

### REASONS FOR CONNECTING PSI AND PHYSICS

- Good for psychical research (Margenau 1985)

*"No amount of empirical evidence, no mere collection of facts, will convince all scientists of the veracity and the significance of your reports. You must provide some sort of model: you must advance bold constructs....in terms of which ESP can be theoretically understood."*

- Good for physics

*"If psi is real, an interaction with physics is required. Even if one regards the probability of its reality as small, its significance - if confirmed - would be so immense that its investigation is worth undertaking."*

\* Physics is already exotic enough to accommodate psi (Koestler 1972))

*"The unthinkable phenomena of extra-sensory perception appear somewhat less preposterous in the light of the unthinkable propositions of modern physics."*

Despite this, there is opposition from both physicists and parapsychologists!

TRANSPERSONAL  
Psi as feature of spirit?

PSYCHOLOGICAL  
Psi as feature of mind?

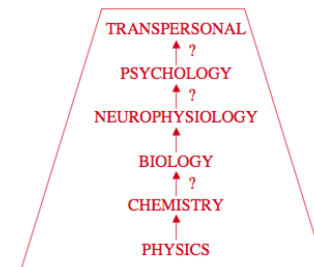
NEUROLOGICAL  
Psi as feature of brain?

BIOLOGICAL  
Psi is feature of life?

CHEMICAL  
Psi as feature of biochemistry?

PHYSICAL  
Psi as feature of matter?

### DIFFERENT LEVELS OF THEORY



Physics may be most fundamental

## TRANSMISSION MODELS

*Like current paradigm*

EM waves  
Neutrinos  
Electrostatic forces  
Tachyons  
Advanced waves  
Wormholes  
Psitrons  
Psi waves



## Problems with transmission models

No transmission or reception organs  
Coding problem  
No fall-off with distance

*"Generally speaking, the experimental evidence indicates that ESP can occur at great distances and does not decline with distance. These findings do not fit well with most hypotheses that physical energies mediate the transmission of extrasensory information."* (Palmer 1978)

## CAN QUANTUM THEORY EXPLAIN PSI?



*"This must lie at the heart of the solution to the problem of psi phenomena; and indeed an understanding of psi phenomena and of consciousness must provide the basis of an improved understanding of quantum mechanics."*

(Walker 1984)

## OBSERVATIONAL THEORY



Consciousness has localized and non-localized aspect

↑  
particle

↑  
wave

Jahn (1982)

Consciousness  $\Rightarrow$  bias in collapse of wave-function  
 $\Rightarrow$  all psi is PK resulting from process of observation  
 $\Rightarrow$  retro-PK!  
Brain like REG  $\Rightarrow$  free will and telepathy



*Objections.*

Pure clairvoyance? Logical coherence? Is brain a quantum system?

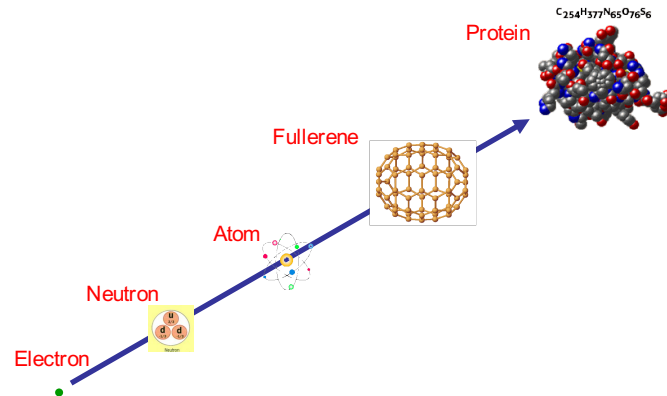
## CAN QUANTUM THEORY EXPLAIN PSI?

