Wave interferometer Creating Space-Time Curvature Engines in a Distant Interference Zone***



News Ltd photo via Associated Press

# Quantum Informatics . . .

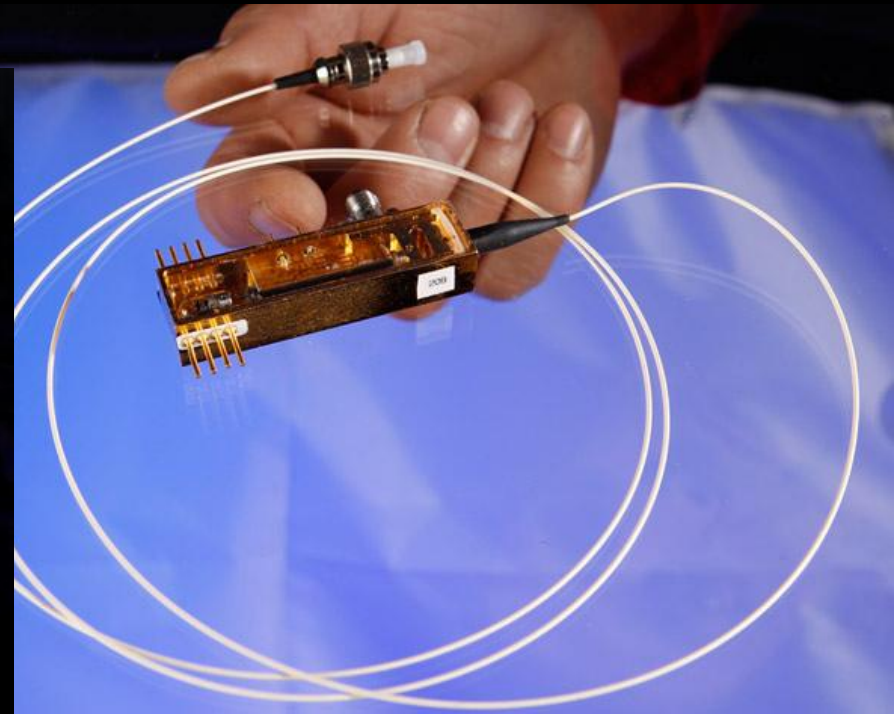
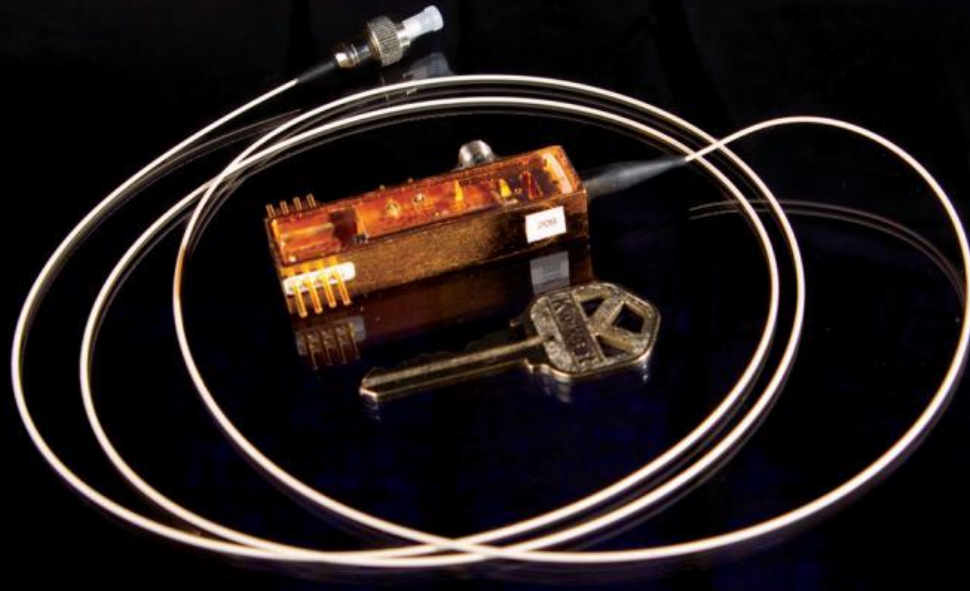
## Quantum Encryption





# Quantum Informatics . . .

## Quantum Encryption





# Quantum Physicists Show a Small Amount of Randomness Can Be Amplified Without Limit

May 16, 2012 — Once again quantum physics gives us philosophical implications: physicists showed how a small amount of randomness can be amplified without limit.

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## See Also:

### Matter & Energy

- Quantum Physics
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- Quantum Computing

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- Quantum Computers
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- Spintronics Research

Classical physics is deterministic: for example, we can determine the position and velocity of a particle at any time in the future. Quantum theory, on the other hand, states that there exist processes which are fundamentally random: for instance, the outcomes of measurements of quantum particles seem to be determined entirely by chance. This is why Einstein argued in a publication in 1935 that the quantum theory is incomplete, and yet another kind of higher theory must exist, but up to the present time there has been no proof either that the world is purely deterministic and all randomness is due solely to a lack of knowledge about certain events, or that everything happens purely by chance. However, ETH Zurich physicists have now succeeded in showing in a thought experiment that randomness can be amplified.



Once again quantum physics gives us philosophical implications: physicists showed how a small amount of randomness can be amplified without limit. (Credit: © Africa Studio / Fotolia)

## Related Stories



### Physicists Make Strides in Understanding Quantum Entanglement

(Dec. 14, 2012) — While some theoretical physicists make predictions about astrophysics and the behavior of stars and galaxies, others work in the realm of the very small, which includes quantum physics. Recently, ... > read

# Quantum domain interaction – “delayed thought” vs perceived photon activity experiment

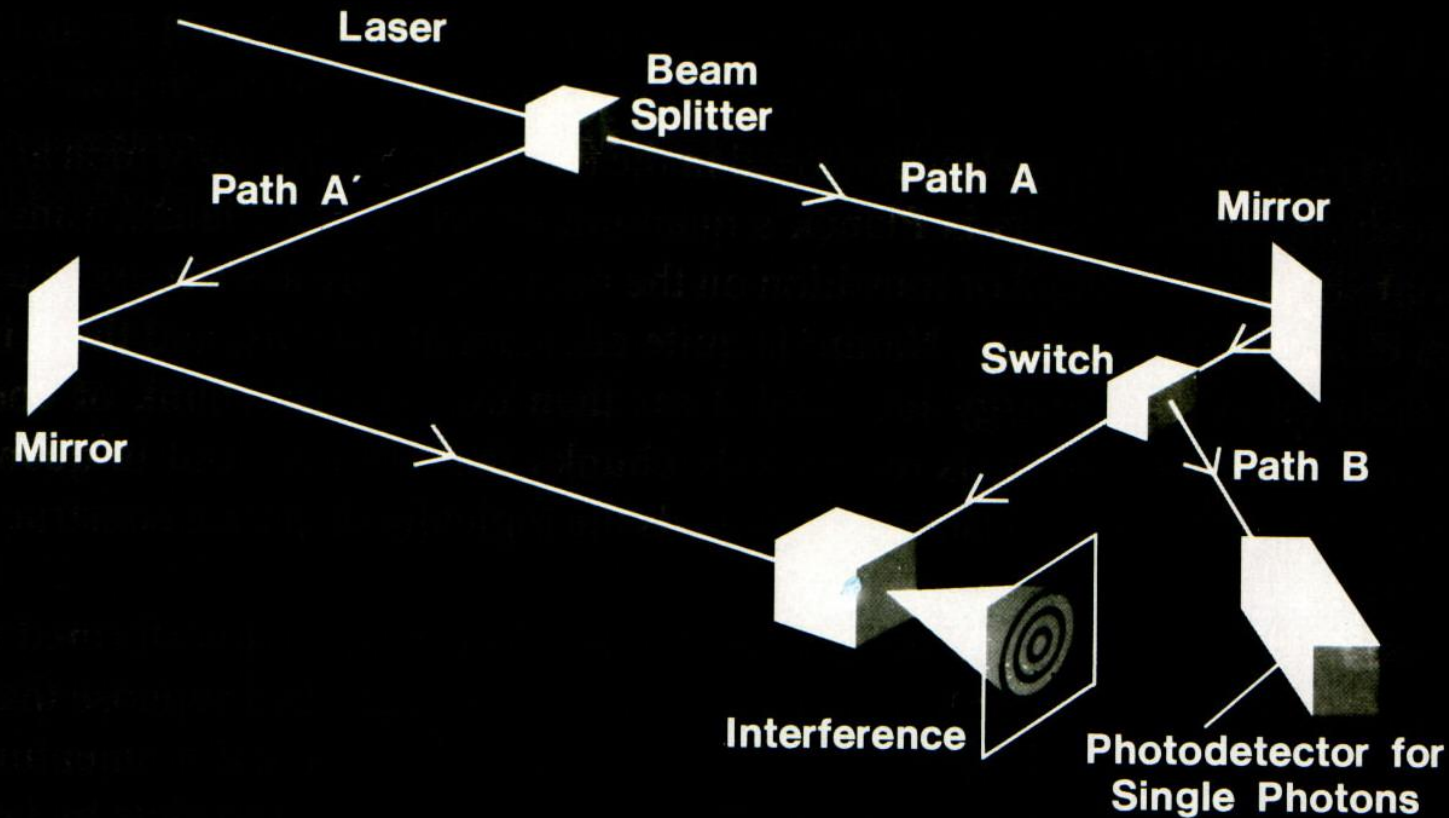
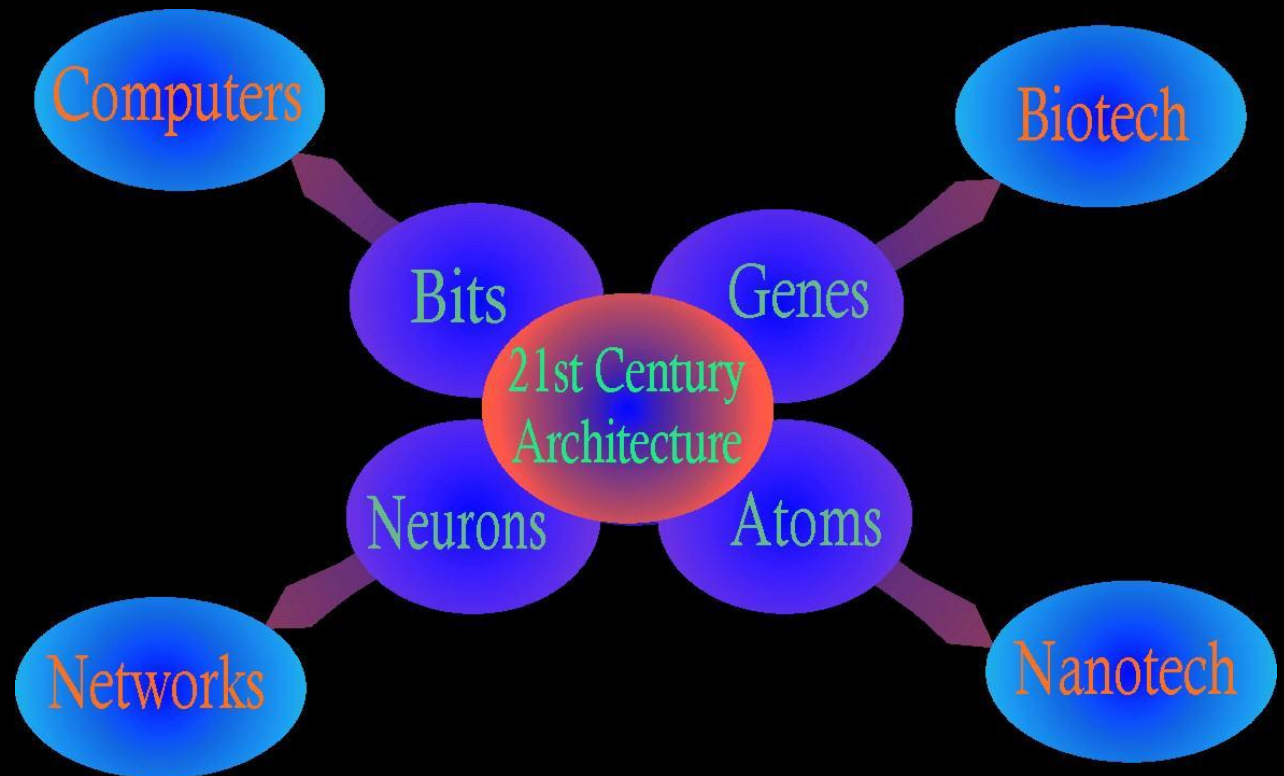


FIGURE 12. A delayed-choice experiment that has been carried out in the laboratory by groups at the University of Maryland and the University of Munich.

# Think Different . . .

## Think Holographic

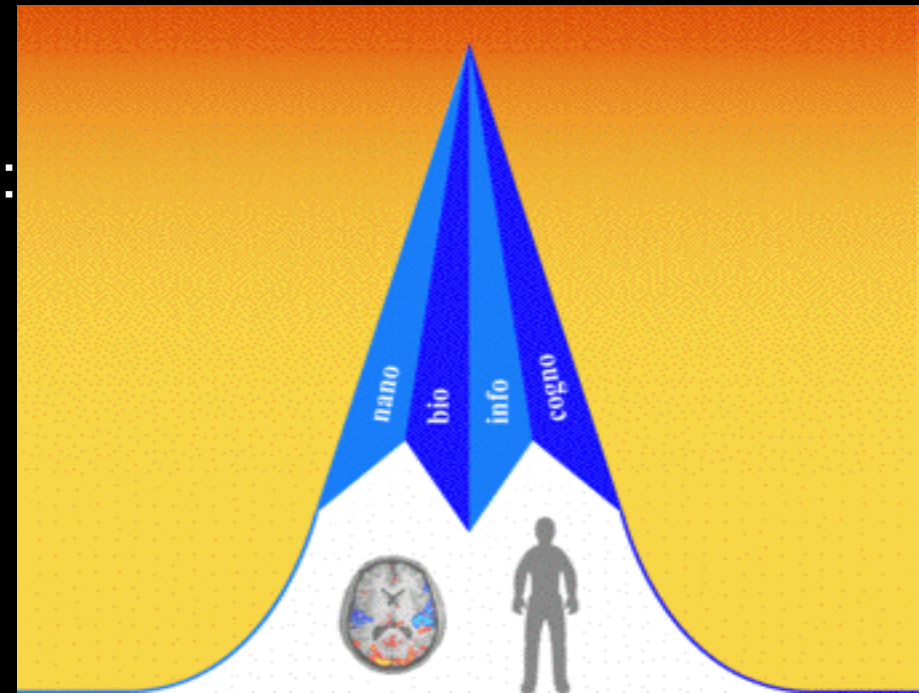
- Emergent NBIC architecture is an evolving architecture of interrelated disciplines, technologies, organizational systems





# The Emergent Infotech / Biotech / Nanotech / Cognotech Operational Ecology

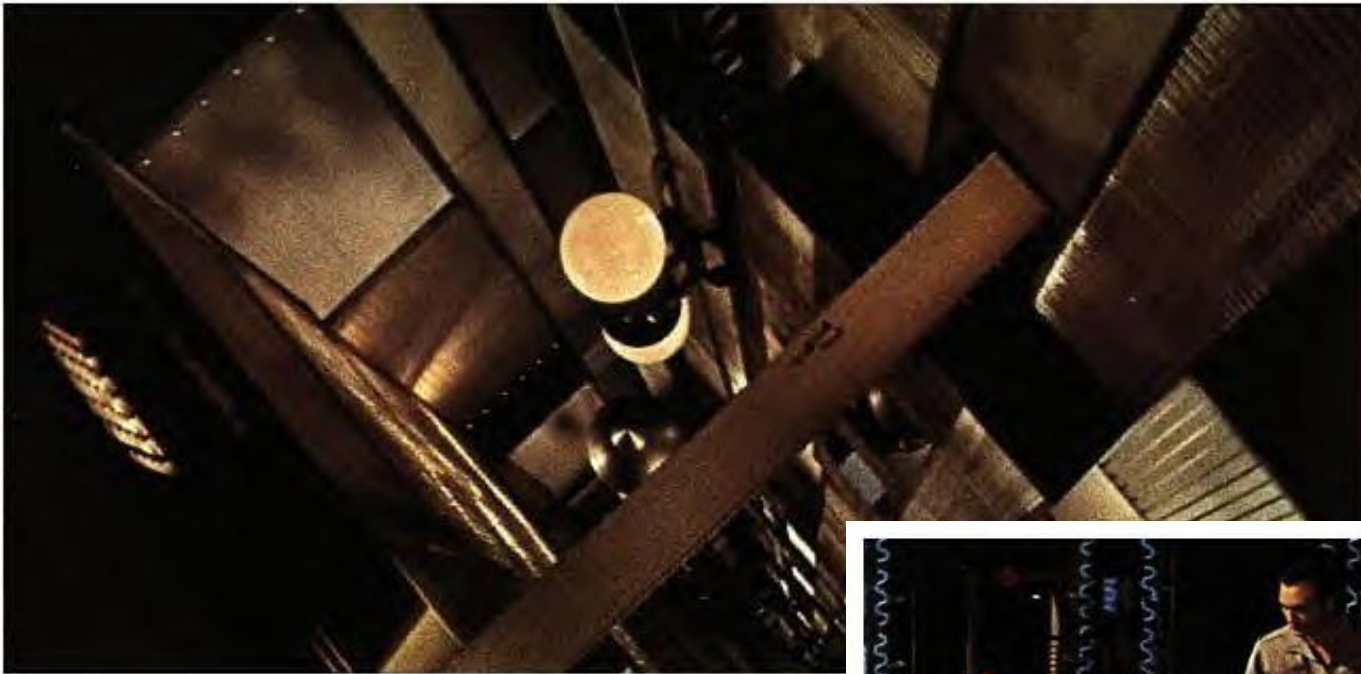
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# Info Bio Nano Cogno Tech Convergence – on the Forbidden Planet



# Info Bio Nano Cogno Tech Convergence – on the Forbidden Planet





# Ultimate failure point – “monsters from the Id”



5/10/2013

# Evolution into the Next Paradigm -

## Computational & Applied Mathematics

On-line version ISSN 1807-0302

Comput. Appl. Math. vol.26 no.3 Petrópolis 2007

<http://dx.doi.org/10.1590/S0101-82052007000300002>

### A note on the Riemann problem for the random transport equation

#### ABSTRACT

We present an explicit expression to the solution of the random Riemann problem for the 1D random linear transport equation. We show that the random solution is a similarity solution and the statistical moments have very simple expressions. Furthermore, we verify that the mean, the variance, and the 3rd central moment agree quite well with Monte Carlo simulations. We point out that our approach could be useful in designing numerical methods for more general random transport problems.

**Mathematical subject classification:** 60H15, 35R60.

$$\begin{aligned}
 \text{Var}[U(x, t)] &= \langle U^2(x, t) \rangle - \langle U(x, t) \rangle^2 \\
 &= \left\{ \langle (U_0^-)^2 \rangle + \theta \left[ \langle (U_0^+)^2 \rangle - \langle (U_0^-)^2 \rangle \right] \right\} - \left\{ \langle U_0^- \rangle + \theta [\langle U_0^+ \rangle - \langle U_0^- \rangle] \right\}^2 \\
 &= \langle (U_0^-)^2 \rangle + \theta \left[ \text{Var}[U_0^+] + \langle U_0^+ \rangle^2 - \text{Var}[U_0^-] - \langle U_0^- \rangle^2 \right] - \langle U_0^- \rangle^2 \\
 &\quad - 2\theta \langle U_0^- \rangle [\langle U_0^+ \rangle - \langle U_0^- \rangle] - \theta^2 \left[ \langle U_0^+ \rangle^2 - 2\langle U_0^- \rangle \langle U_0^+ \rangle + \langle U_0^- \rangle^2 \right] \\
 &= \text{Var}[U_0^-] + \theta \{ \text{Var}[U_0^+] - \text{Var}[U_0^-] \} + \theta \langle U_0^+ \rangle^2 - \theta \langle U_0^- \rangle^2 \\
 &\quad + 2\theta \langle U_0^- \rangle^2 - \theta^2 \langle U_0^+ \rangle^2 - \theta^2 \langle U_0^- \rangle^2 - 2\theta \langle U_0^- \rangle \langle U_0^+ \rangle + 2\theta^2 \langle U_0^- \rangle \langle U_0^+ \rangle \\
 &= \text{Var}[U_0^-] + \theta \{ \text{Var}[U_0^+] - \text{Var}[U_0^-] \} \\
 &\quad + (\theta - \theta^2) \langle U_0^+ \rangle^2 + (\theta - \theta^2) \langle U_0^- \rangle^2 - 2(\theta - \theta^2) \langle U_0^- \rangle \langle U_0^+ \rangle \\
 &= \text{Var}[U_0^-] + \theta \{ \text{Var}[U_0^+] - \text{Var}[U_0^-] \} + \theta(1 - \theta) [\langle U_0^+ \rangle - \langle U_0^- \rangle]^2.
 \end{aligned}$$

Transactions of the  
**Moscow  
Mathematical  
Society**

2008

A Translation of

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МОСКОВСКОГО  
МАТЕМАТИЧЕСКОГО  
ОБЩЕСТВА

TOM 69 2008



American Mathematical Society  
Providence, Rhode Island USA  
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ISSN 0002-9939

Available electronically at  
[www.ams.org/proc/](http://www.ams.org/proc/)

“Pure” randomness tends to be a very fragile domain, with structured order perpetually attempting to emerge therein



# The GCP Network





# **Nonlocal Consciousness And Global Correlations**

## ***The Reach of Mind***

**Invited presentation for the  
International Remote Viewing Association  
10<sup>th</sup> Anniversary Conference  
Las Vegas, NV, June 21 2009**

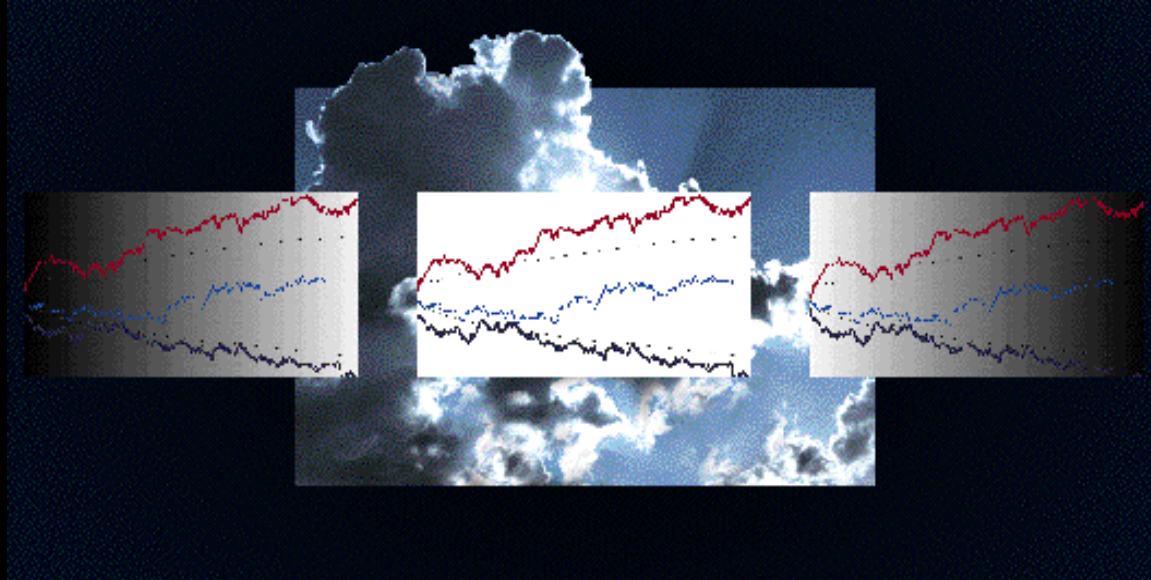
***Roger Nelson***

**Director, Global Consciousness Project  
<http://noosphere.princeton.edu>**

# Background: PEAR

## *Princeton Engineering Anomalies Research*

Nearly three decades of supported research  
Tapping the resources of a great university