**ENTANGLEMENT**

Occurs when two or more particles interact, causing their fates to become linked *outside of space & time.*

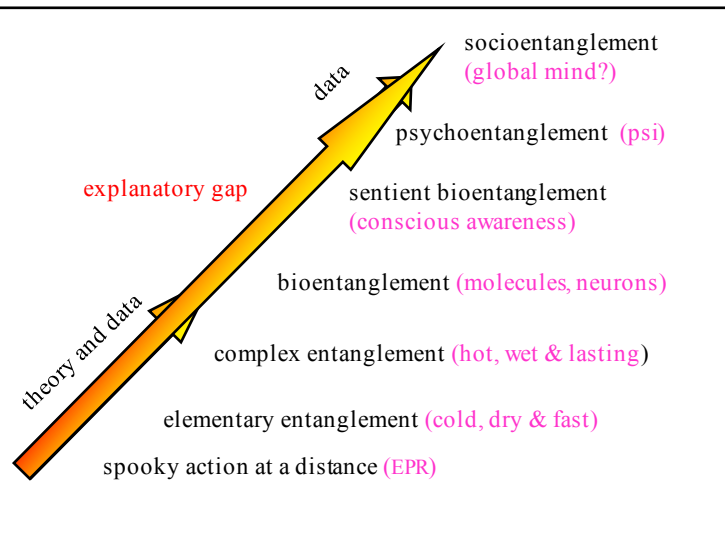
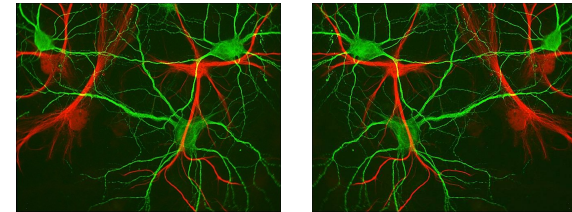
Radin "The Entangled Mind" (2005)

## What can be entangled?



## Non-local correlations between separated neural networks

Pizzi, Fantasia, Gelain, Rossetti & Vescovi  
Department of Information Technologies  
University of Milan



What if the universe  
were fully entangled?

What would  
experience be like in  
that holistic medium?



Is psi an experiential glimpse of the holistic fabric of reality?

#### OTHER QUANTUM APPROACHES

Vacuum energy (Laszlo 1993)  
Pervasive energy field connecting living systems

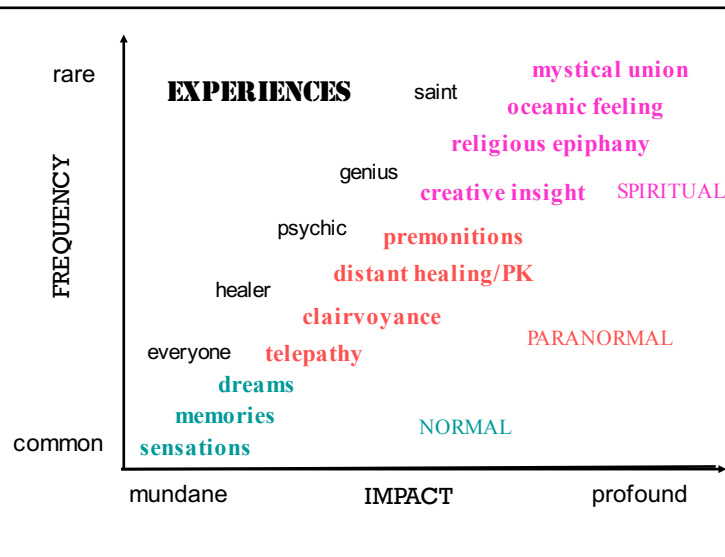


Zero point fluctuations (Puthoff 2007)

"All of us are immersed, both as living and physical beings, in an overall interpenetrating and interdependent field in ecological balance with the cosmos as a whole...a unitary viewpoint of the universe as a fluid, changing energetic information cosmological unity."

Subtle energy fields (Srinivasan 1998, Tiller 1993)  
So subtle that cannot be measured directly!