**Roger Nelson**

Coordinated research at PEAR from 1980-2002  
Founded the Global Consciousness Project in 1997

**A major focus at PEAR was on  
Mind-Machine Interaction (MMI)  
In which we asked ordinary people  
To change the behavior of machines**

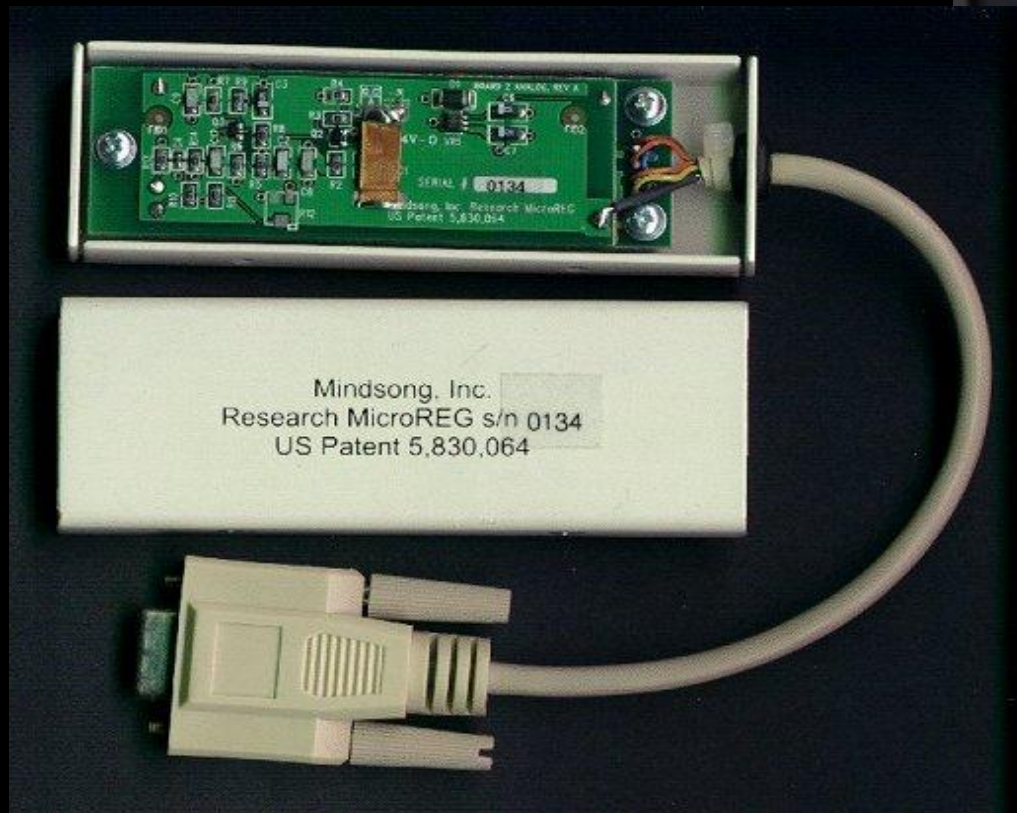


**We found  
Significant  
Effects**



# Physical Random Event Generators REG or RNG -- Miniaturized for field use

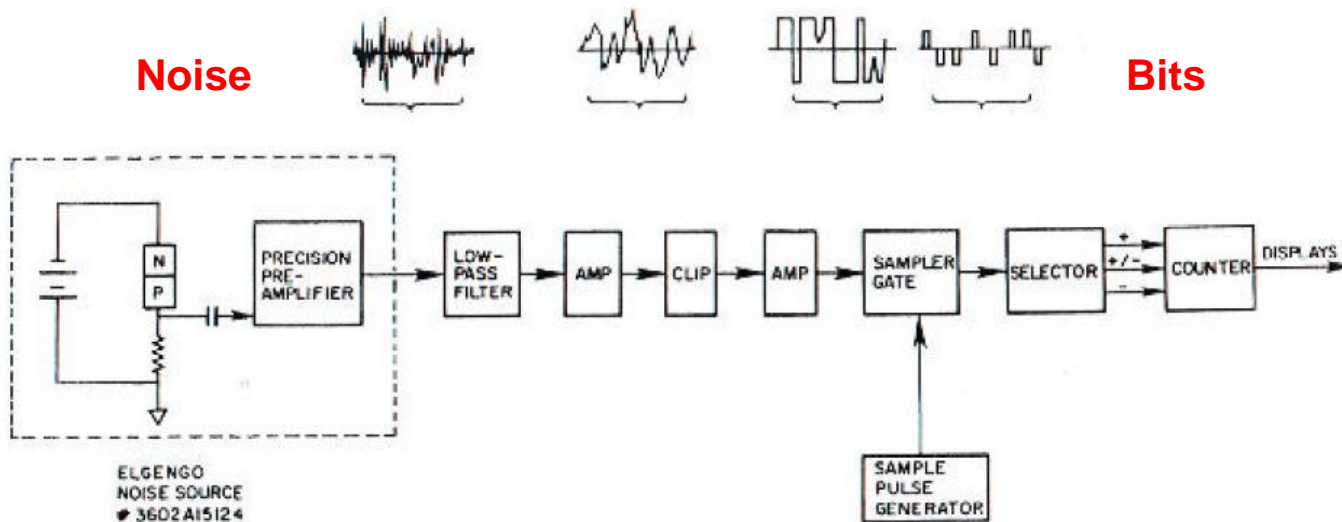
## Mindsong REG



## Orion RNG

# Basics of a Physical REG

Quantum electronic noise, e.g. diode  
Voltage samples, electron tunneling  
Convert high and low to 1 and 0  
Count these 'bits' vs 50/50 probability



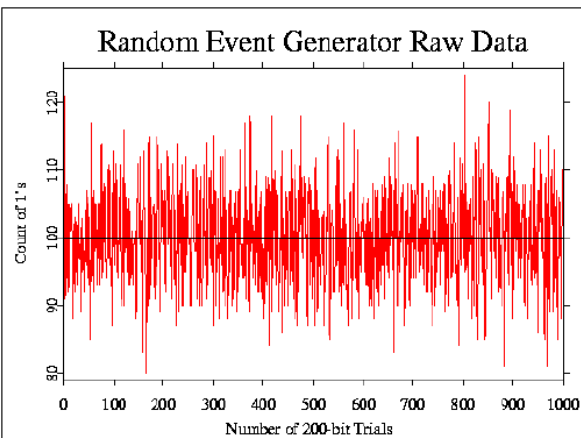
FUNCTIONAL DIAGRAM OF REG



# How It Works: Here's 1000 Trials From A Physical Random Source

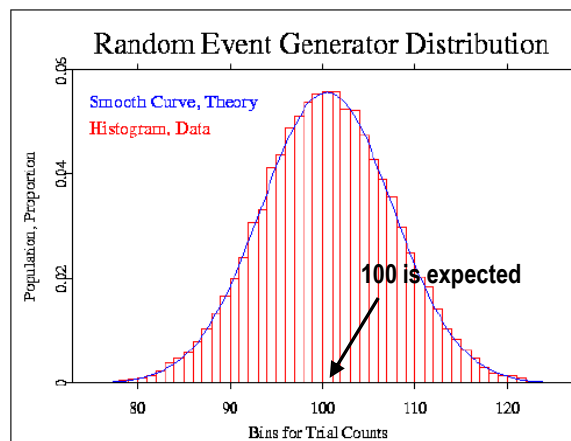
## Each Trial Is the Sum of 200 Bits

Trial Scores:  $100 \pm 7.701$   
Plotted as a Sequence

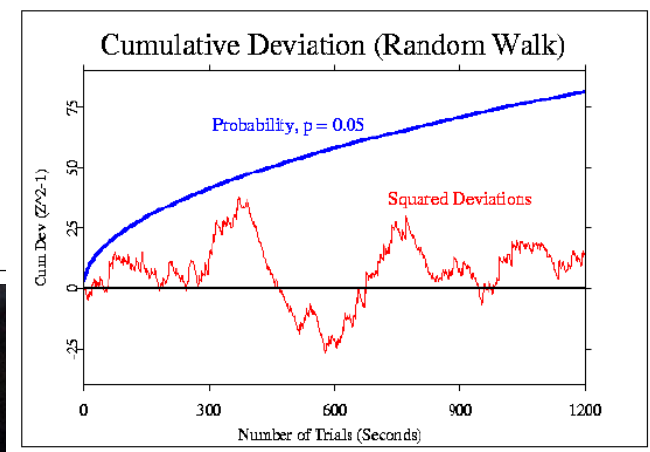


Like flipping 200 coins and counting the heads

Binomial Distribution of Data  
Compared to Theoretical Normal



Display data history with  
Cum Dev from Expectation  
Random ("Drunkard's") Walk





Starting 1993, continuous data recording and  
Miniaturization facilitated moving out of the laboratory

## Field REG Experiments

Take REG technology into the Field  
Look for evidence of a Consciousness Field  
Situations with **Resonance or Coherence**  
Concerts, Cathedrals, Rituals, Sacred  
Spaces, ...  
  
Comparison with **Mundane situations**  
Shopping center, train station, busy street  
corner

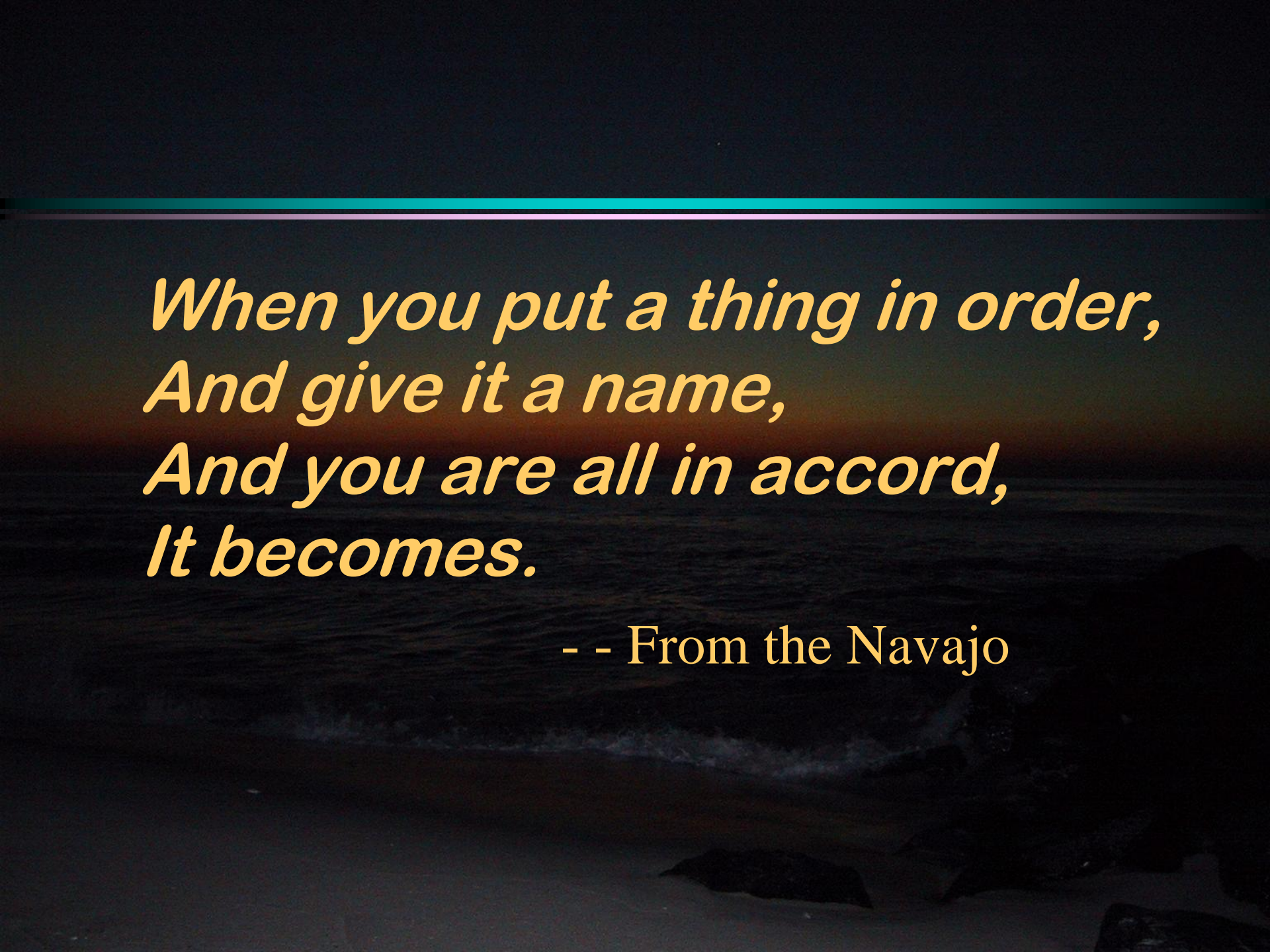


We were ready to ask a new question:

---

Could a world-spanning network of such  
Random devices capture evidence of an  
Emerging Global Consciousness?



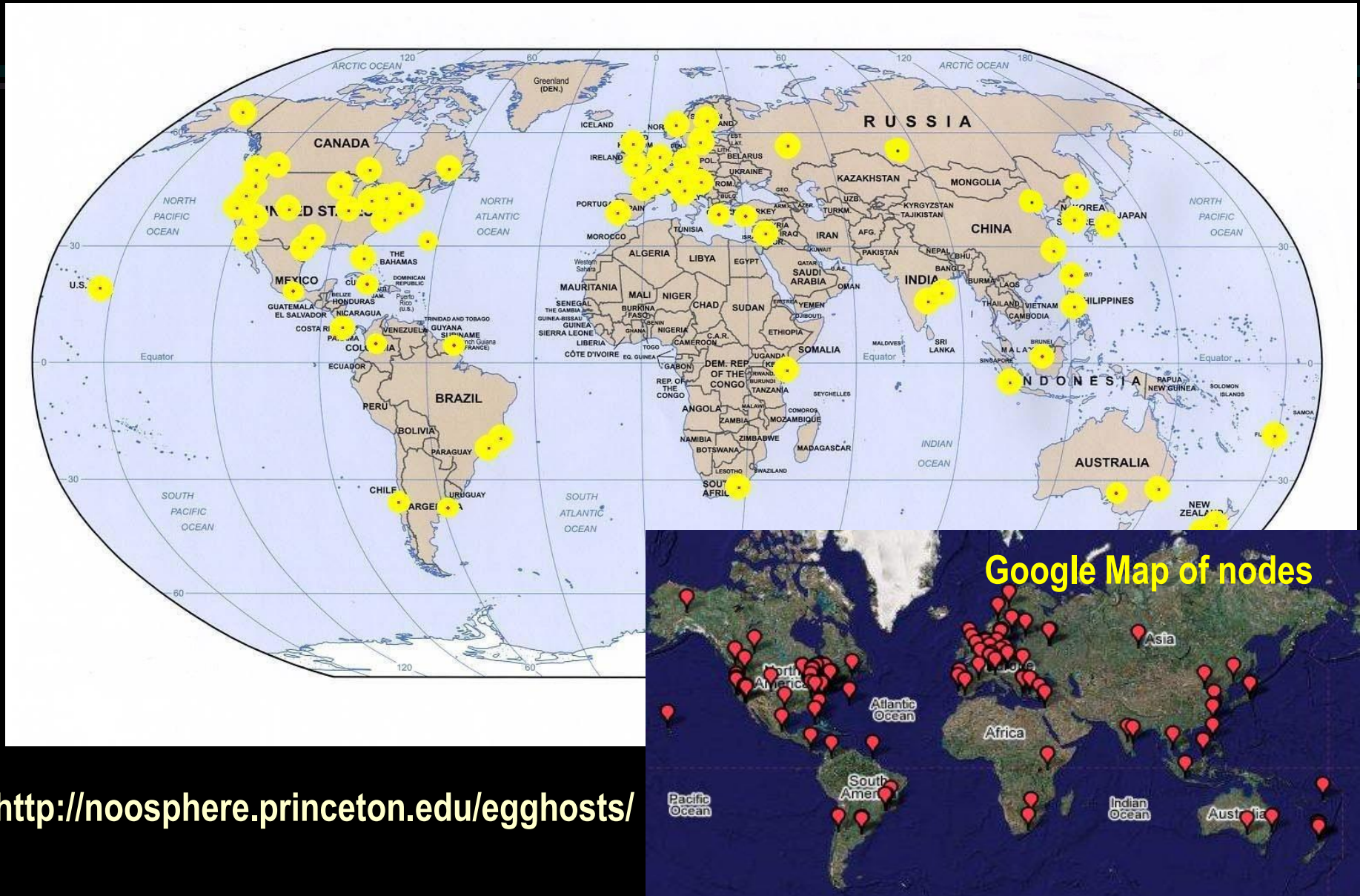


*When you put a thing in order,  
And give it a name,  
And you are all in accord,  
It becomes.*

- - From the Navajo



# A world-spanning network of REGs (EGGs)





# Global Consciousness Project (aka the EGG Project)

---

**The people:** International collaboration, 100+ people  
Network of over 65 host sites world wide

**The tools:** REG technology, Field application  
A world EEG – an *ElectroGaiaGram* or *EGG*

**The method:** Identify deeply engaging global events,  
predict correlated deviations in network data

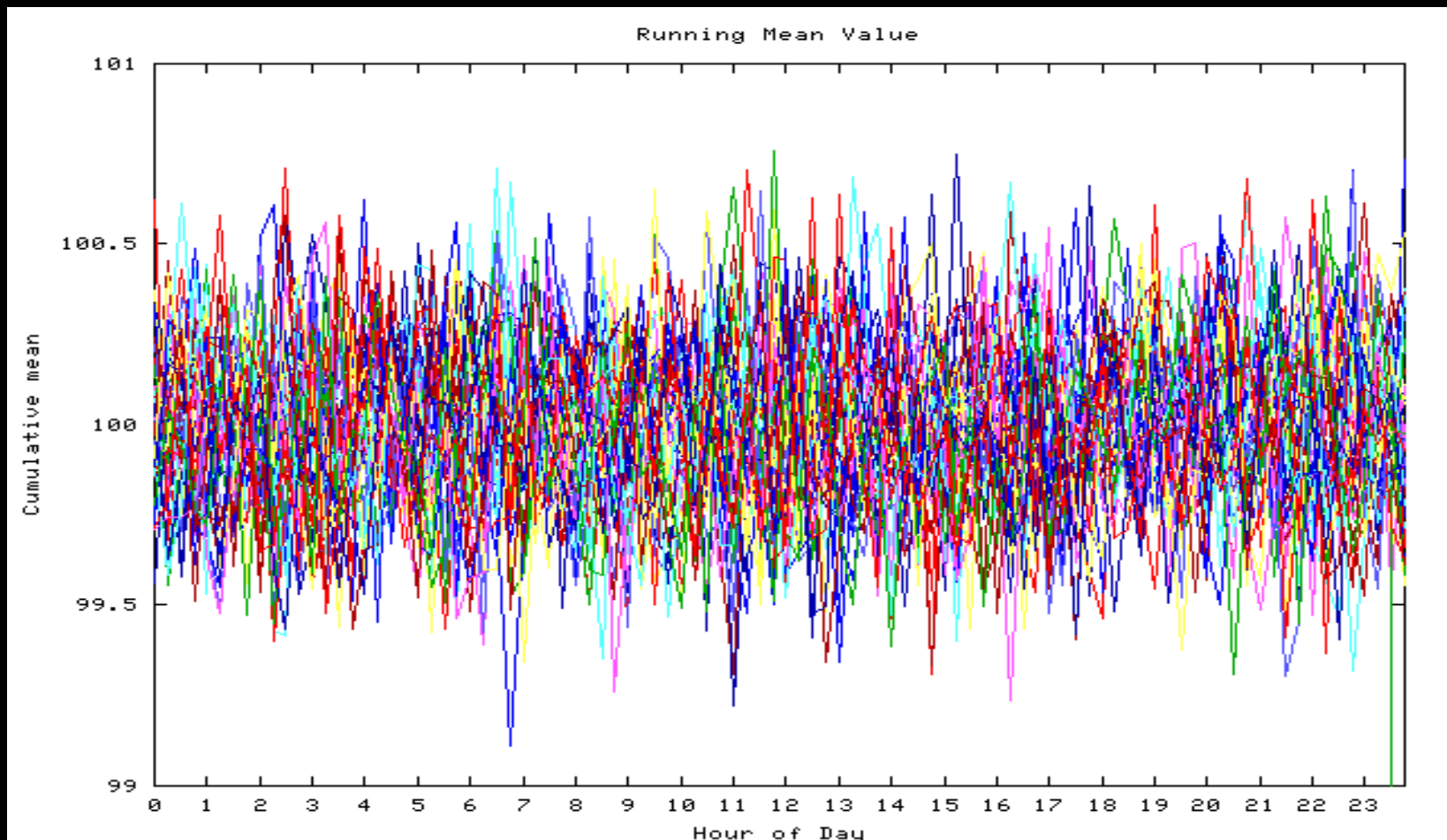
**The question:** Can we capture a glimmering of  
Global Consciousness?



# Internet transfer of data to Princeton

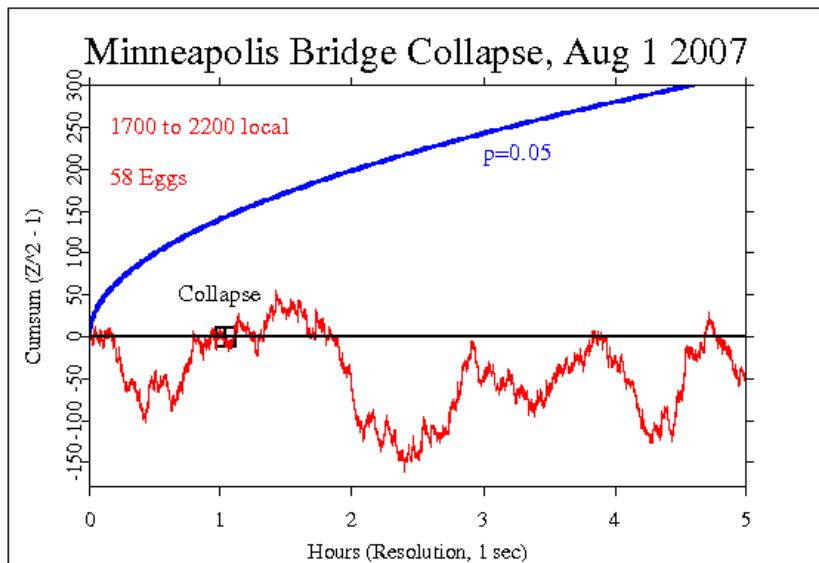
## Combined data for a whole day

### From all eggs – It looks random

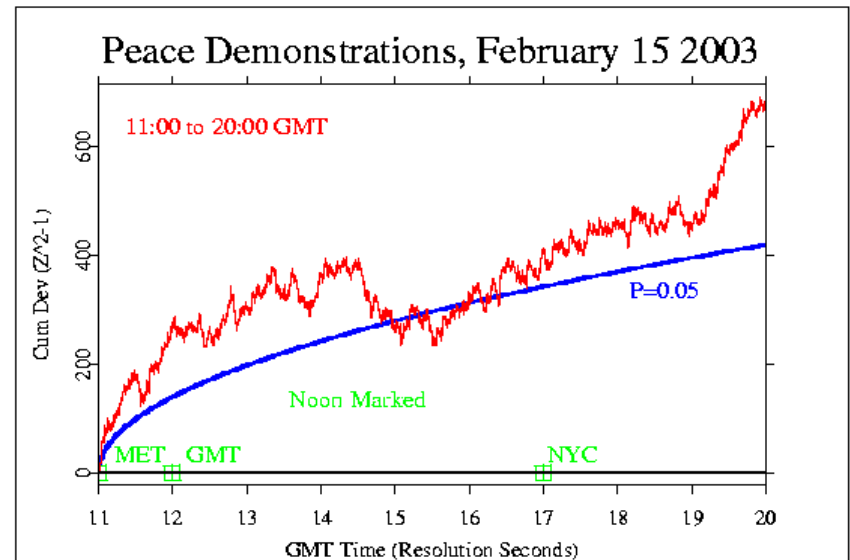


# Squared average Z-score across Eggs Network Variance (Chisquare distributed) Cumulative deviation should be a random walk

Many events show only  
The expected level trend



But ~ 70% show departures  
From expectation apparently  
Correlated with consciousness



15 to 20% significant at 5% level  
(we use a one-tailed prediction)

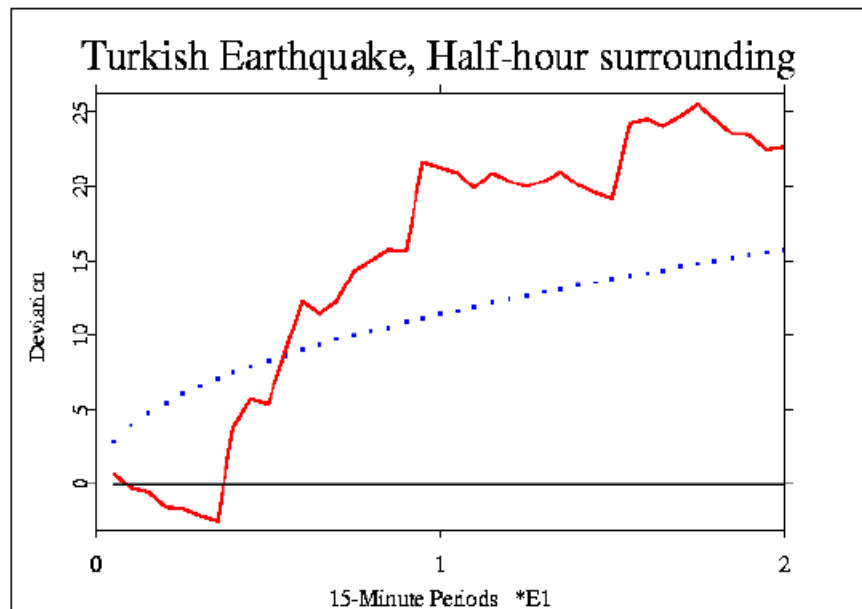


# Continuous random sequences since 1998

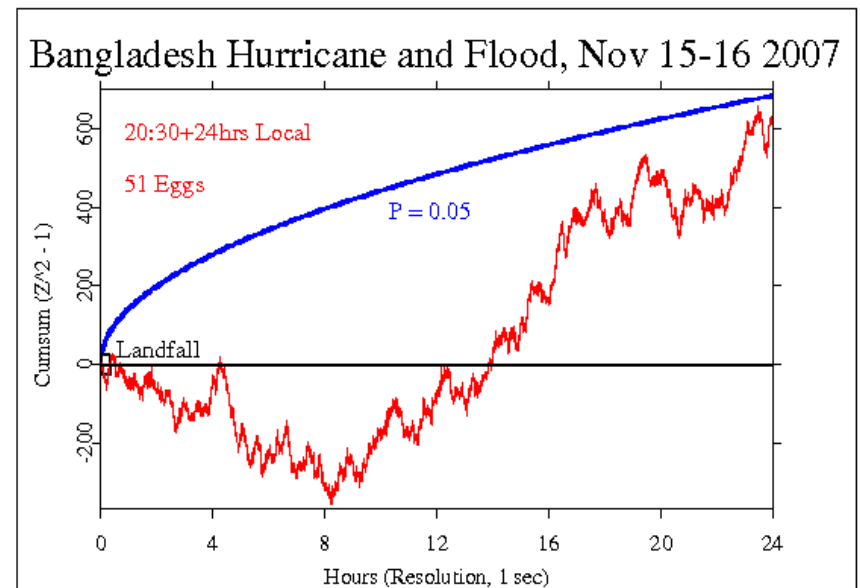
## History of data that we can compare with a

## History of Global Events, e.g. Natural Disasters

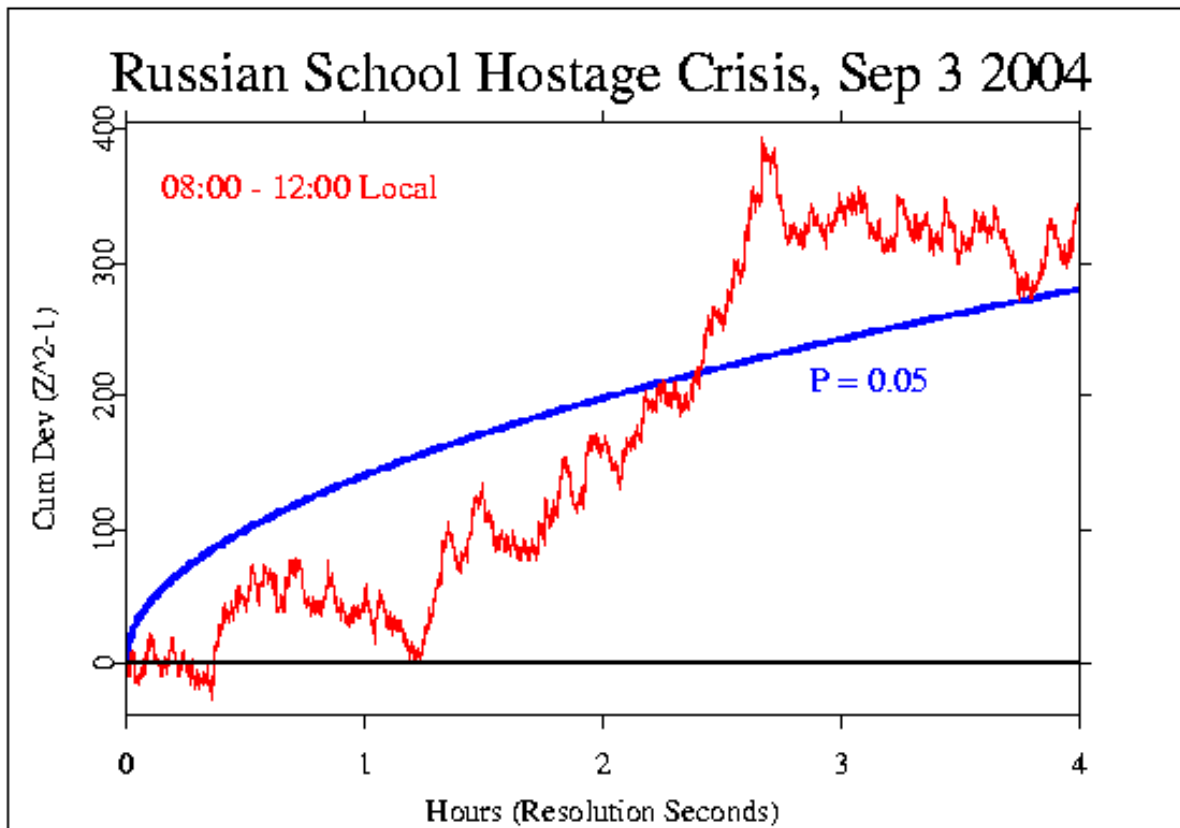
### Earthquake Aug 17 1999 Near Istanbul, Turkey



### Hurricane and Flooding Nov 2007, Bangladesh



# Human Tragedies: World attention riveted Ossetia hostage crisis, hundreds at risk Does the EGG network respond?



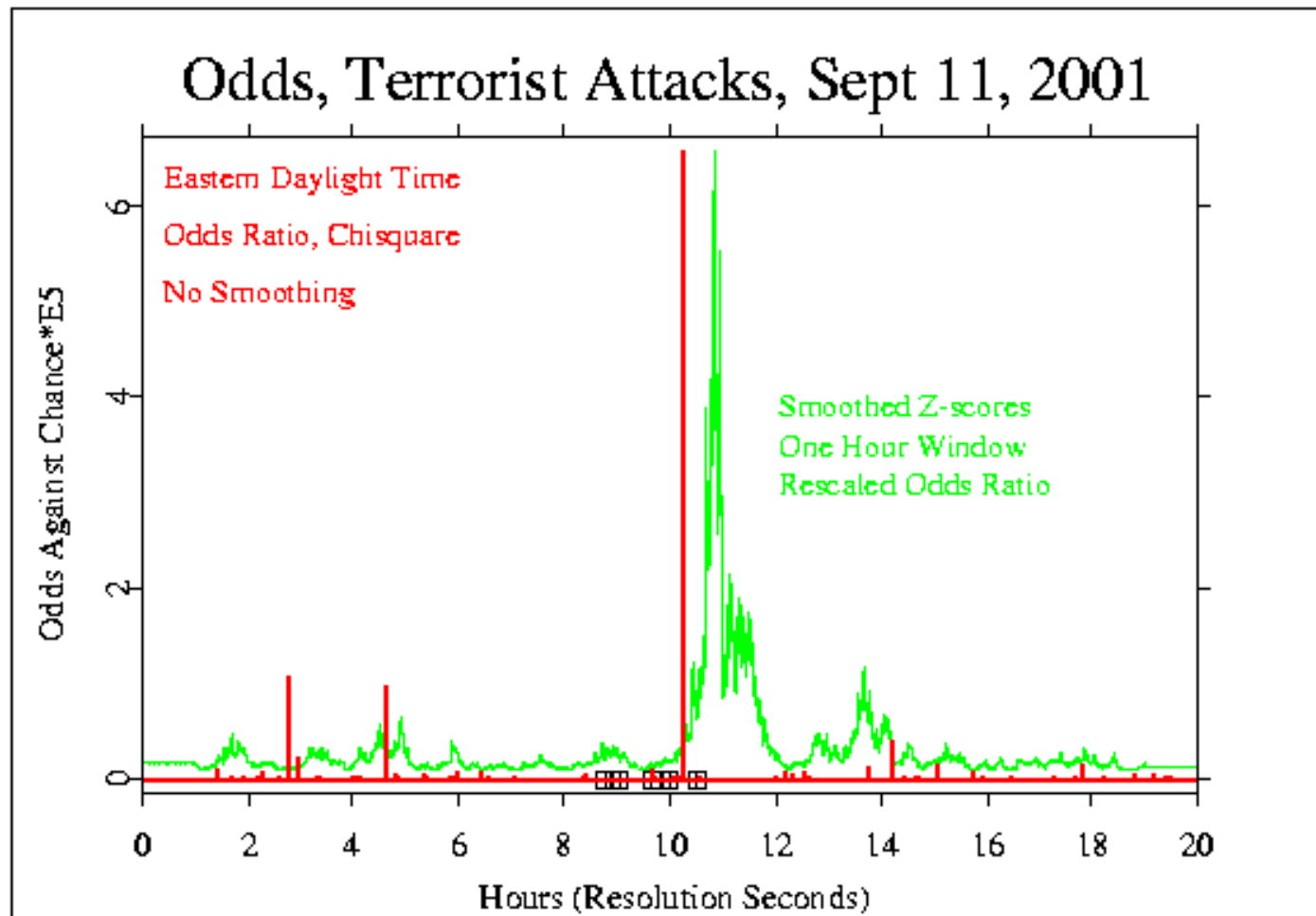


**Human caused  
Disasters yield  
Strong effects**

**The World  
Trade Center  
September 11  
2001**



# Additional Example Event data



# 911 EGG data map





# Additional Example Event data

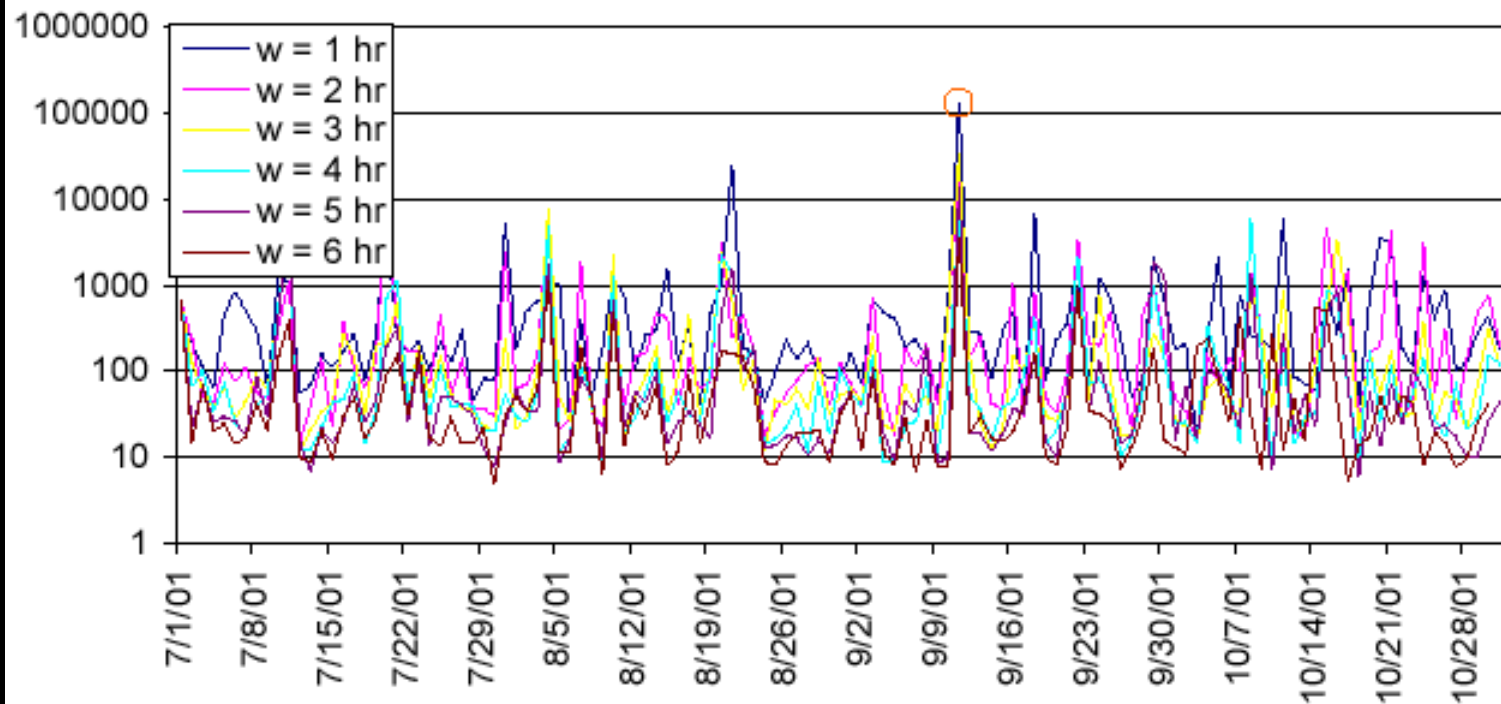
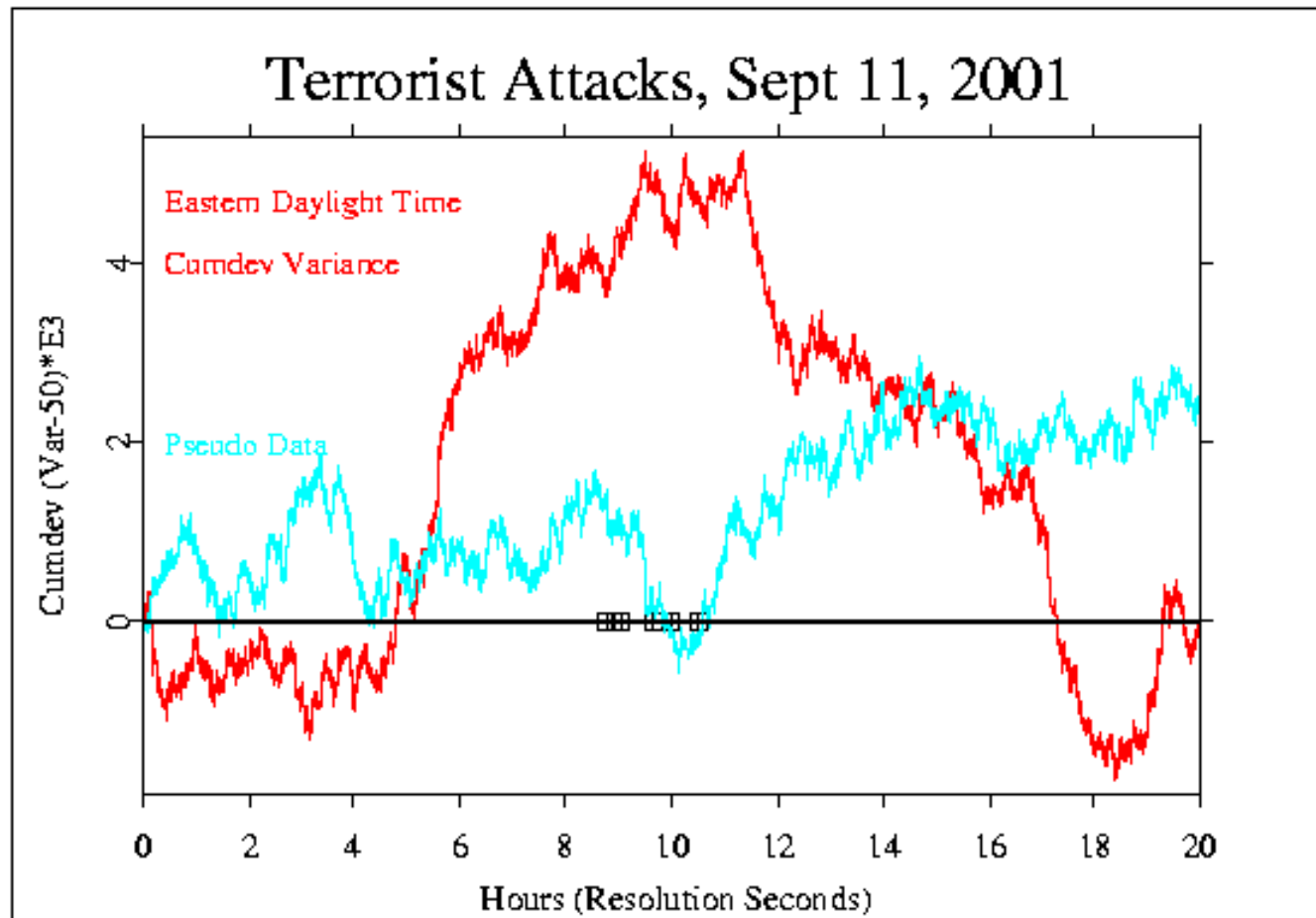
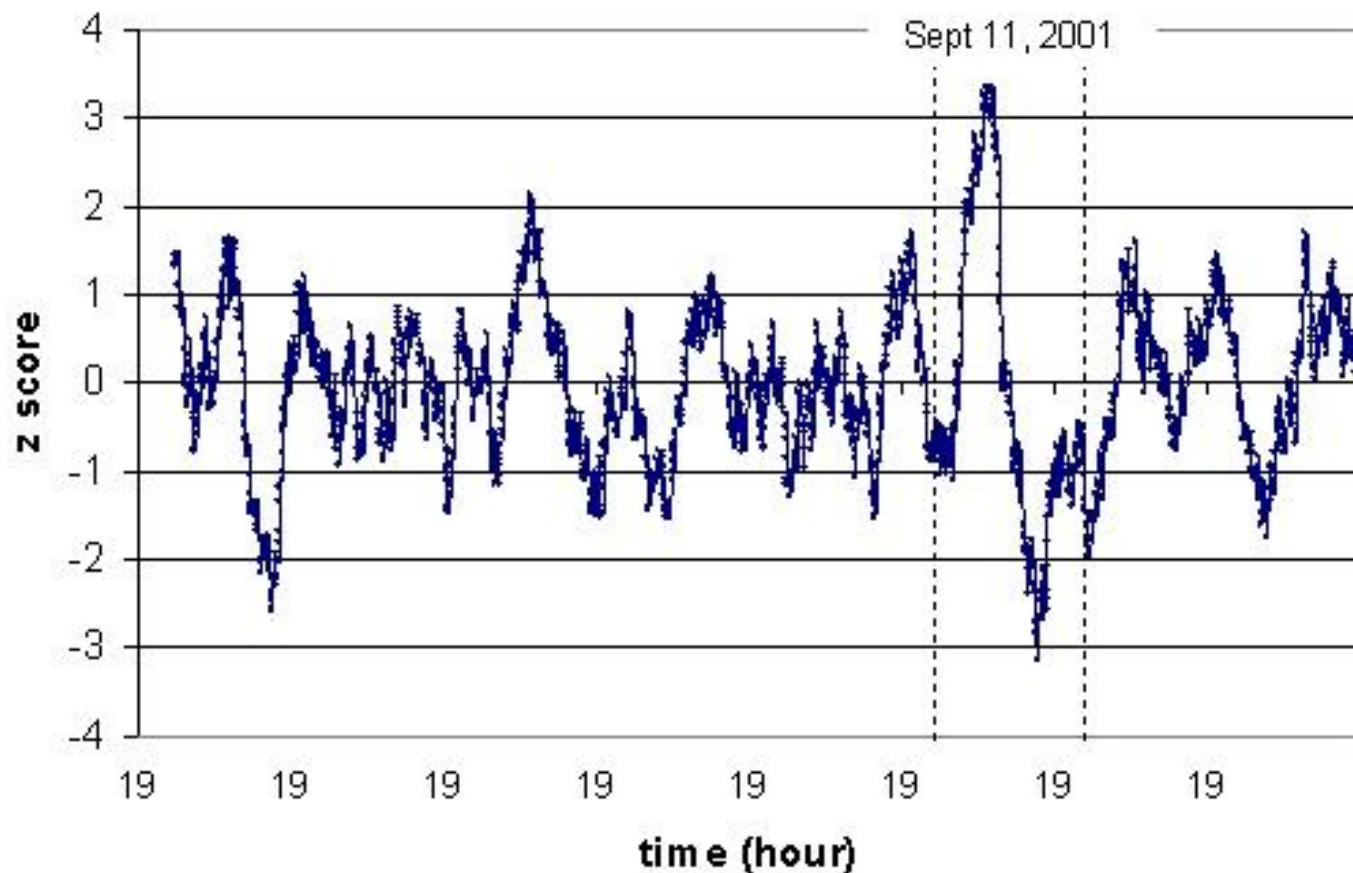