But we need deeper theory which underlies both QM and psi



We must understand sensory perception



before we can understand extrasensory perception

## PROPOSAL

We need extension of physics\* which provides explicit model of

### MIND



\* But not physics as we know it - **hyperphysics**

We need

A NEW PARADIGM

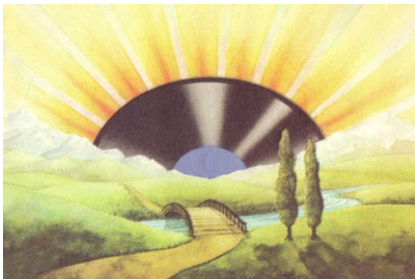
which incorporates...

- \* consciousness
- \* transcendence of space and time
- \* mental phenomena in some radically new way

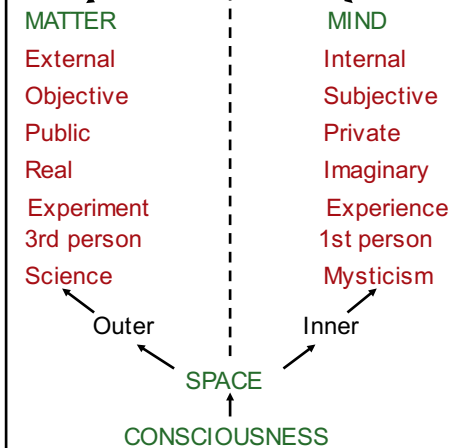
GRAND UNIFIED THEORY OF MATTER AND MIND

...which involves higher dimensions!

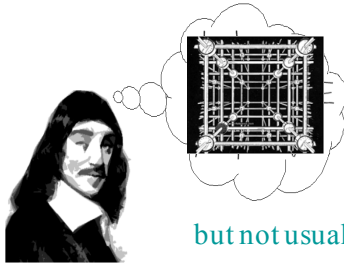
## MAKING SPACE FOR MIND



## TWO WORLDS



## WE NEED SPACE AND TIME FOR MIND

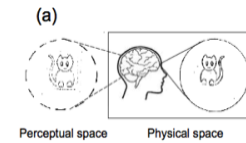


but not usual space and time

Universal Structure = higher dimensional reality structure with normal, paranormal and spiritual mental phenomena.

## RELATIONSHIP BETWEEN WHAT IS IN THE MIND AND IN THE WORLD

Physical percepts

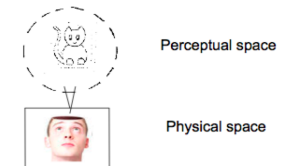


\* Representative theory  $\Rightarrow$  perceptual space is **secondary** (internal construct)

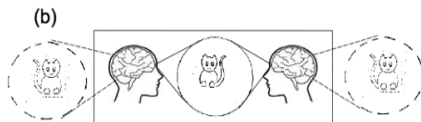
\* Naïve realism  $\Rightarrow$  **percept is object**  $\Rightarrow$  perceptual space is physical percept.

Physics  $\Rightarrow$  **object is itself a representation?**

What about mental percepts?

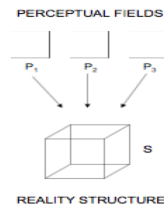


Percepts associated with external (physical) reality in standard view



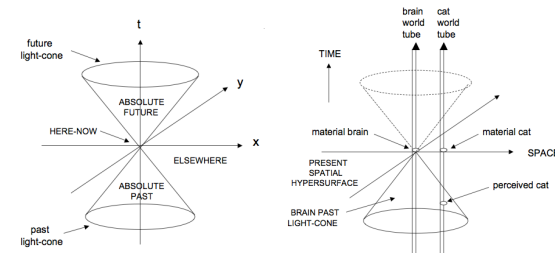
## WHAT IS THE NATURE OF REALITY?

There exists 3D space in which are localized both physical objects and sensors through which we observe objects. Each observer has only partial information about this space but there exists a 3D configuration which gives 2D projections concordant with those presented. Reality is **3D structure** which consistently reconciles our perceptions of it.