Figure 2. Odds of max daily  $\chi^2$ , Jul-Oct 2001

# Additional Example Event data



# Additional Example Event data



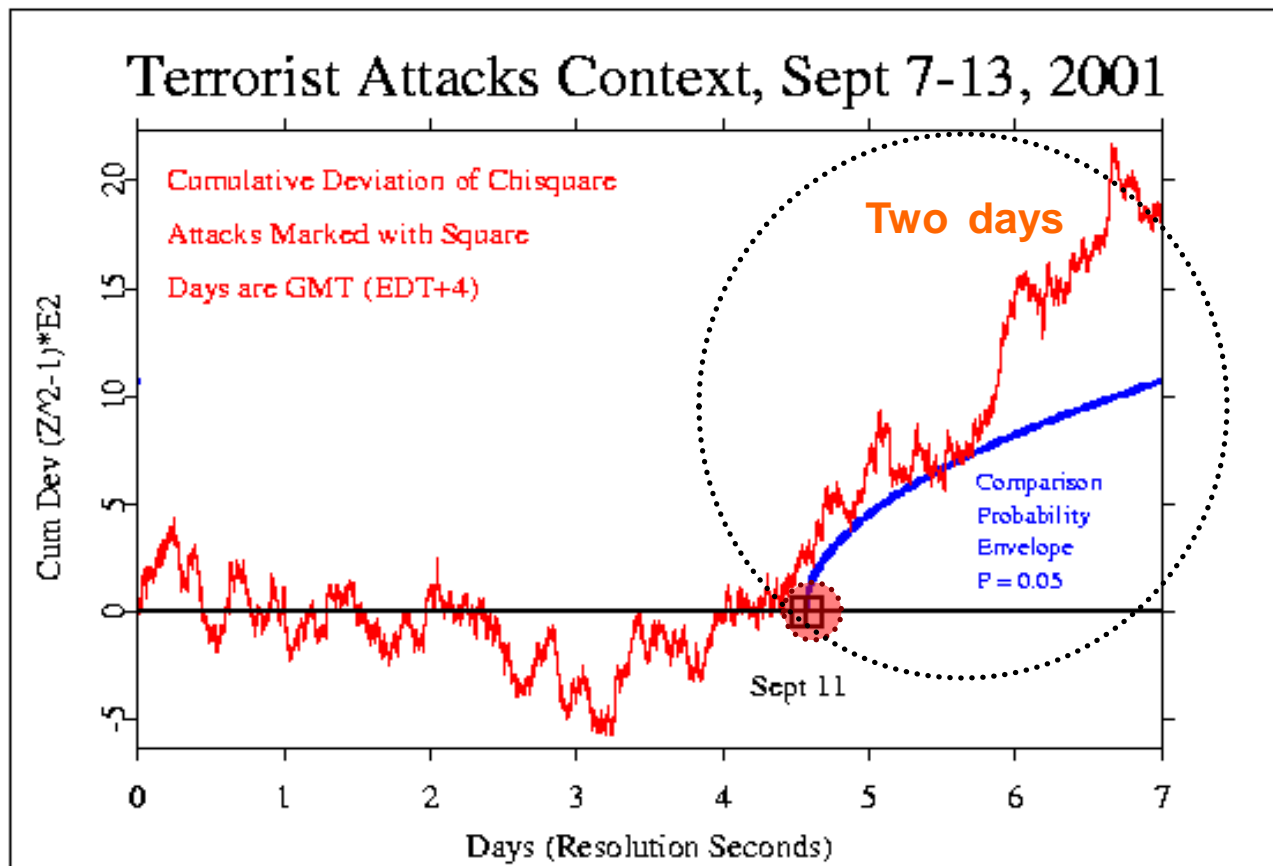


The graph displays the odds of a specific event occurring over time. The y-axis, labeled 'odds', ranges from 0 to 1600 in increments of 200. The x-axis, labeled 'time (hour)', shows a timeline with several '0' markers. A major peak in odds occurs around 12:00 on Sept 11, 2001, reaching a value of approximately 1350. There are also smaller peaks around 06:00 and 18:00. Vertical dashed lines indicate the time of the event.

# September 11 2001

## Destruction of the World Trade Towers

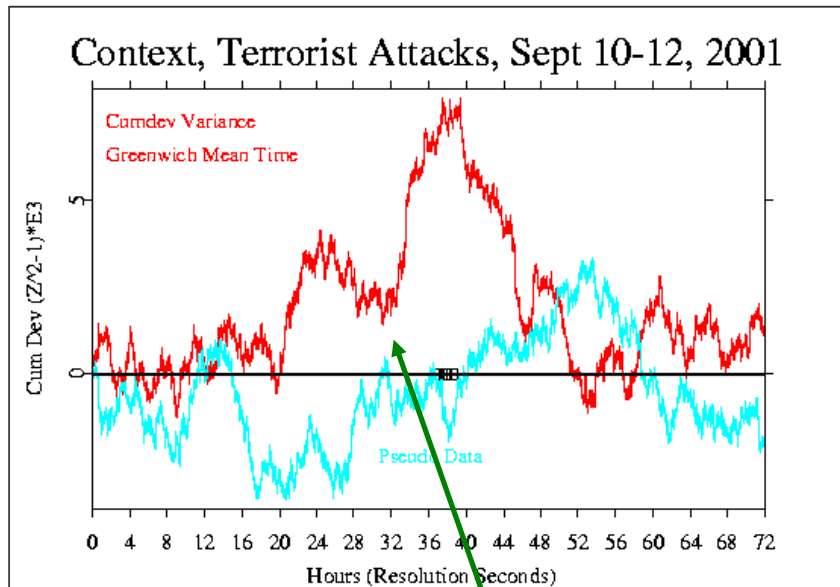
### Increased network variance (Netvar) for 50 hours



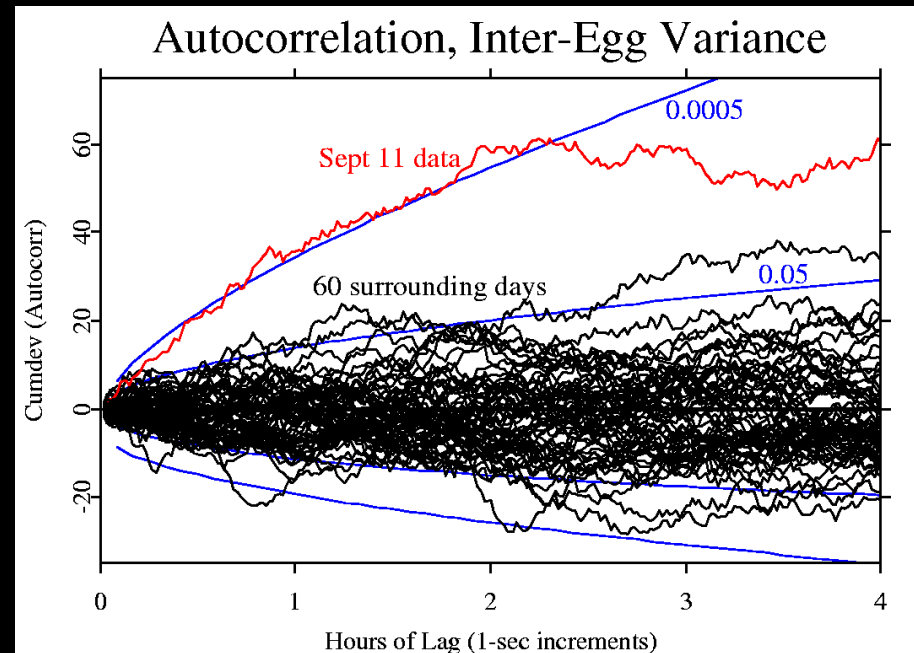
# Further assessment of data around 9/11

## Learn about the context and broader effects

### Device Variance Spikes, Autocorrelation is Huge



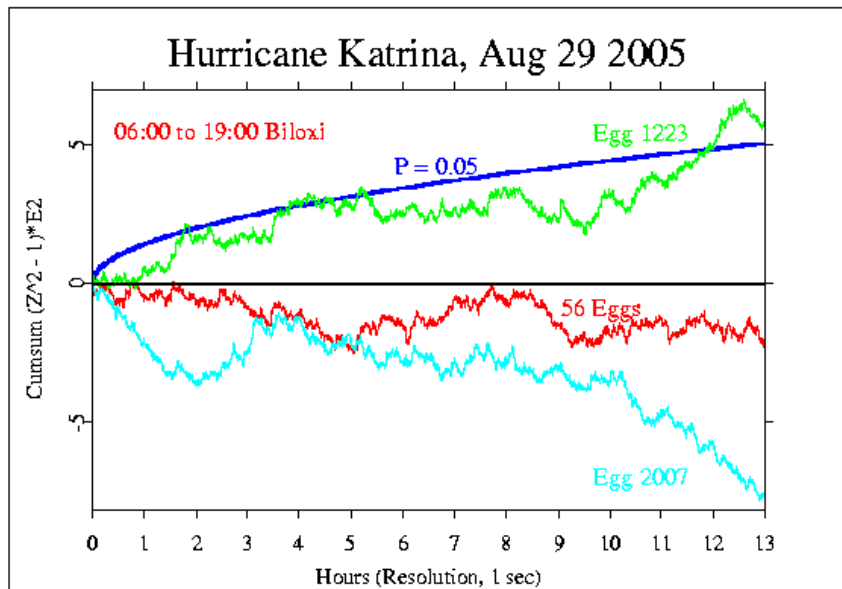
Notice the timing: Shift begins at 4:30 am ET



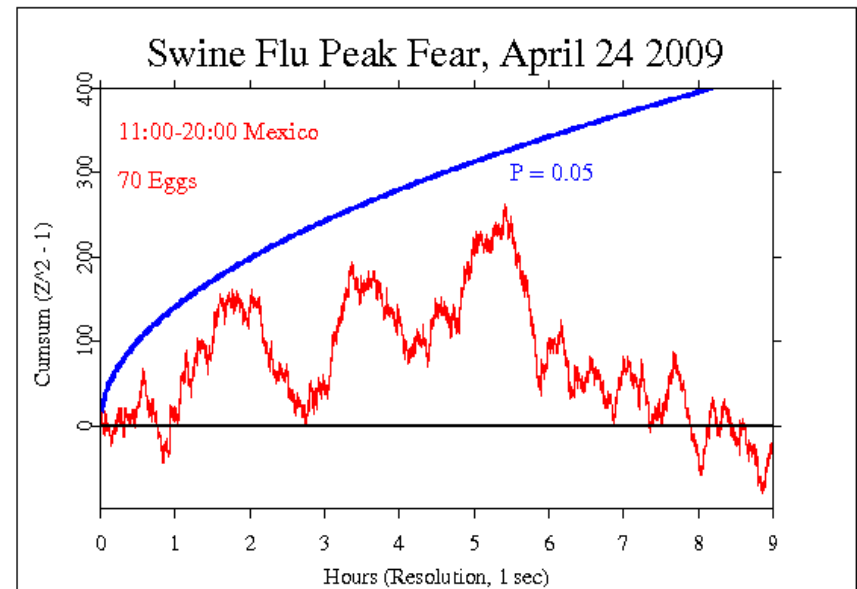


# But big events don't always show predicted effect

## Hurricane Katrina



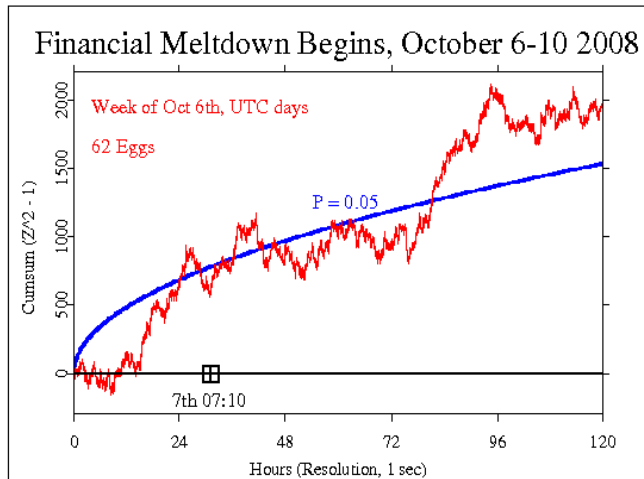
## Swine Flu Pandemic



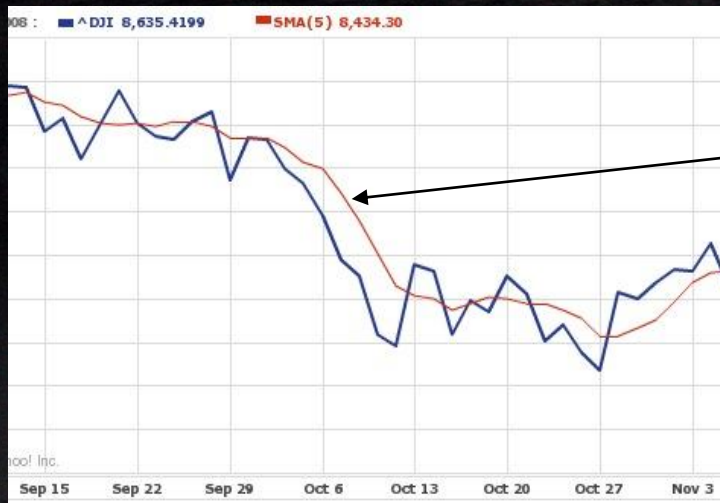
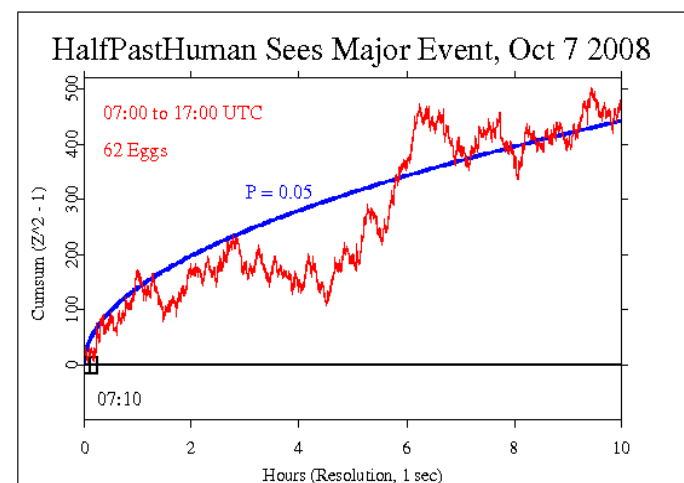
Our signal to noise ratio is low, so real effects may be buried, or noise may masquerade as signal.  
Solution? Many replications of the hypothesis test.

# Dick Allgire's talk inspires me to show another slide: “Remote Viewing” of Half Past Human analysis of Oct 7

William Treurniet's  
analysis of market fall



Clif's half past human  
prediction of Oct 7, 7:10



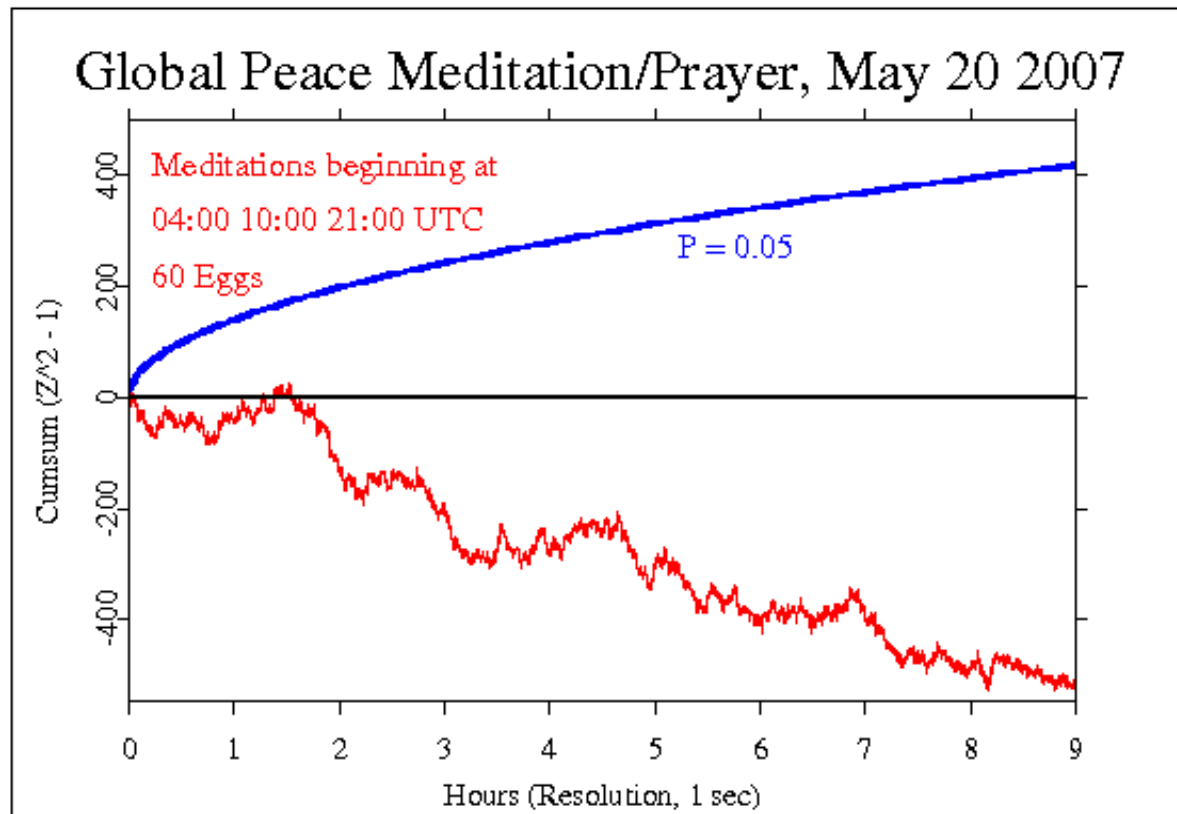
The straight red segment  
in the middle is Oct 6-10

# The network also responds to positive events

## Synchronized meditation

### Half a million people around the world

### Significant reduction of network variance

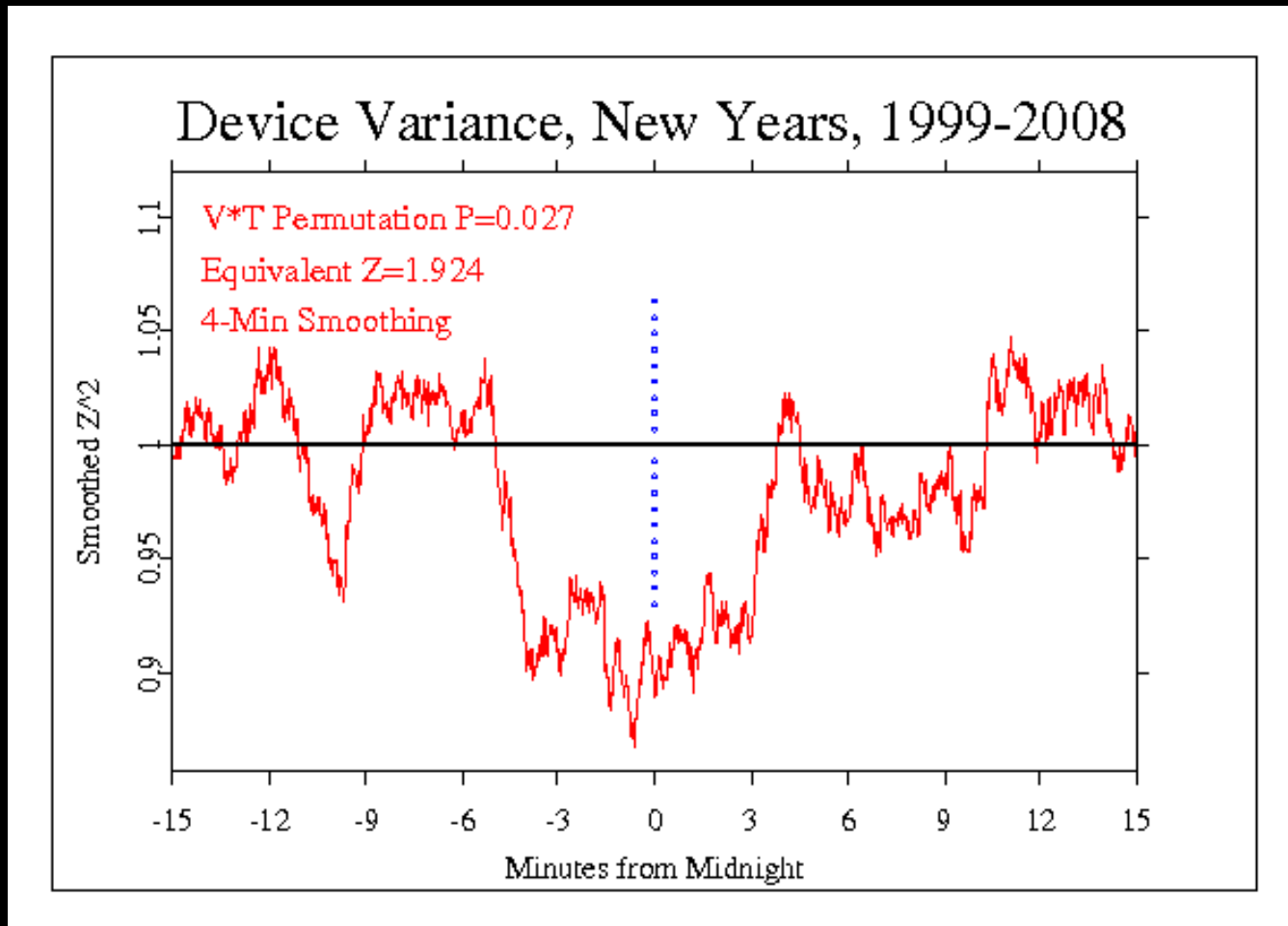


Note that  
this trend is  
opposite to  
prediction.  
It subtracts  
from our  
composite  
bottom line.

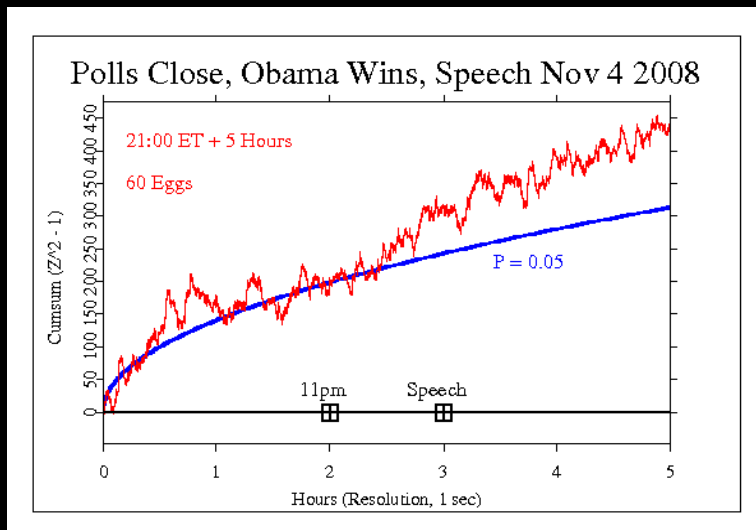
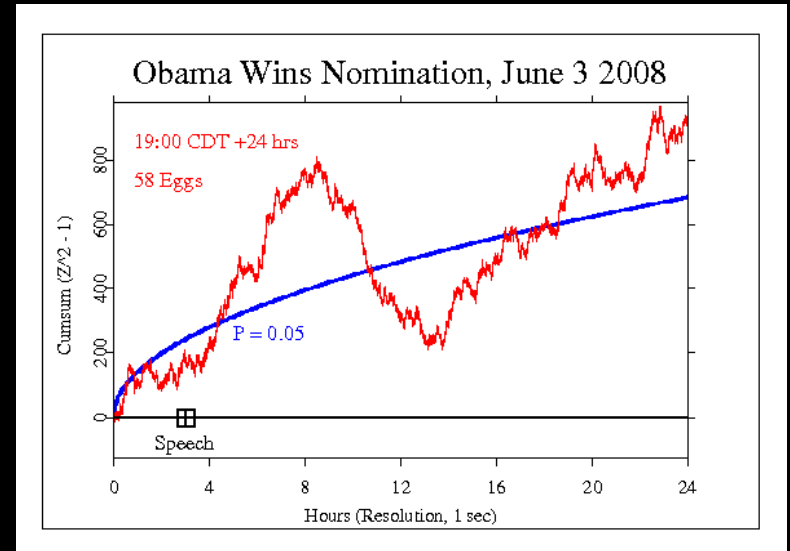


# Celebration: New Years Eve 1999-2008 (10 years, 37 time zones)

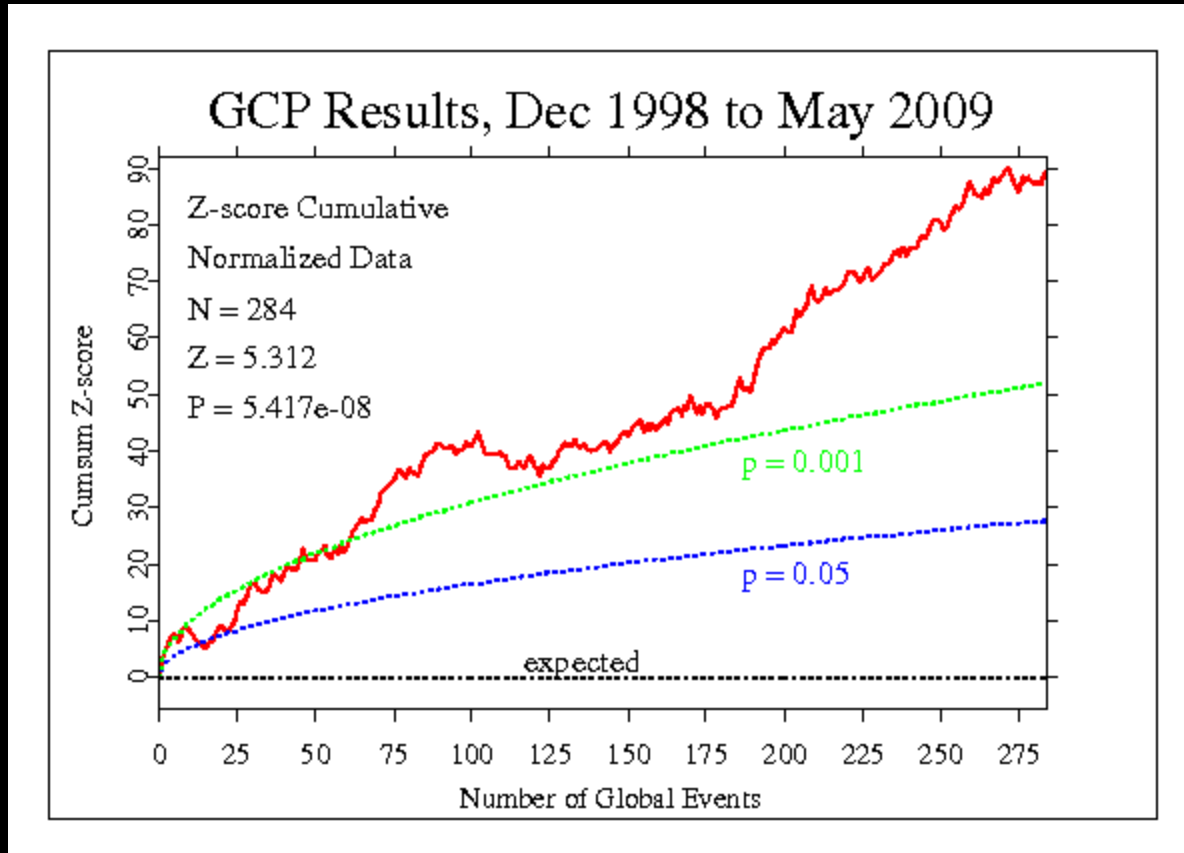
## Signal averaged device variance decreases



# Elections 2008, Barack Obama



**Concatenate 10 years of formal replications**  
**284 rigorously defined global events**  
**Chance odds: 10 million to 1**

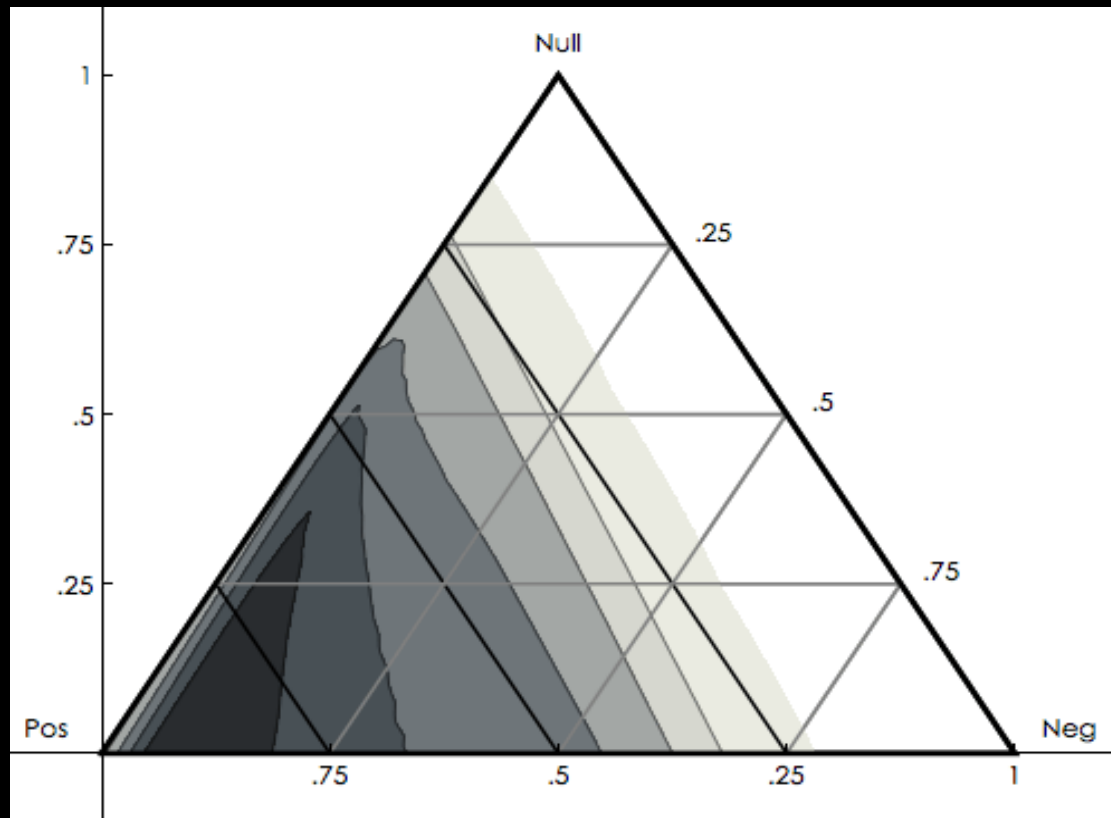


**But it is a small effect: The average Z-score is about 0.35**



## Deeper analysis

**Proportions in three-way model of effects**  
**Positive = 67%, Negative = 17%, Null = 15%**

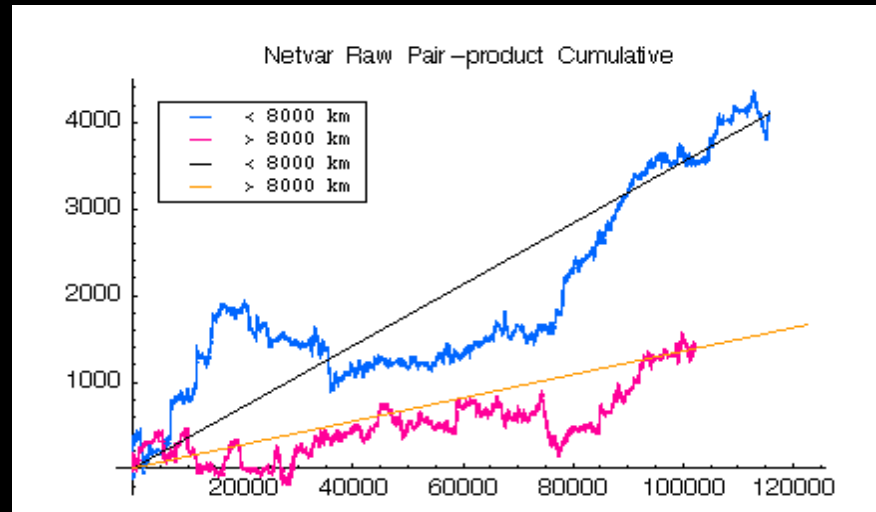


**Average positive Z-score based on the model is about 0.59**

# Deeper analysis: Distance structure

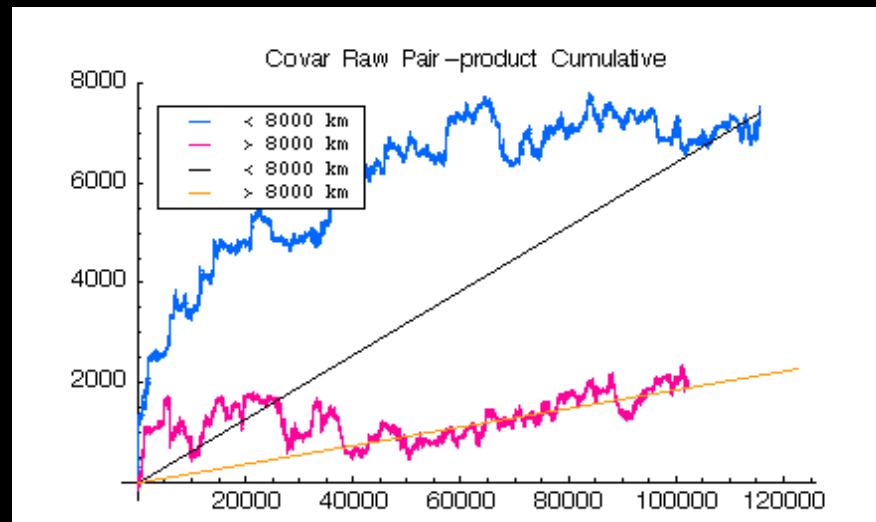
## Closer pairs = Stronger correlations

S1:  $z_i z_j$



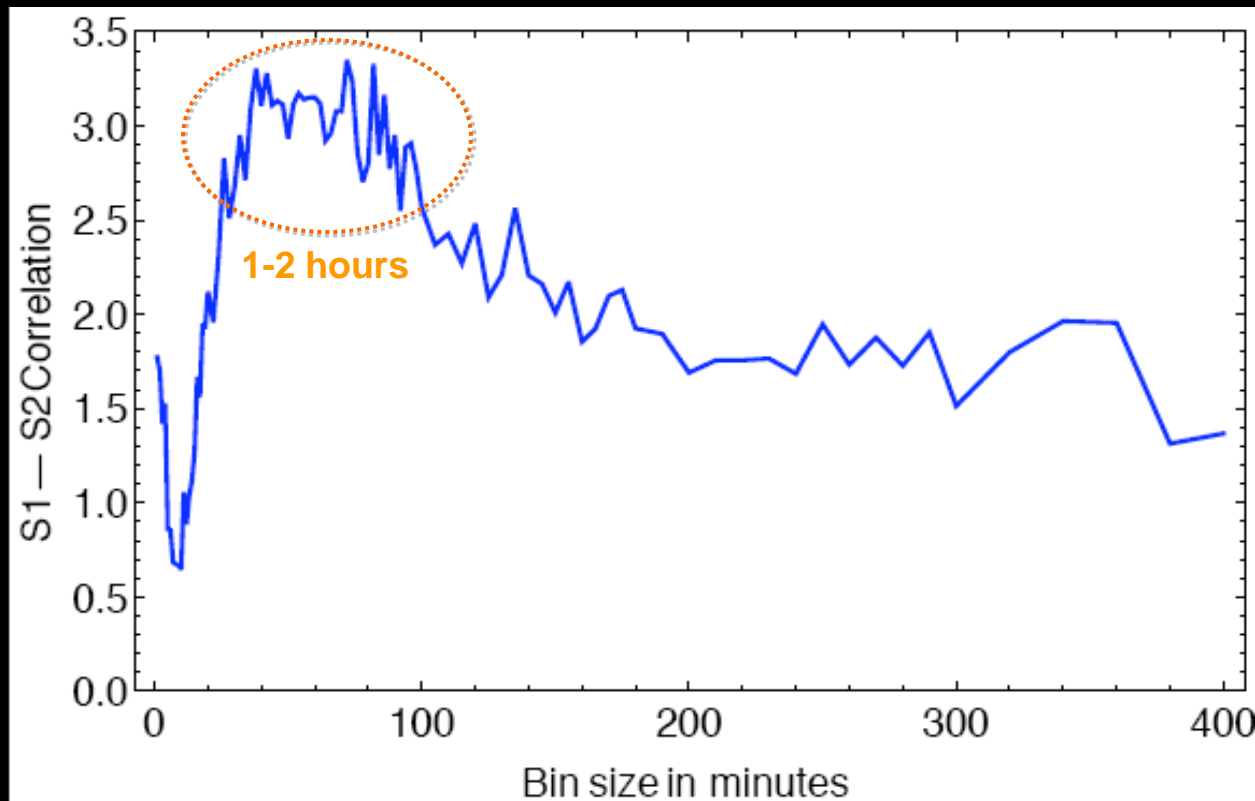
Independent  
2<sup>nd</sup> measure

S2:  $z_i^2 z_j^2$



## Deeper analysis: Time structure

**Correlation of two independent measures**  
**Z-scores maximal for events ~ 1-2 hours**



**A “moment” in global consciousness space?**



# Deeper analysis yields convergent evidence: Structure in data where there should be none

## Five independent measures and correlations

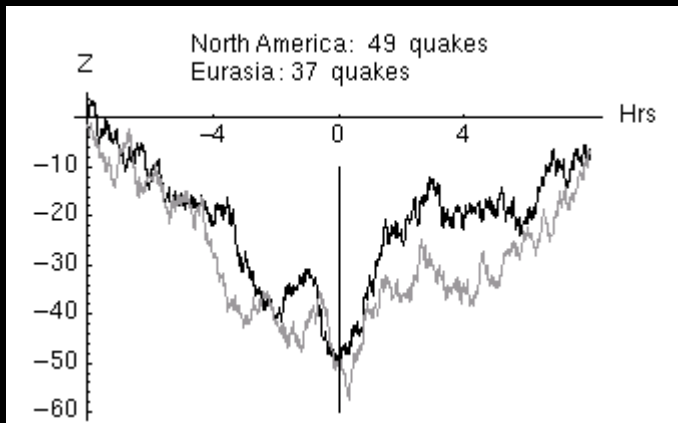
Structure	Sigma	P-value
1. Netvar (phase 1, obsrv eff ?)	3.67	0.0001
2. Covar (phase 2)	2.45	0.007
3. Distance – NV (phase 2)	1.49	0.07
4. Distance – CV (phase 2)	2.48	0.006
5. Correlation – NV&CV (ph 2)	1.95	0.02
<b>Combined Results Phase 2</b>	<b>3.90</b>	<b>0.00005</b>
<b>Combined Results Phases 1&amp;2</b>	<b>5.35</b>	<b><math>5 \times 10^{-8}</math></b>

Calculations by Peter Bancel; Uses reduced dataset amenable to all analyses

Applications?

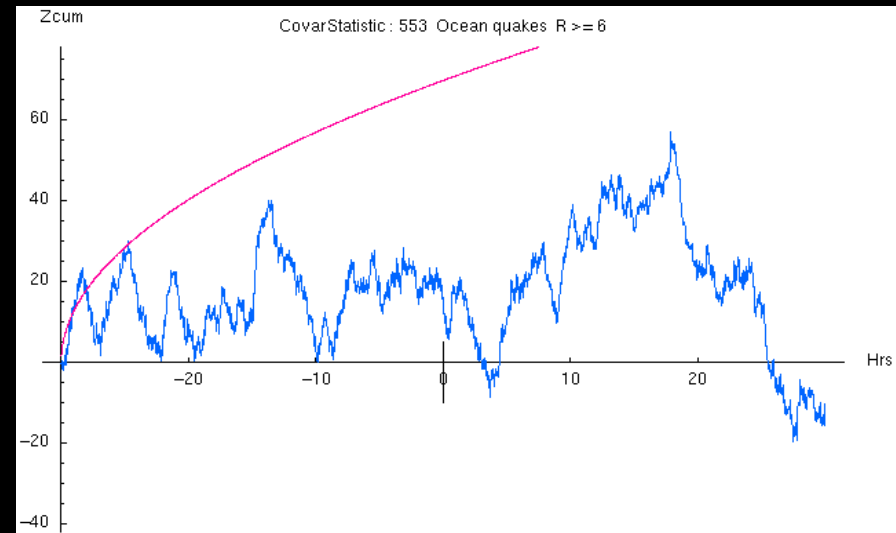
# All Earthquakes, Richter 6 or More Cumulative Deviation of Covariance

Quakes on Land +/- 30 hours



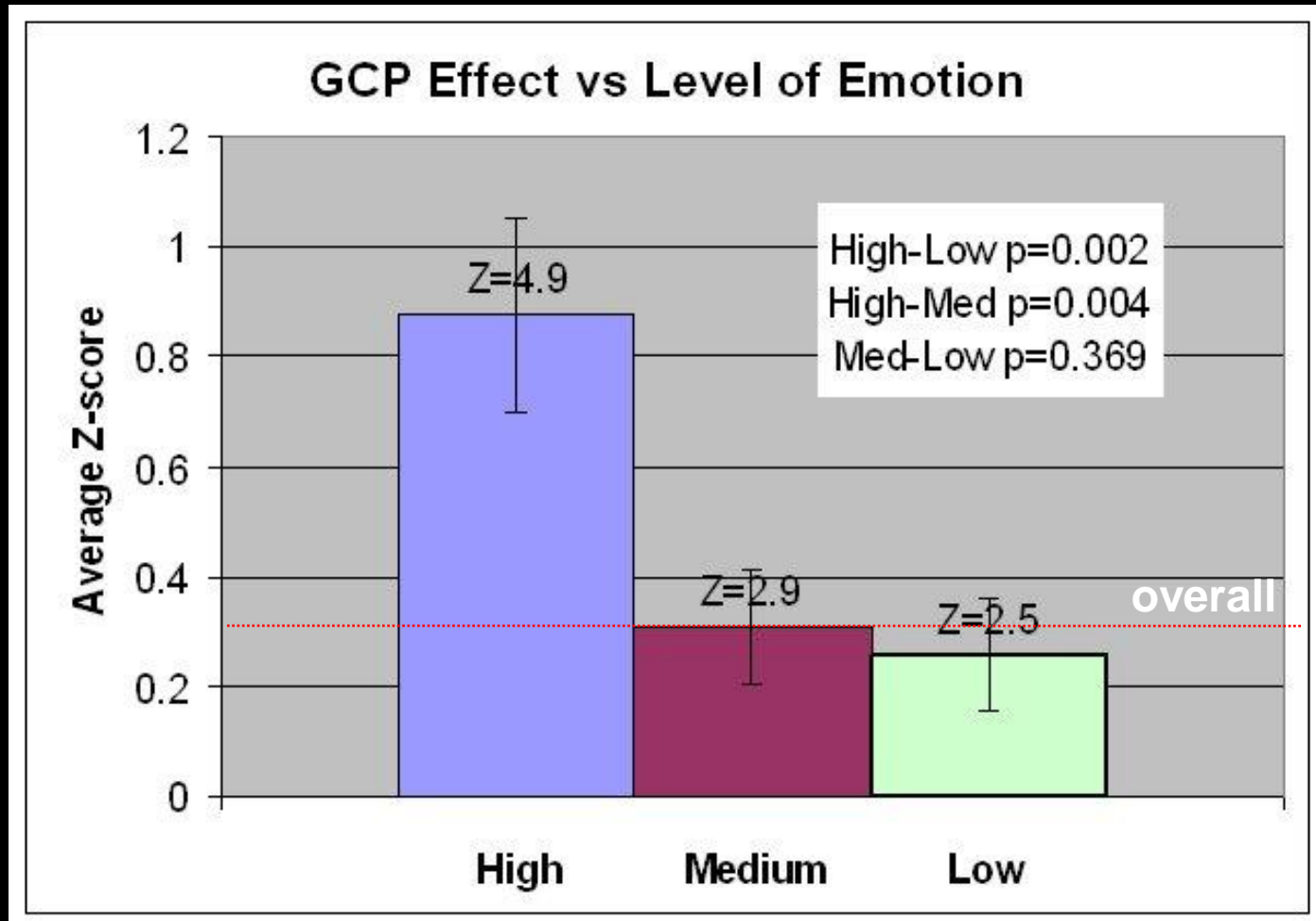
Consciousness implied  
Premonition suggested

Controls (no humans affected)  
Ocean Quakes +/- 30 hours



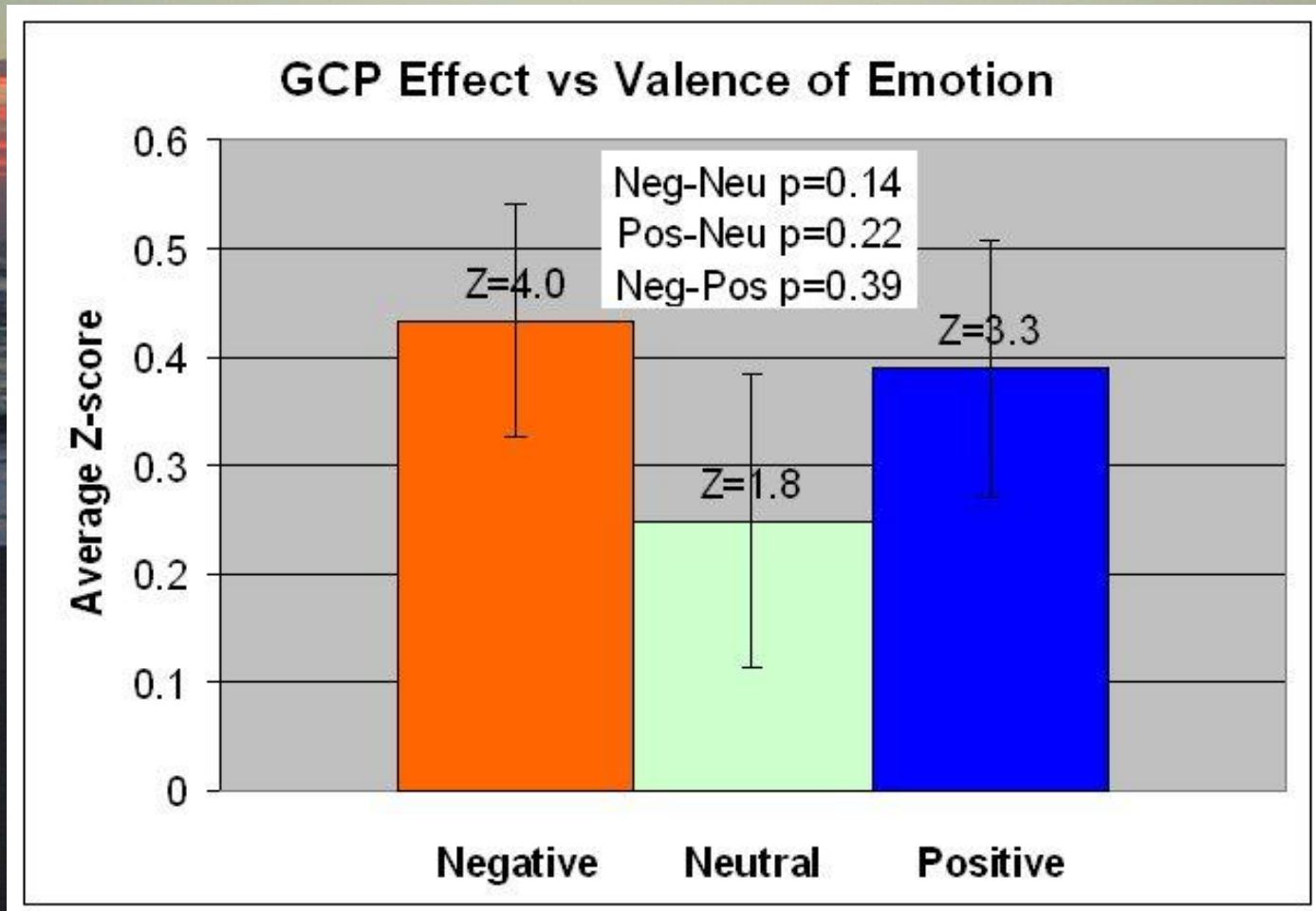
Same trend, independent subsets  
Begin early ~ 8 hours before quake