This leads to controversy between naïve realism and representative theory

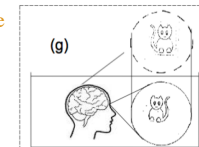
Relativity  $\Rightarrow$  physical world is 4D, with the object and observer being represented by **world-lines** and perceptual fields being **3D past light-cones**



Object and percept are aspects of 4-dimensional structure

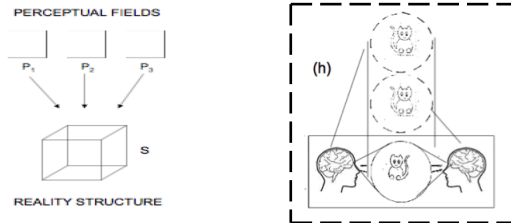
3D view: 3D object  $\rightarrow$  2D percept

4D view: 4D object  $\rightarrow$  3D object + 3D percept



### MODIFIED MODEL OF REALITY

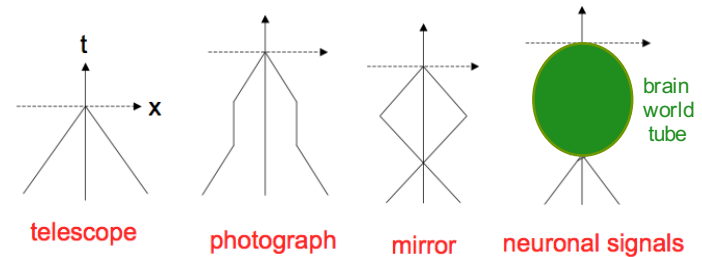
Relativity theory implies that physical world is 4D, with the objects and observers being represented by world-lines and perceptual fields being 3D. Physical reality is 4D structure which consistently reconciles our perceptions of it.



This partly resolves naïve realism V representative theory controversy

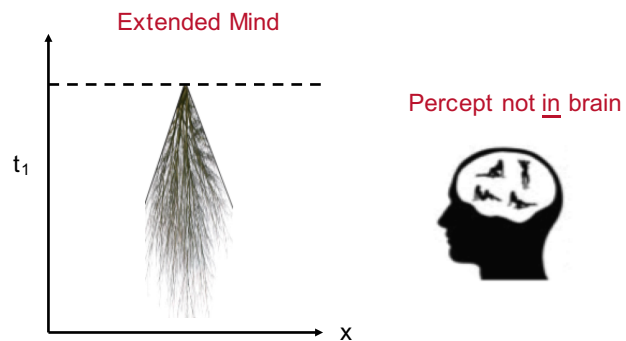
### 4D EXTENDED MIND

Spacetime diagrams of various perceptual processes



Phenomenal space for any consciousness is the part of spacetime connected to worldline of its brain and sensory extensions though nexus of signalling worldlines => **percepts are not in the head!**

### SPACETIME OUTLOOK TREE



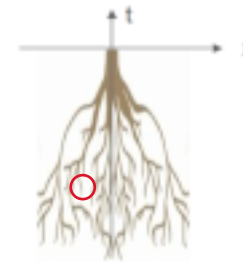
Phenomenal space is part of spacetime. Object and brain are just two ends of 4-dimensional chain.

Can we extend this idea to non-physical percepts?

### MEMORY SPACE

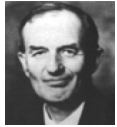
View 1. Memories are generated by brain and derive from physical world. Experiences are **internal** (i.e. inside the head).

View 2. Memories of physical events reflect direct access of consciousness to spacetime which contains the events. Experiences are **external** (i.e. the part of spacetime connected to the brain by nexus of signalling worldlines).



Memory is re-experiencing of past (**tag not trace**). Brain can replicate information but spacetime structure persists after brain dies.

## DREAM SPACE



Price (1955) proposes that physical events and dream events exist in different spacetimes

*"We inhabit two worlds simultaneously, the world of common experience governed by physical law and another space, quite as real, which obeys other laws....continuous dream-life goes on throughout our waking hours and occasionally we may catch a glimpse of it."*



Broad (1953) merges dream and phenomenal spaces into a single space of more than three dimensions in which sensations of all kinds exist

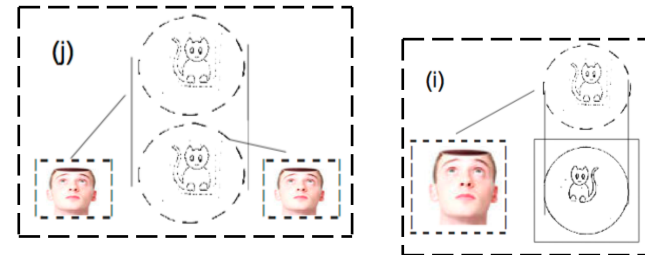
## PSI SPACE

\* Telepathy => non-physical percepts have attributes of externality

=> communal mental space

\* Clairvoyance => physical objects have attributes of internality

=> mental space contains physical space



## IS THERE A SPACE FOR ALL PSYCHIC EXPERIENCES?

### \* Threshold experiences

Pseudo-physical on sleep/waking border, often associated with sleep paralysis

### \* Apparitions

Hallucinations? Veridical? Collective cases? Physical trace?

### \* Out-of-body experiences

Pseudo-physical? Higher planes? Clairvoyance? Physical detection?

### \* Near-death experiences

Tunnel effect? Survival space? Memory Space?

### \* Mystical experiences

Sense of unity, transcendence of space/time, deeper sense of reality

Need a space which is not the same as physical space but relates to it and unifies phenomenal space, memory space, dream space, ESP space and all these other spaces

## IS THE SUBTLE BODY PHYSICAL?

Weighing subtle body

MacDougall (1907), Carr (1970)



Excess light detected near target

when remote viewer looked at it

Yonjic (1982), Hubbard (1986)



Alex Tanous experiment

Disturbances on strain gauge during remote viewing

Osis & McCormick (1980)

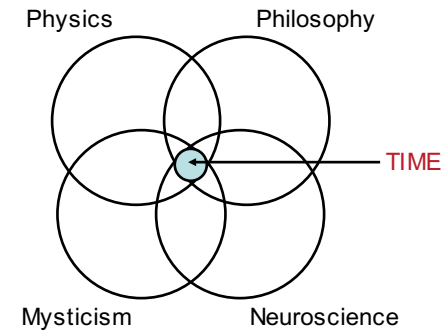
Keith Harary experiment (Morris 1978)

Harary's kitten meowed and moved less during his OBEs

Ingo Swann experiment (Mitchell 1987)

Targets only visible from particular angle and location

### MAKING TIME FOR MIND



### THE MYSTERY OF TIME

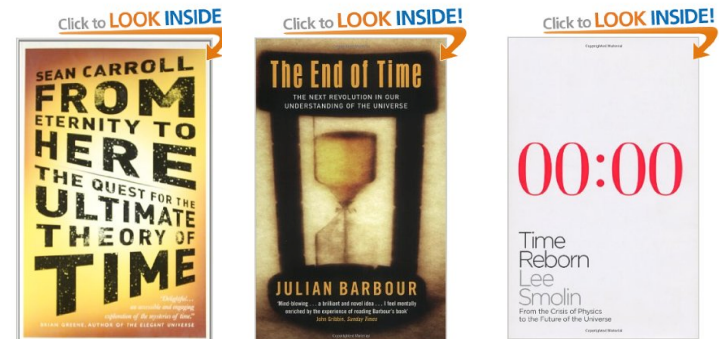
St Augustine “What is time? If no one asks me, I know. If I wish to explain it to one that asketh, I know not.”

Albert Einstein “Time is nothing but a stubborn persistent illusion”

Richard Feynman: “We physicists work with time every day but don't ask me what it is. It is too difficult.”

Julian Barbour “We can recognize time but we do not understand it. It is remarkable that there's so little agreement on what time is or even how to how to investigate a solution”.