# LEVEL of emotion relatively easy To assign -- highly significant factor

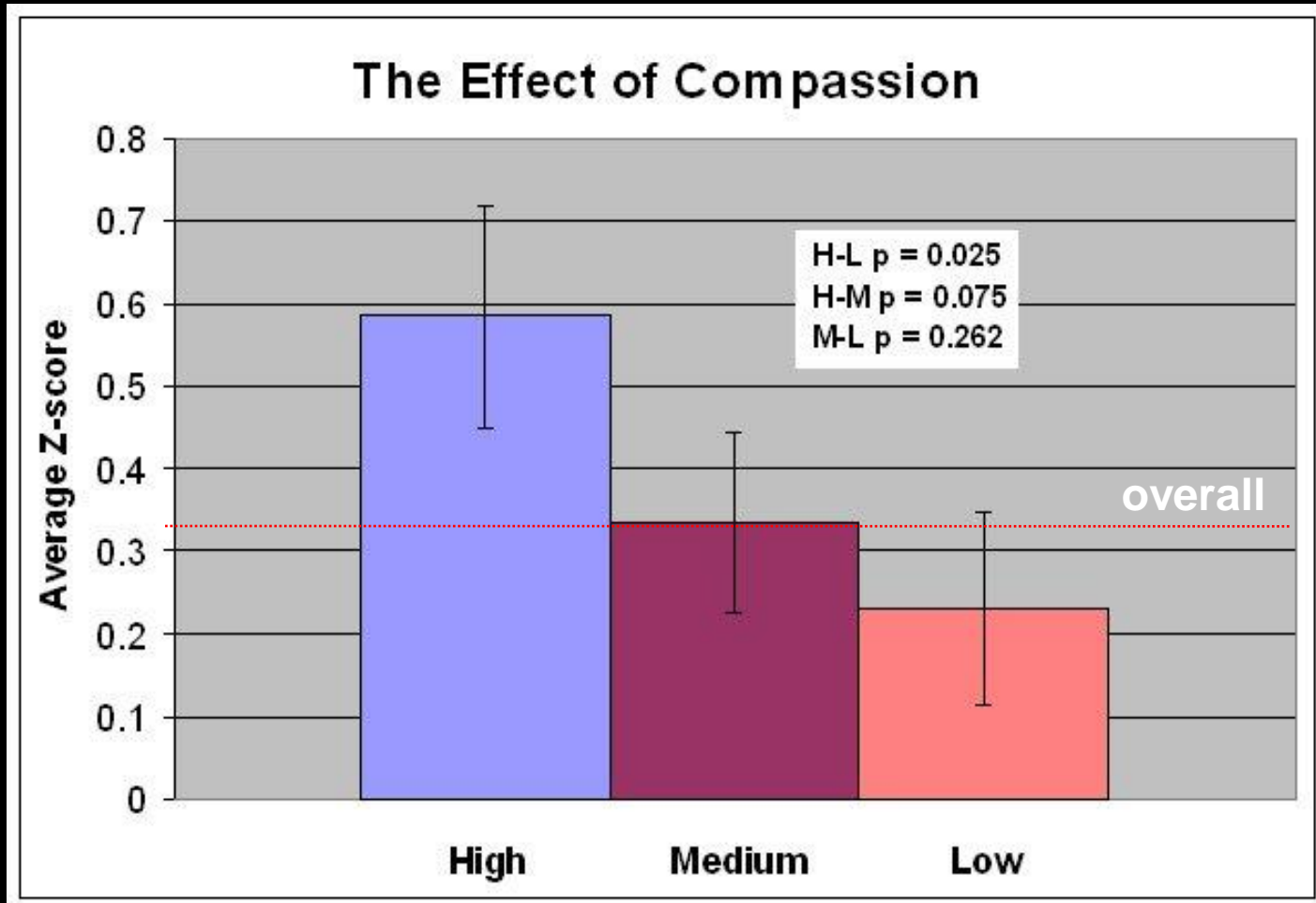




**VALENCE: Both positive and negative events  
Have larger effects than neutral events  
(But differences are not significant)**



# COMPASSION: Events that evoke or embody Compassion or love have larger effects

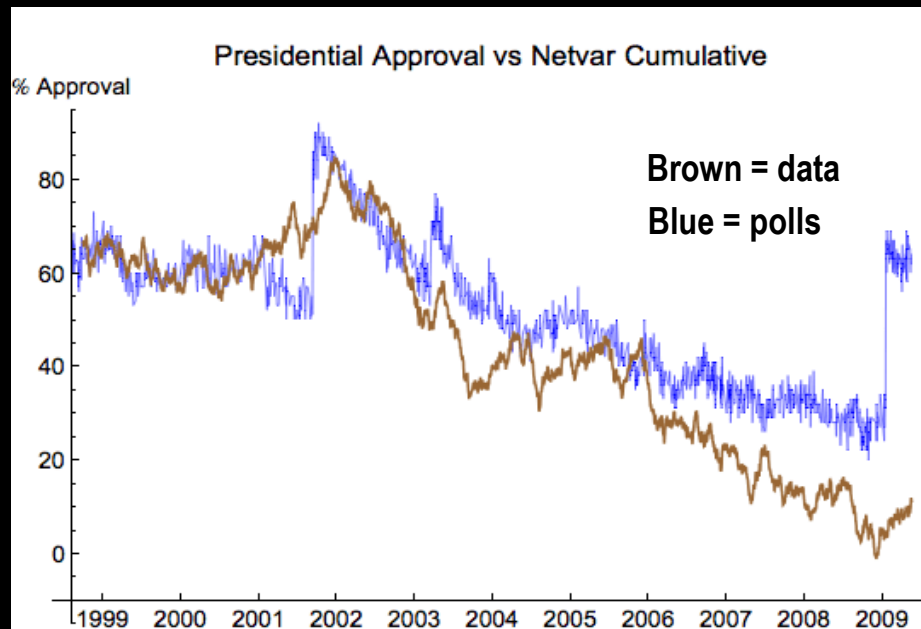


Intimations?

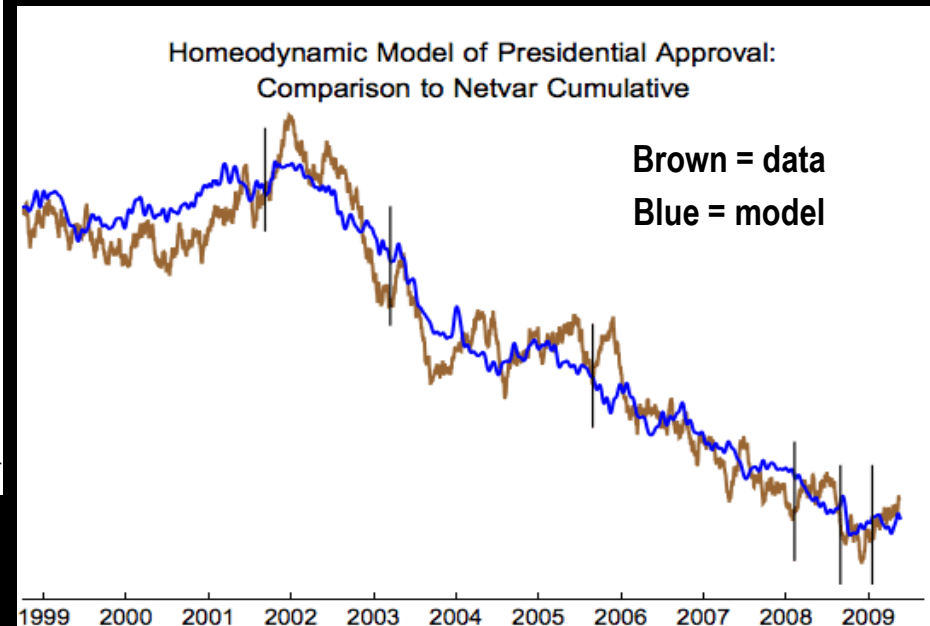
# Long term trend suggests Searching for external correlates

## Social variable: Presidential Approval Rating

### Raw Approval Rating



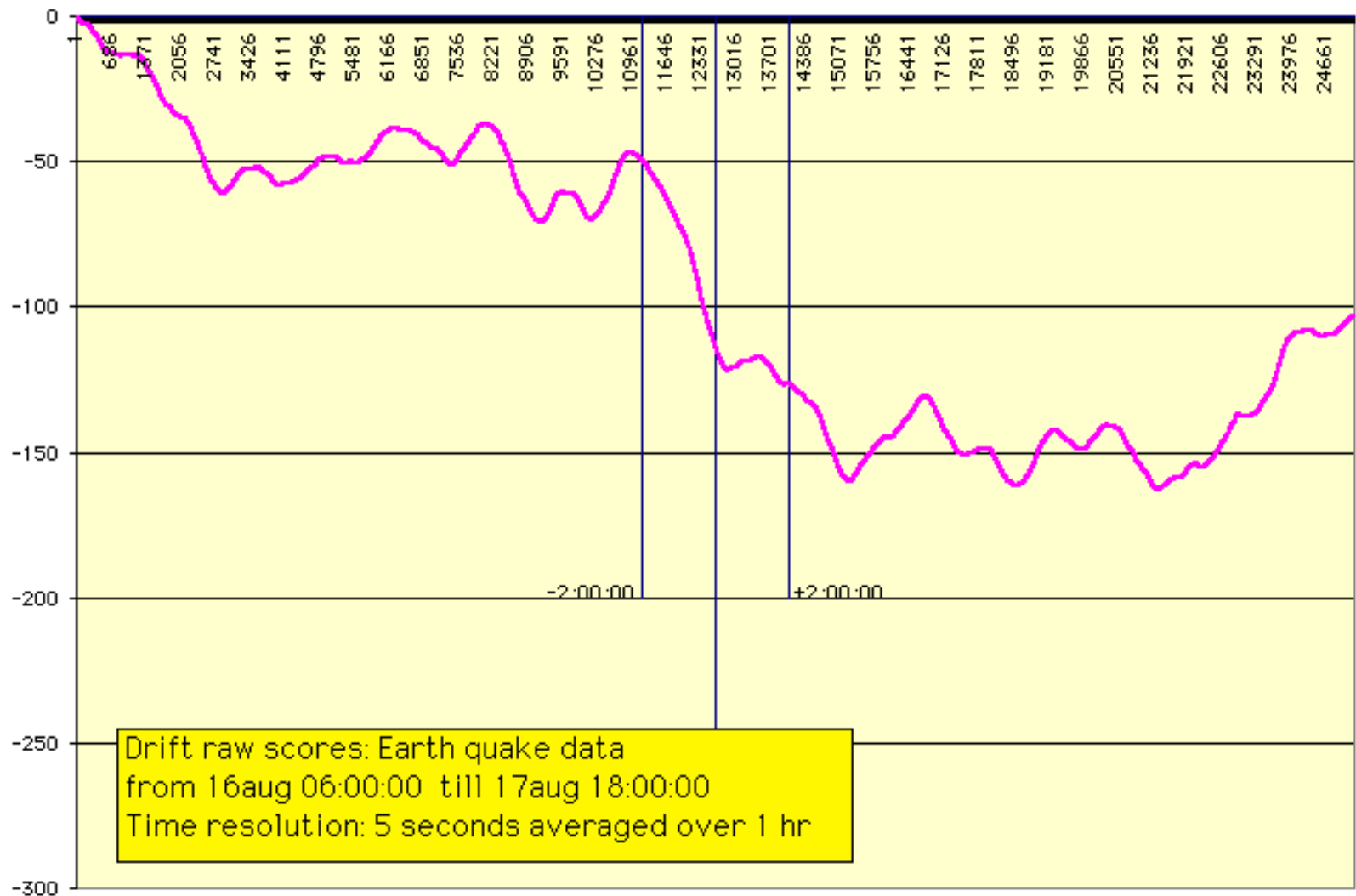
### 2 Parameter model fit $F = a \text{ (value)} + b \text{ (slope)}$



It is important to remember  
this is a correlation. There  
is no assertion of causation.

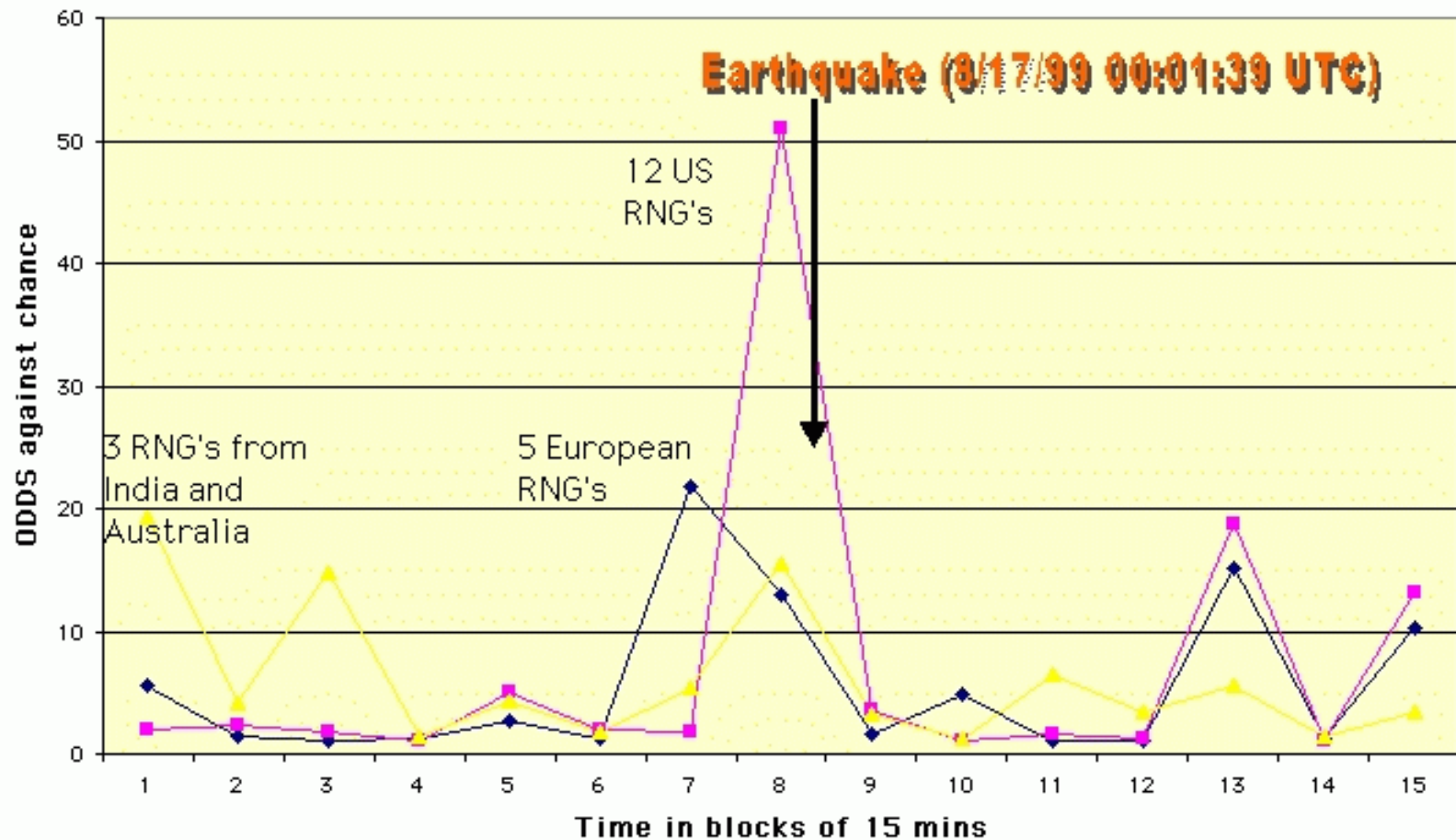


# Additional Example Event data

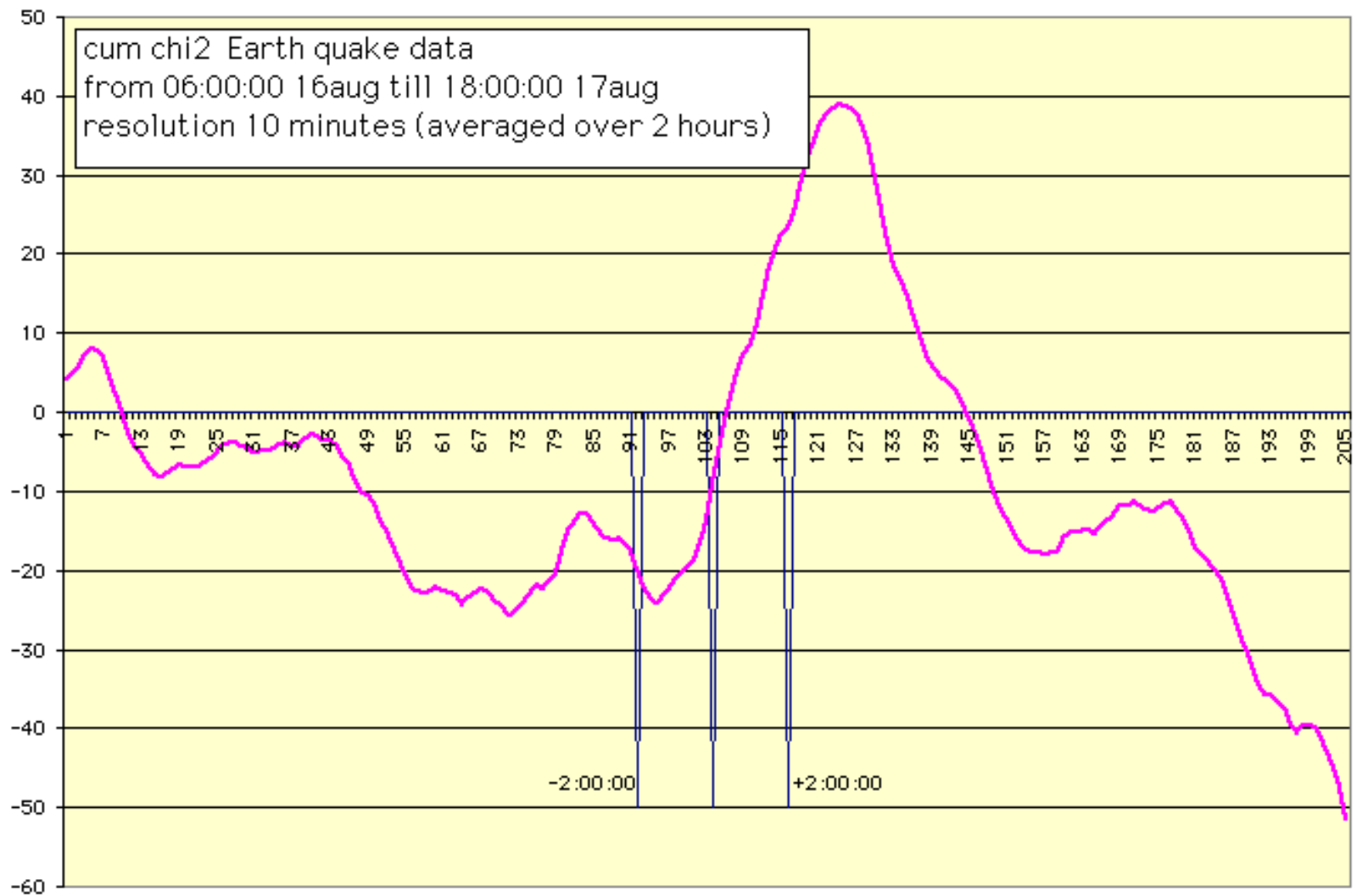


# Additional Example Event data

Turkey Earthquake (RNG's split)  
Period from -2:00:00 till +2:00:00

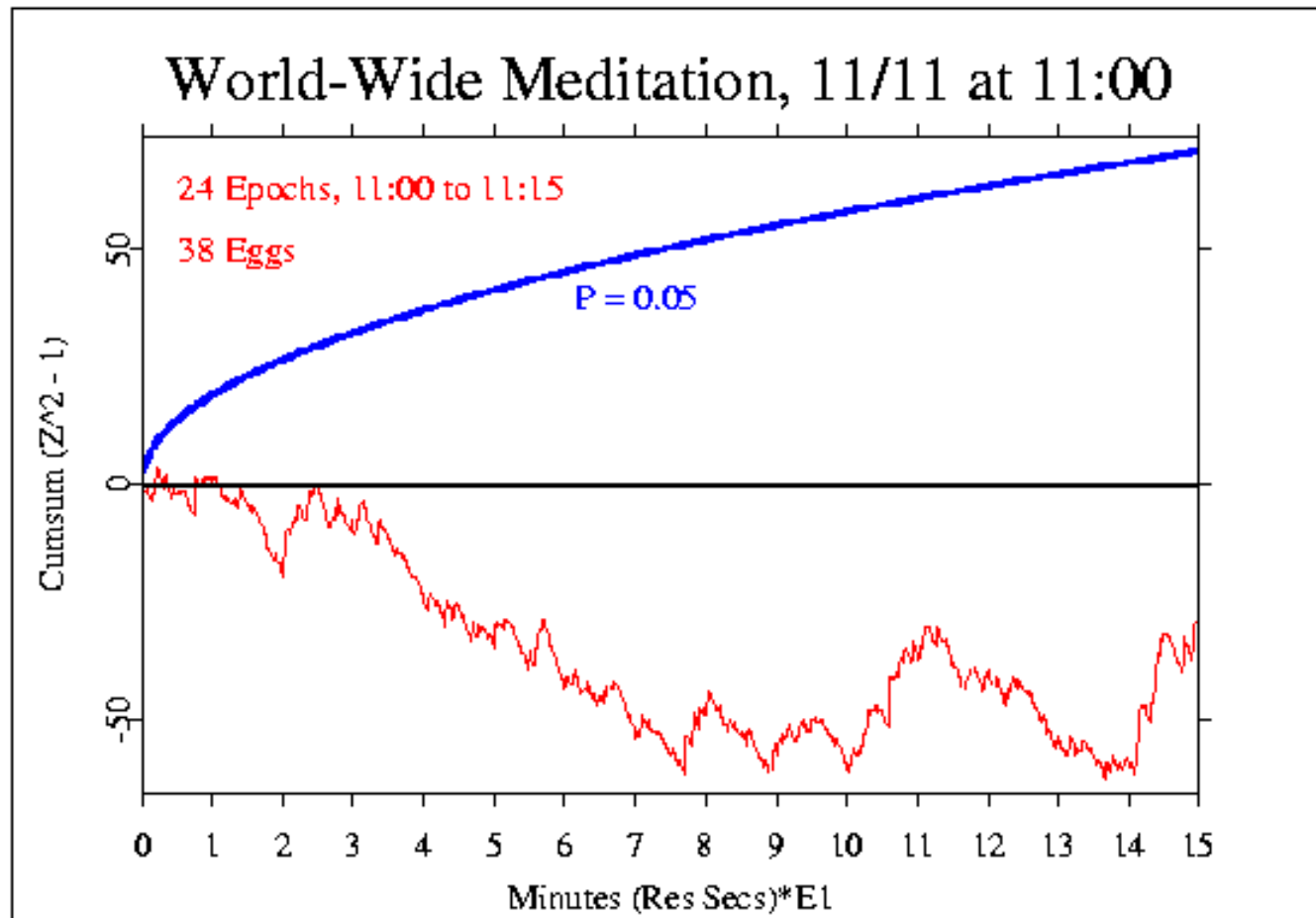


# Additional Example Event data

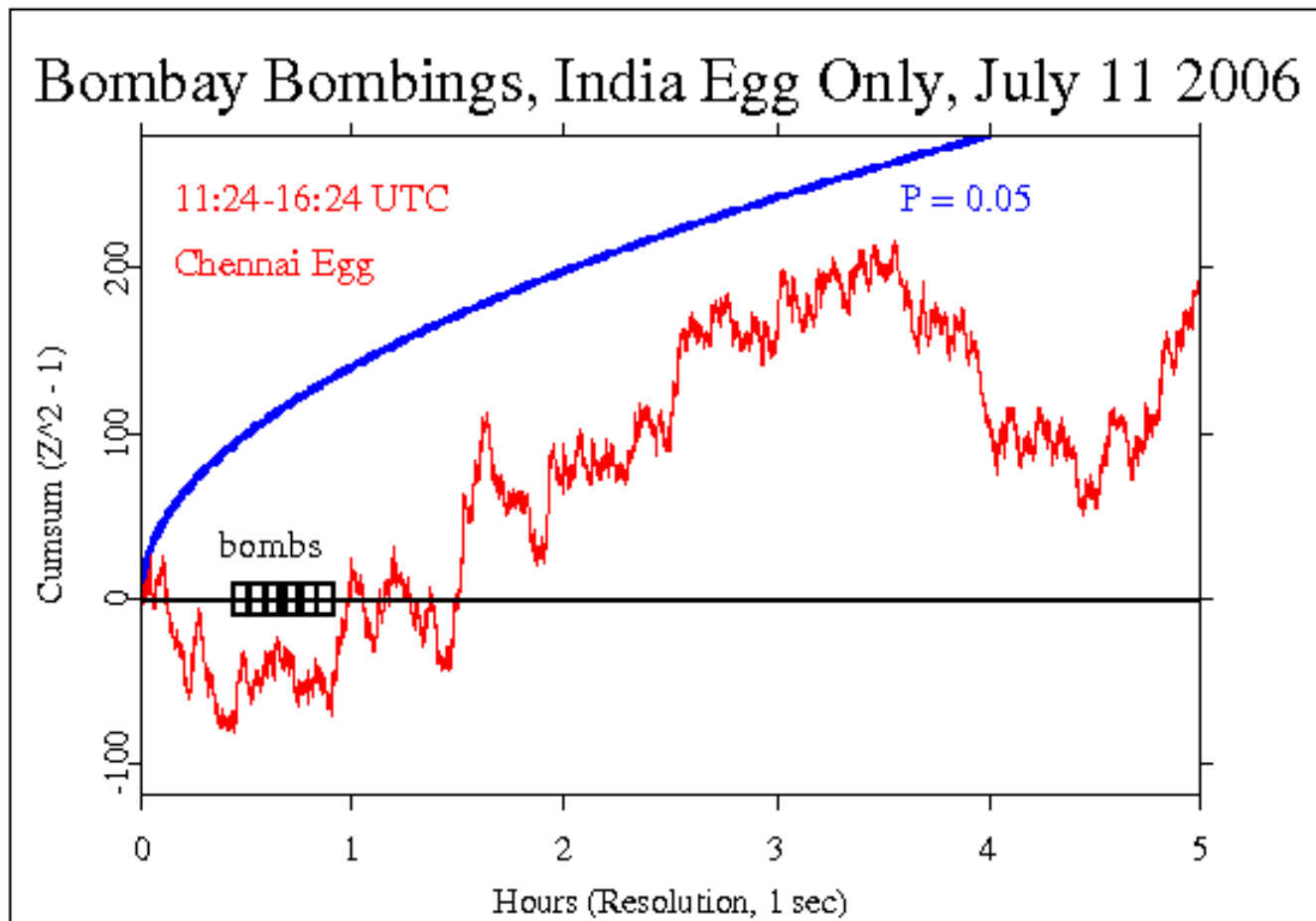




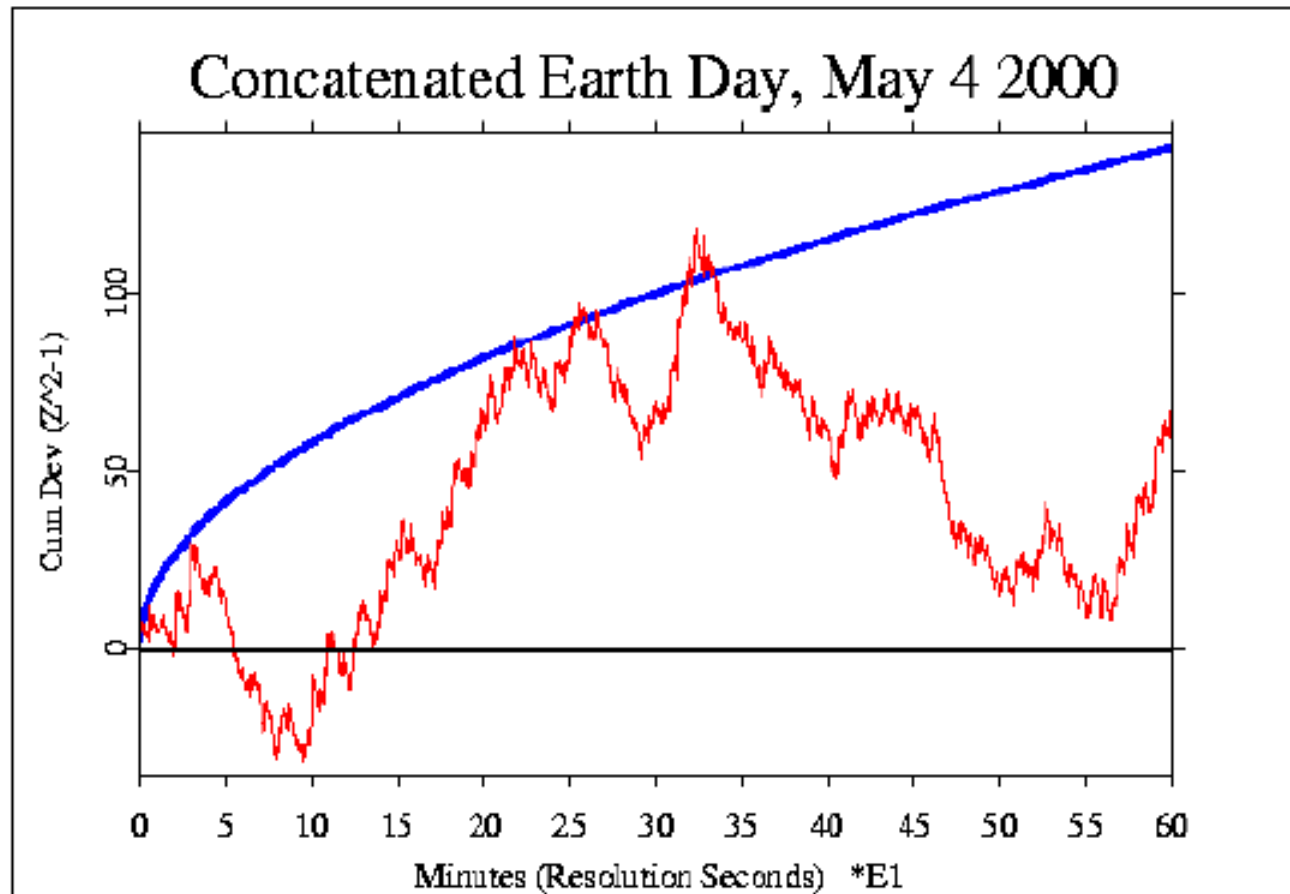
# Additional Example Event data



# Additional Example Event data

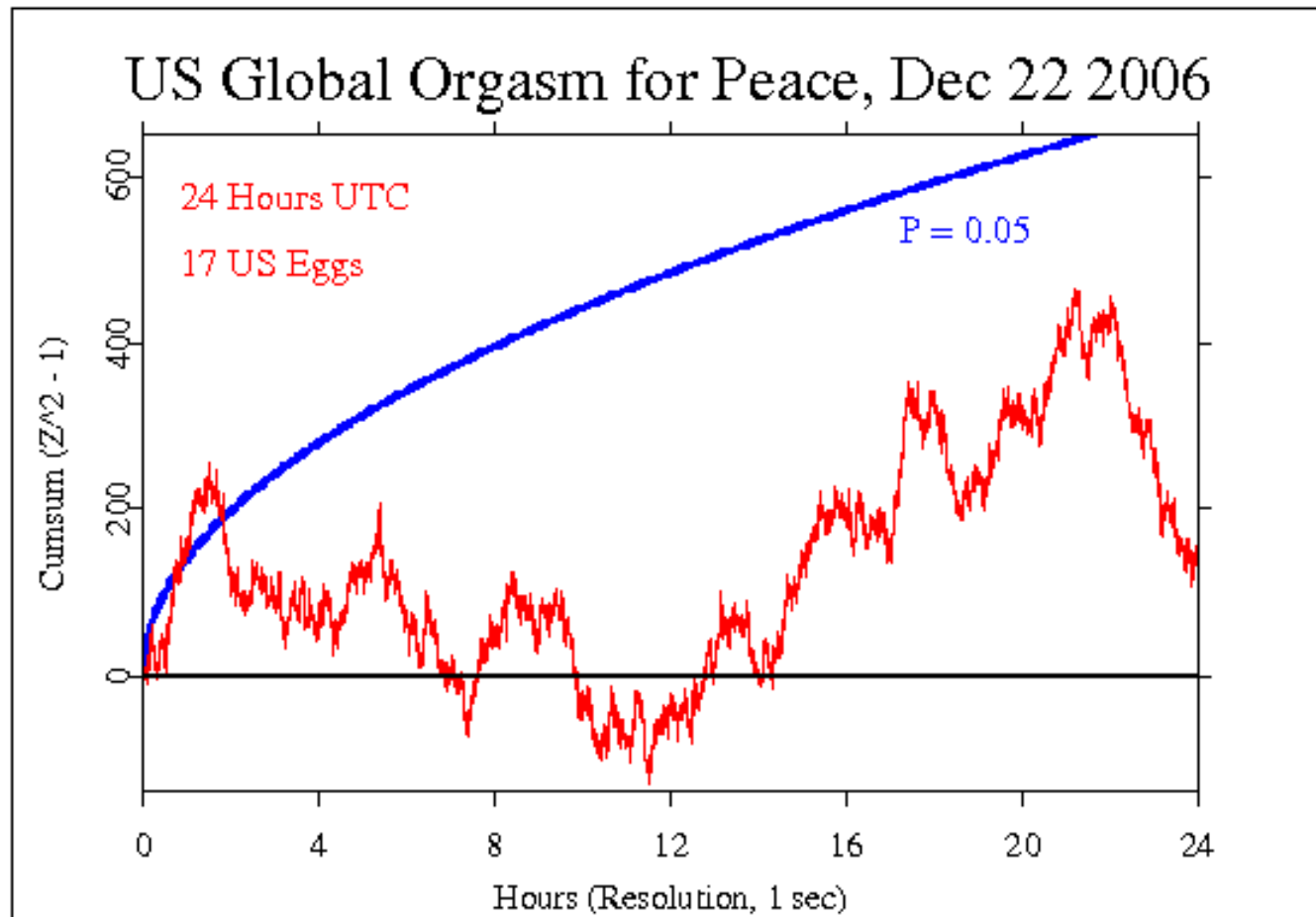


# Additional Example Event data

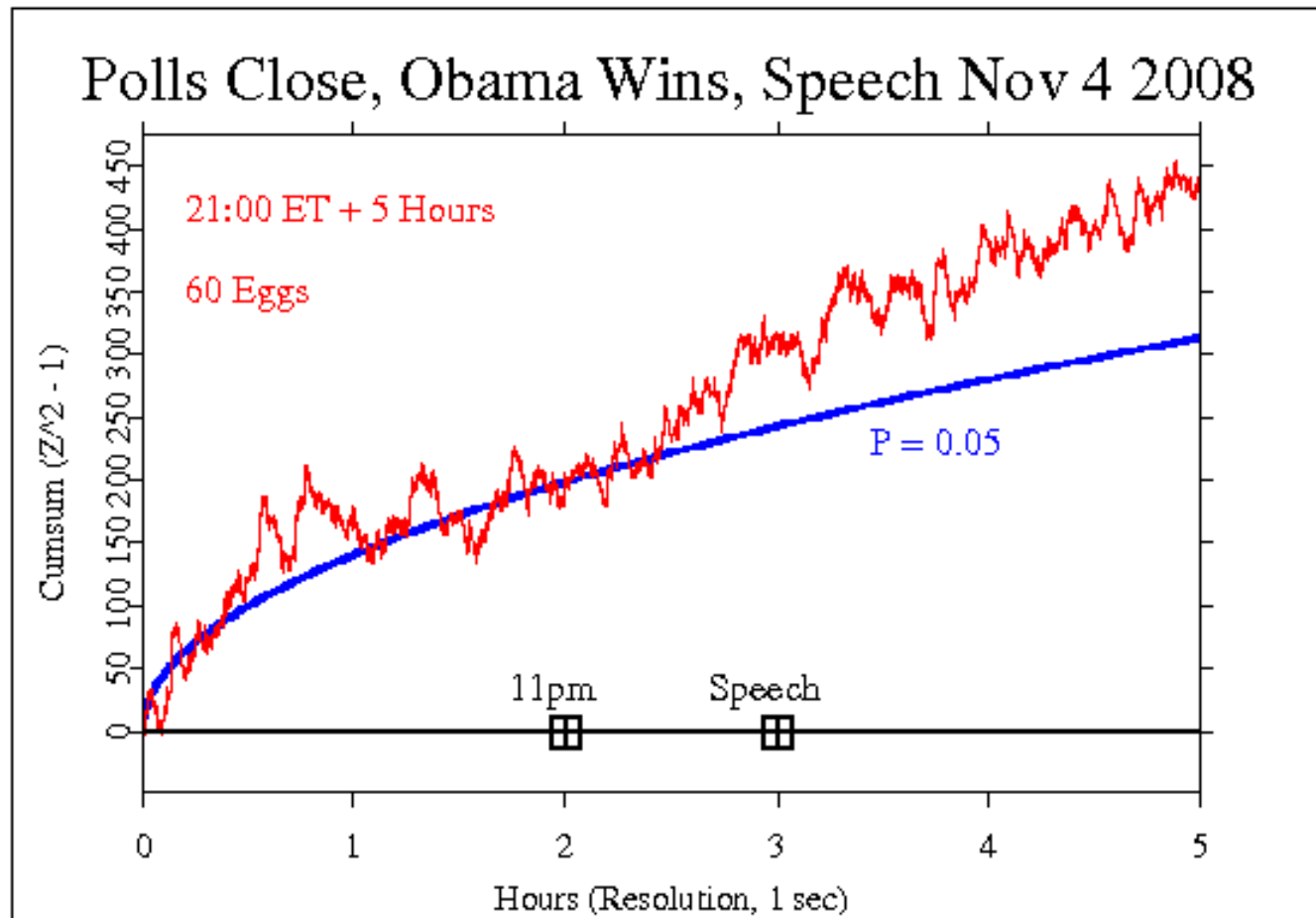




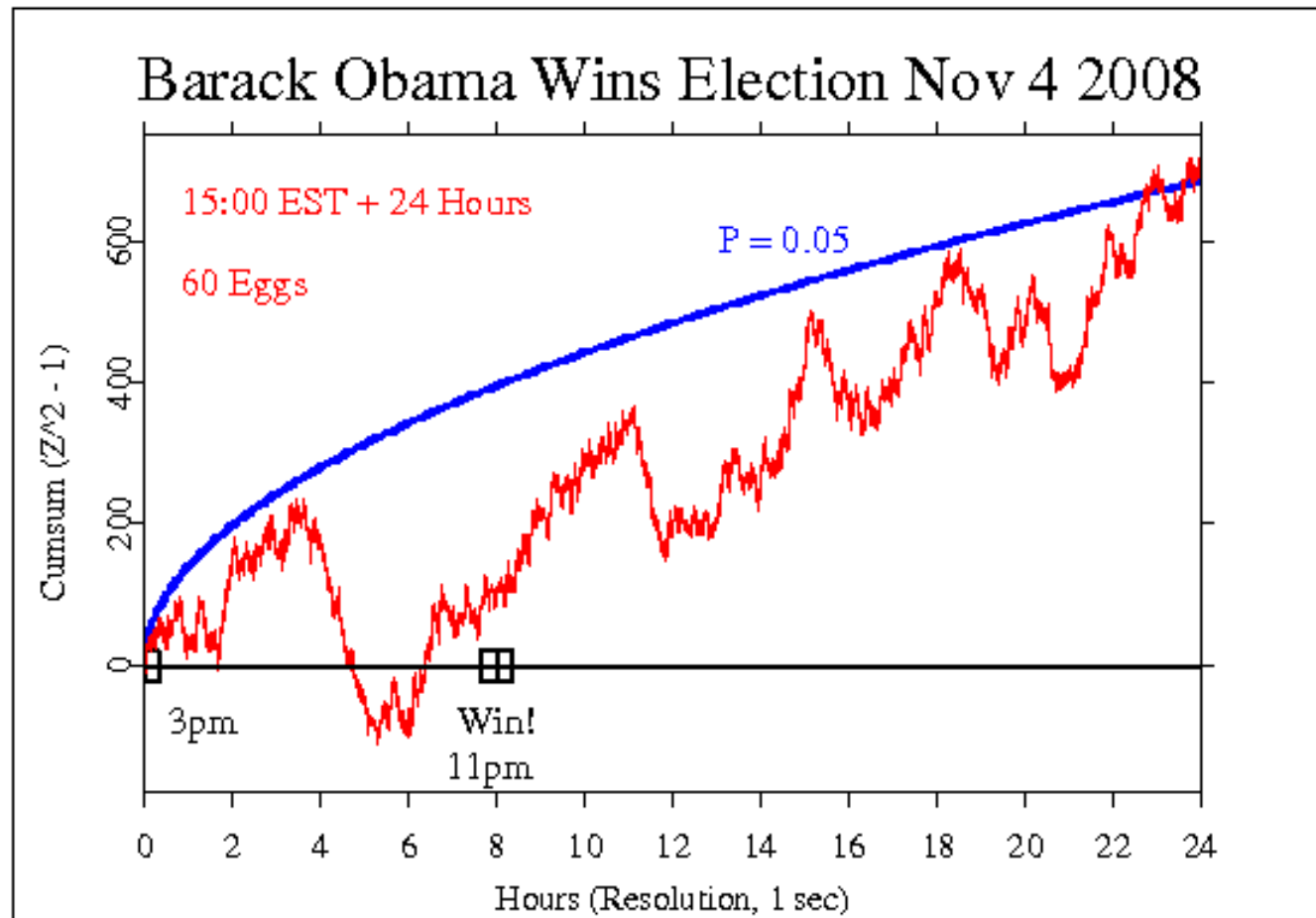
# Additional Example Event data



# Additional Example Event data

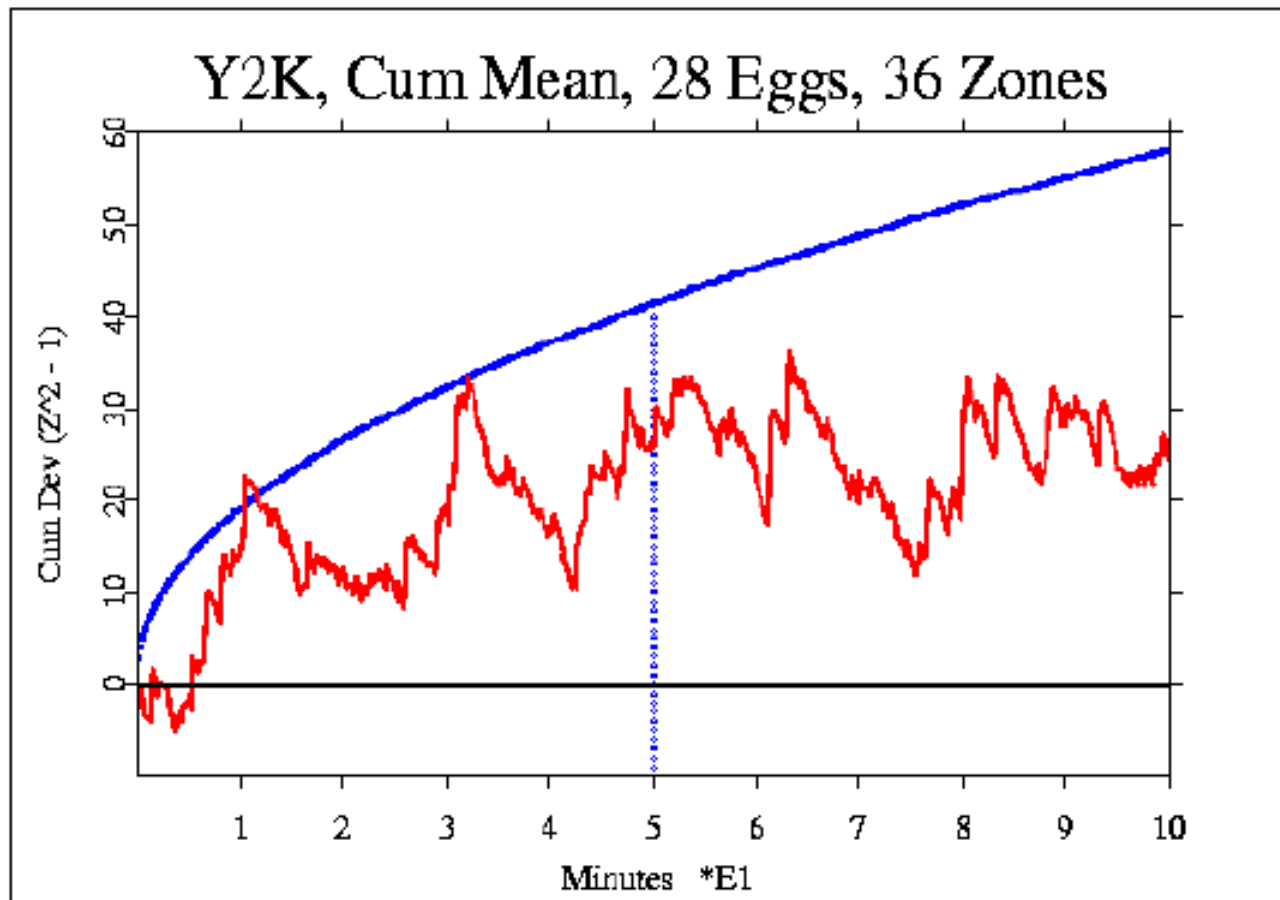


# Additional Example Event data

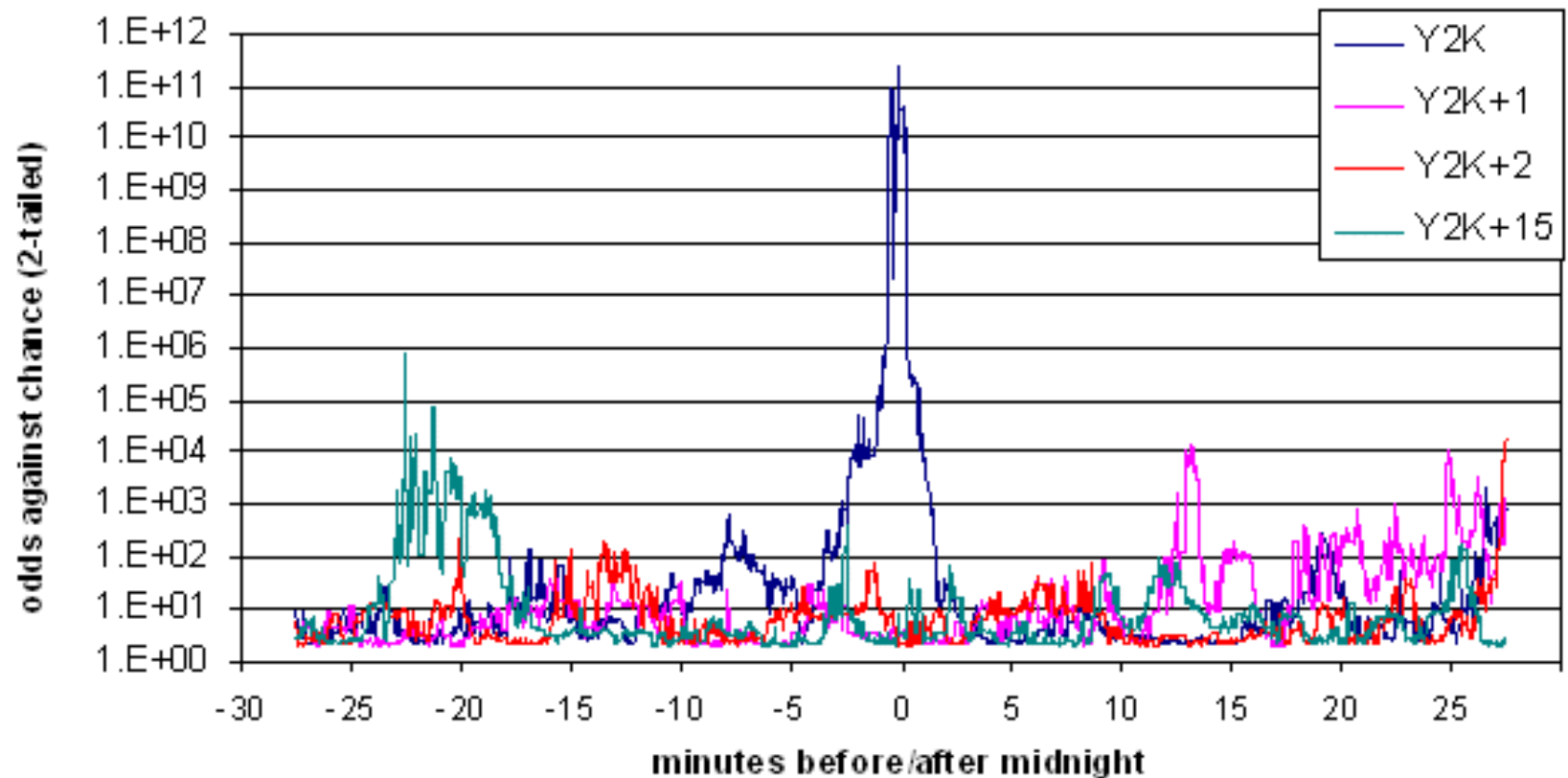




# Additional Example Event data



# Additional Example Event data

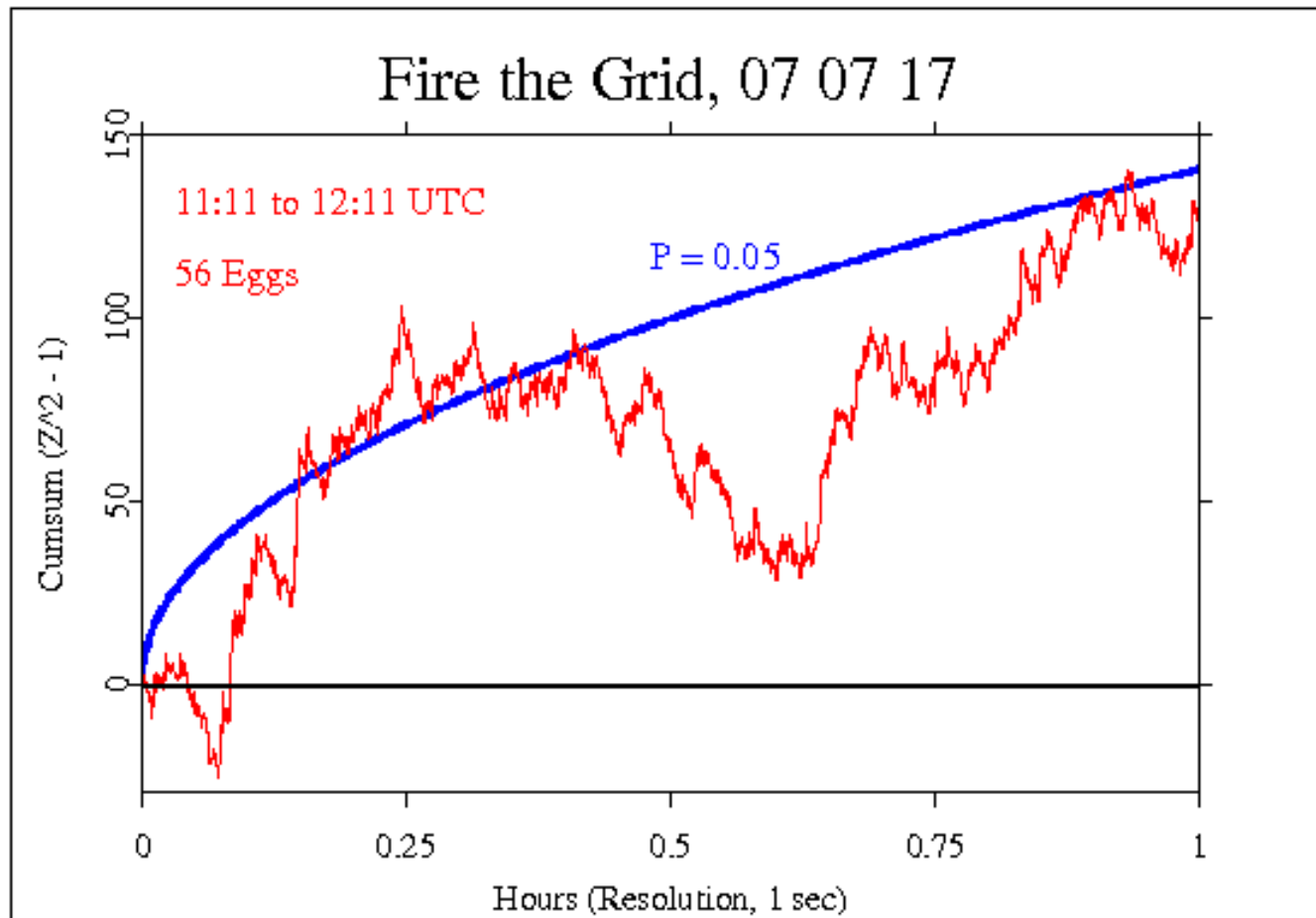


This is Your Invitation  
To Help Heal The Earthgrid  
11:11am GMT on 17:7:2007  
[www.firethegrid.com](http://www.firethegrid.com)

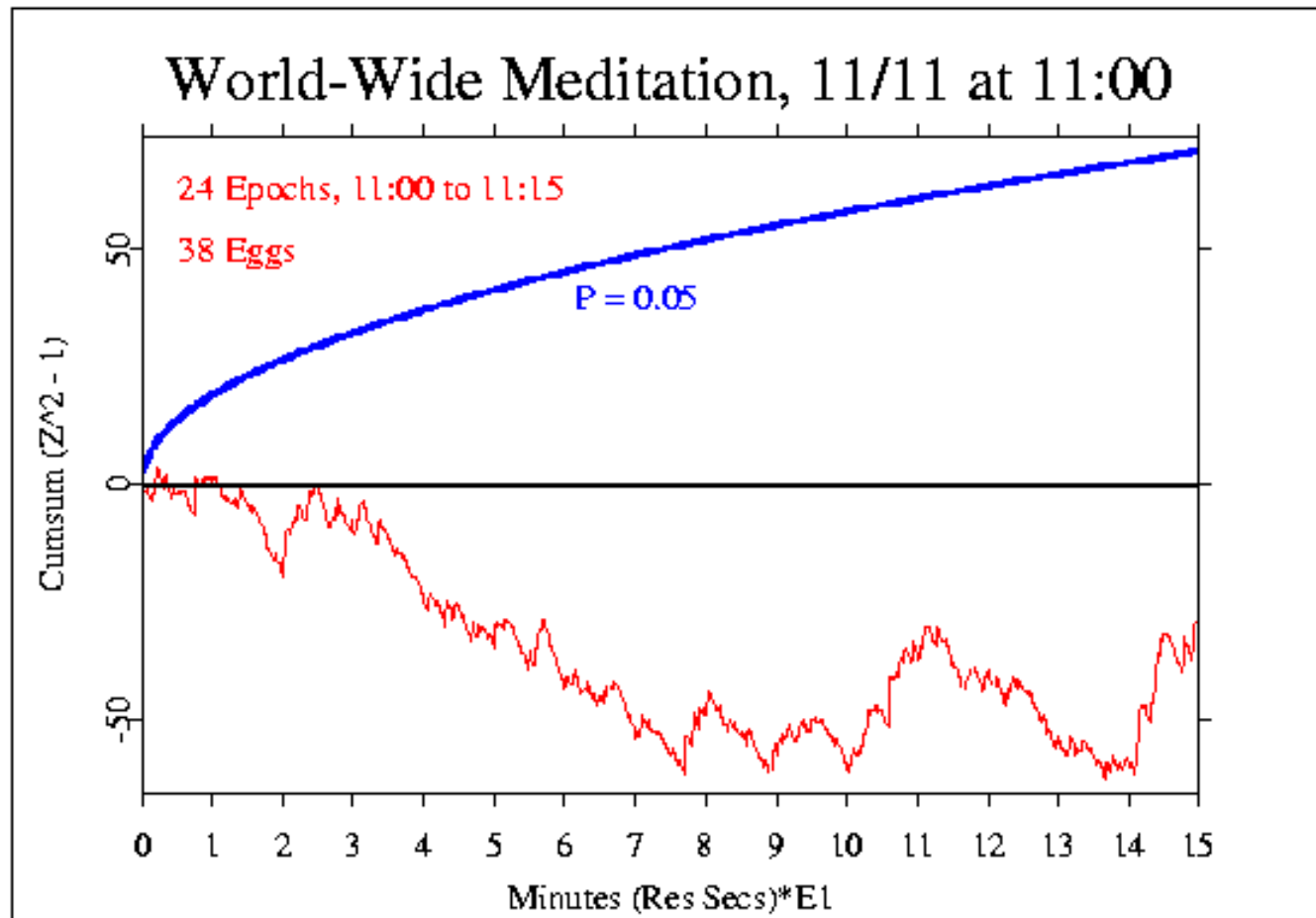




# Additional Example Event data



# Additional Example Event data



# Global Consciousness Project Extends and Amplifies Decades of Anomalies Research

1. *Consciousness is “real” and has direct effects*
2. *Consciousness is extended and interconnected*
3. *Consciousness is nonlocal in space and time*
4. *Intention and emotion create information fields*
5. *Physical and statistical theories are incomplete*
6. *Scientific models must expand to include mind*
7. *Conscious evolution is possible and imperative*



# **GCP/EGG Project**

## **The people who make it go**

**International collaboration of 100 Scientists, Artists, Friends, ...