### THREE RECENT BOOKS ON TIME AND PHYSICS



...but these barely mention consciousness!

## TWO VIEWS OF TIME.....from both philosophy and physics

- Time is illusory (Parmenides) and truth is timeless (Plato). Earthly realm imperfect (birth/death) but heavenly realm perfect. We are trapped in time but seek higher aspects of world which transcend it.

Physics is search for timeless equations which govern world and its progress has progressively removed time.

- Time is fundamental (Heraclitus) and nothing transcends it.

Physics has unified heaven and Earth. Timeless view is based on time-reversible micro laws but these omit irreversible micro processes (quantum measurement) and macro processes (complexity).

## TWO PROFOUND QUESTIONS

What is now?

Why am I me?

“Time is Nature’s way of keeping everything from happening at once.”

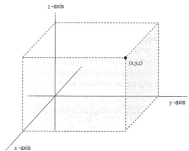
“Space is Nature’s way of keeping everything from happening here.”

Both these questions reveal inadequacy of standard view of reality

## NEWTONIAN VIEW



Arena of physical reality is 3D space....and time

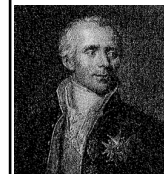
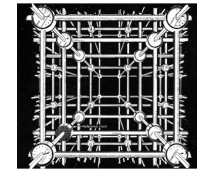


Both space and time are absolute (God's sensorium)

## NEWTONIAN MECHANISTIC UNIVERSE

=> future and past implicit in present

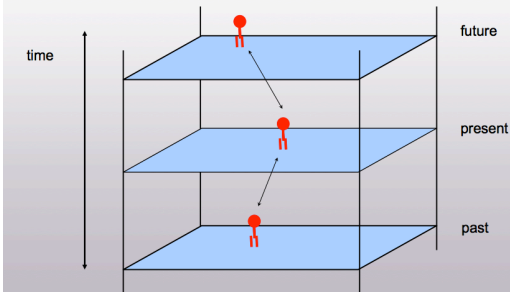
=> time and free will are illusions



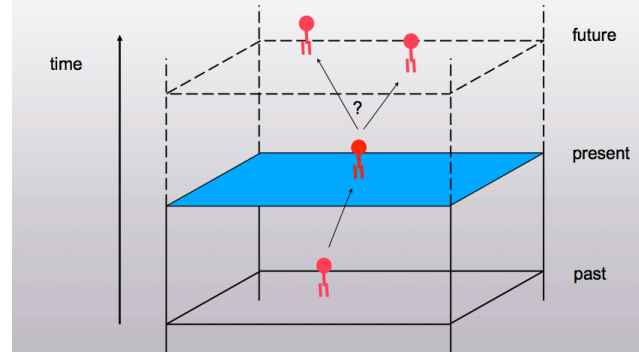
Pierre Laplace

“An intellect which at a certain moment would know all the forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies in the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes.”

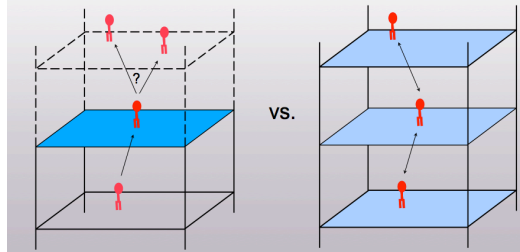
**Newtonian/Laplacian time:** the block universe.  
All times are implicit in every moment.  
Prediction and retrodiction: **reversibility**.



**Intuitive time:** “now” is real.  
The past has happened. (Memories, records.)  
The future is conjectural. (Teleology, free will.)



How do we reconcile the block universe  
with our intuitive understanding of time?