**

**Peter Bancel**, Paris, professional analysis, collaboration

**William Treurniet**, Canada, egganalysis programming

**John Walker**, Switzerland, programming, general support

**Richard & Connie Adams**, USA, general support

**Paul Bethke**, USA, windows programming, network

**Dick Bierman**, Netherlands, design and realtime display

**Dean Radin**, USA, design and independent analysis

**Brad Anderson**, USA, widget programming

**Taylor Jackson**, Canada, realtime display maintenance

**Greg & Lefty Nelson**, USA, program architecture, general support

**Fernando Rodríguez**, Spain, egghosts google map

**Dale**, USA, realtime display and daily movies

**York Dobyns** and PEAR, general support, server hosting

**Leane Roffey**, USA, music, outreach, general support

**Jaroen Ruuward**, Netherlands, realtime programming

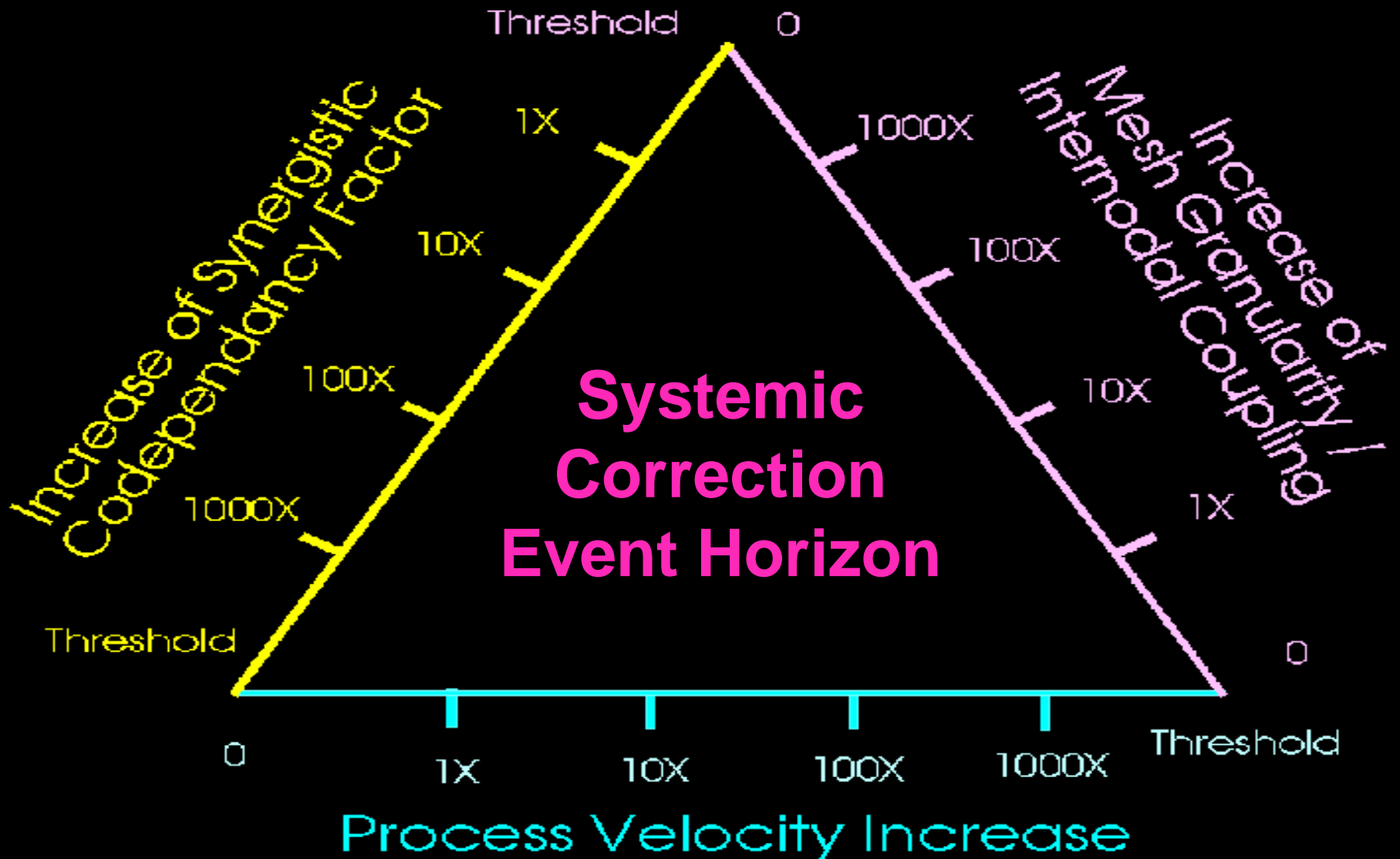
**Dick Shoup**, USA, independent analysis

**Nishith Singh**, India, realtime programming

**Mahadeva Srinivasan**, India, general support

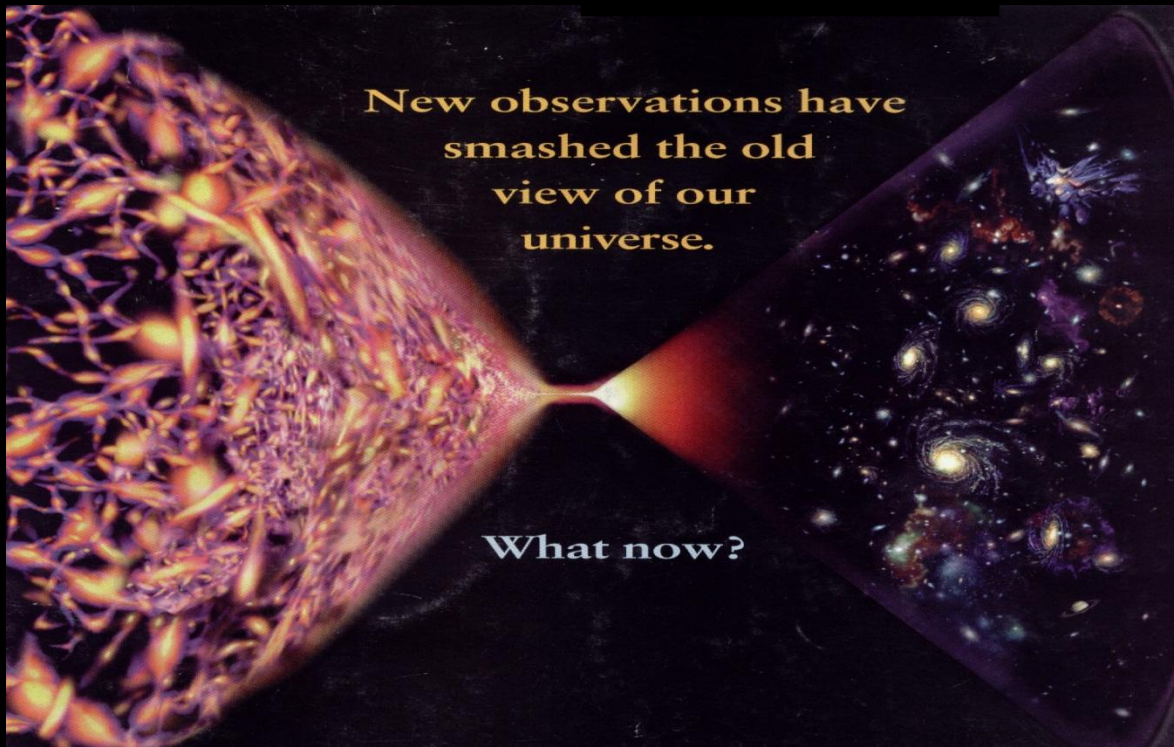
**And all the EGG hosts** around the world

# Convergence Syndrome Triad



# Cultural Imperatives of the Evolutionary Eventstream in the Beginning, the End

- 65+ indigenous cultures on 5 continents have embedded in their mythos prophecies foretelling “something of great significance” that will occur within the 1<sup>st</sup> 3<sup>rd</sup> of the current 21<sup>st</sup> century.
- The question beckons – **why?** Or perhaps, from **who**, or **what?**
- Thesis =





# We are Biophysical Manifestations of Entities Dwelling within the Ubiquitous “Quantum Jello” Manifold –

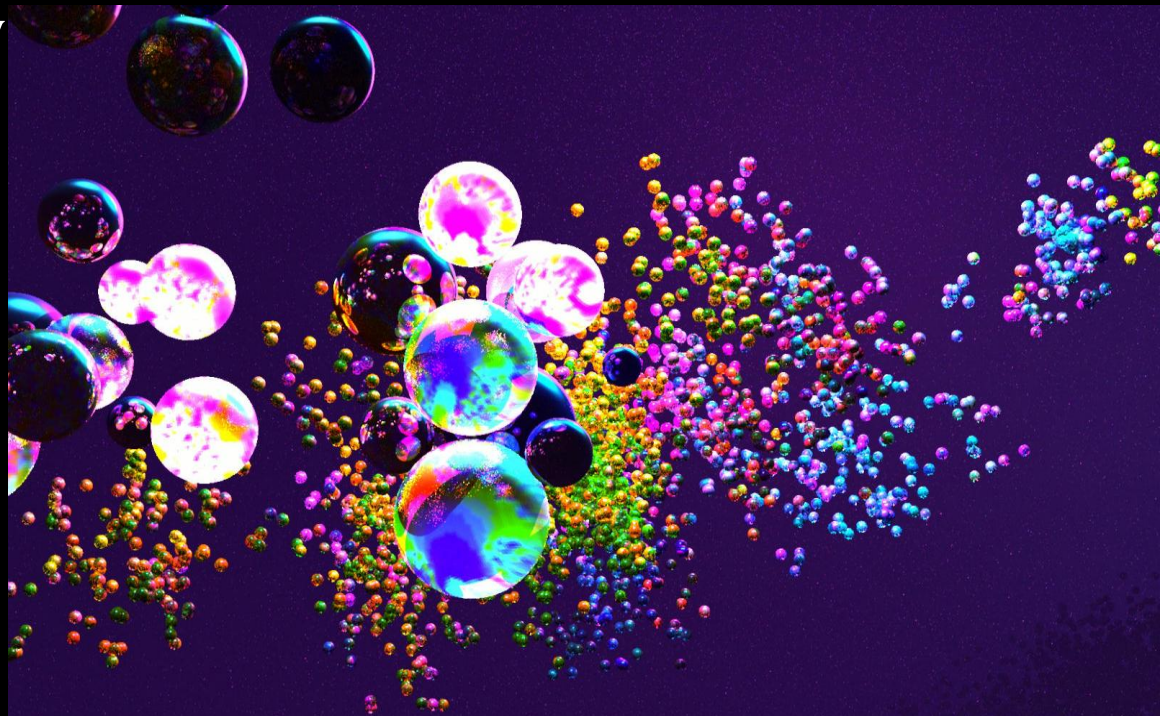
- All Living Things are Interconnected into an non-localized Operational Ecology
- This Planet as a “Living System” is Interconnected into a Cosmological Ecology



# The Holographic Perspective

- Focused intentionality as a mechanism of influence
- All living things are systematically interconnected
- Definition of “living things” extends to systems, processes, entities which behave biologically

“And the day came when the risk it took to remain tight in the bud was more painful than the risk it took to blossom.” ~Anais Nin~



Thank you for your  
time and attention

Fini