### ARROWS OF TIME

- Cause and effect
- Life and death
- Cosmic expansion
- Build up of complexity
- Psychological



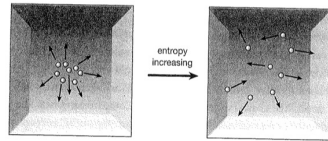
Leaves with no way back to tree

All past/future distinctions arise because our environment is very far from equilibrium, and entropy is increasing.



All arrows arises from

Second Law of Thermodynamics



## ENTROPY INCREASE



“Whenever I try to organize the office, I get interrupted, so I never get anywhere,” says Guth. “I’m also a saver. I would rather keep a pile of junk, assuming there is something there I want, than throw the whole thing away and regret it.”

ARTHUR EDDINGTON



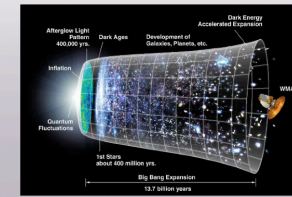
“If your pet theory of the Universes is in disagreement with Maxwell’s theory, so much the worse for Maxwell’s theory. If it is found to be contradicted by observations - well, these experimentalists do bungle things sometimes. But if your theory is found to be against the Second Law of Thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation.”

But Newton’s laws and equations of physics are time-symmetric

To understand the evolution of entropy, we need to supplement Boltzmann by the **Past Hypothesis**:

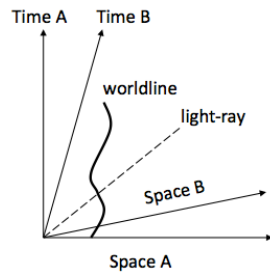
The observable universe began in a low-entropy state that could evolve into our current state via increasing entropy.

Nobody knows why this should be true, but it is.



## EINSTEIN VIEW

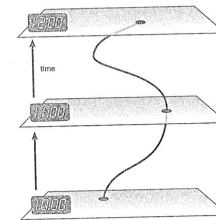
Arena of physical reality is 4D spacetime



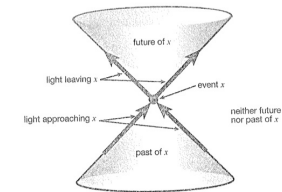
Time is 4th dimension

## TIME IN SPECIAL RELATIVITY

Worldline



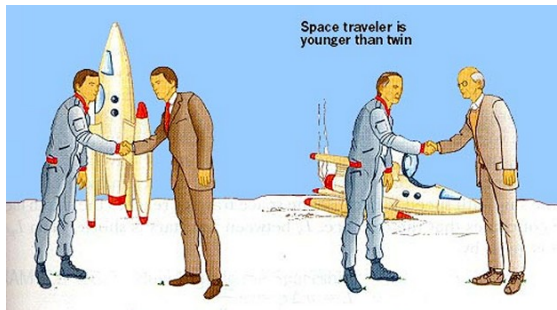
Light-cone



- Always move forward in time
- No absolute present
- Moving clocks run slow and rulers shrink

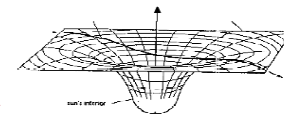
## TWIN PARADOX

$$T = \frac{T_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

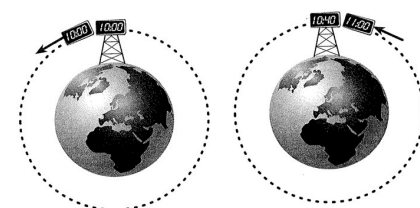


## TIME IN GENERAL RELATIVITY

Spacetime is curved by gravity  
 $\Rightarrow$  clocks run slow in gravity field



Time experienced depends on space-time path  
 Longest duration for freely-falling observer



Time stops at edge of black hole

## TIMEWARPS



Living in bungalow for year =>  
microsec younger than at top of skyscraper



Sergei Krikalev is 0.2 sec younger than  
someone who stays on Earth



Clock on plane going around world  
eastward (westward) records  
40 nanosecs less (273 nanosec more)



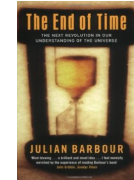
Head ages more than feet  
by 300 nanosec in 80 years

## HOW PHYSICS HAS REMOVED TIME

Spatialization of time  
Newtonian paradigm and determinism  
Time-reversibility

Relativity of simultaneity  
Block Universe  
Time started at Big Bang

Time and causality may be removed by quantum gravity



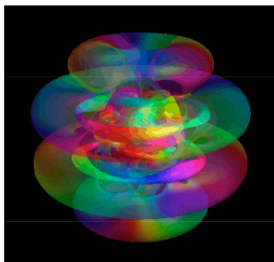
## HOW PHYSICS MAY REINSTATE TIME

All previous arguments are based on fallacy  
of extending description to whole Universe  
but this is different from its parts.

Time is real and key to understanding quantum gravity.  
Laws emerge and evolve with Universe => surprises and creativity



## Time in quantum mechanics: 2 mysteries



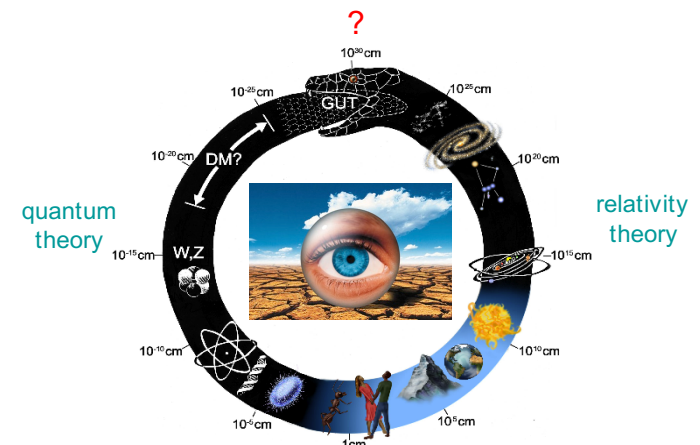
### Nonlocality

How can a single  
particle be at 2 places  
at the same time?



### Indeterminacy

Einstein: "God does  
not play dice."

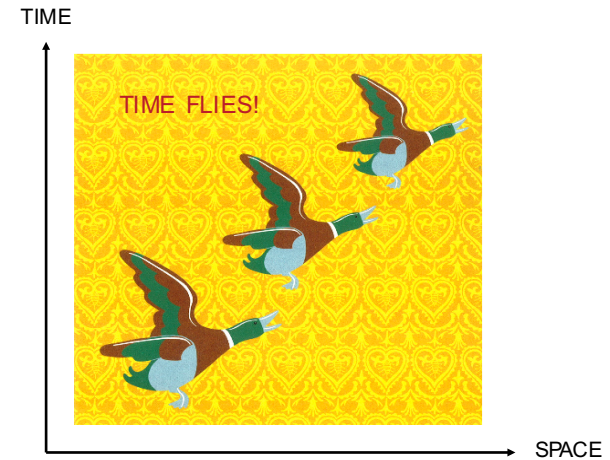


Will final theory support GR with no time or QT with no space?

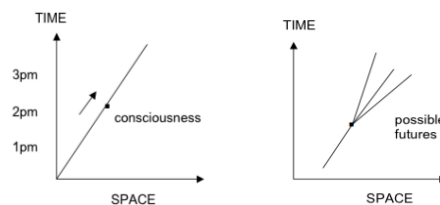
## TIME AND MIND: THREE PROBLEMS



- Flow of time
- Precognition
- Specious present



## CONSCIOUSNESS AND THE FLOW OF TIME



Einstein "block universe" does not describe flow of time because past, present and future coexist

St Augustine "It is inexact language to speak of three times - past, present and future. In the soul there are these three aspects of time, and I do not see them anywhere else."

## Weyl: No objective passage



Hermann Weyl (1949)

The objective world *is*, it does not *happen*. Only to the gaze of my consciousness, crawling upward along the life-line of my body, does a section of this world come to life as a fleeting image in space which changes in time.

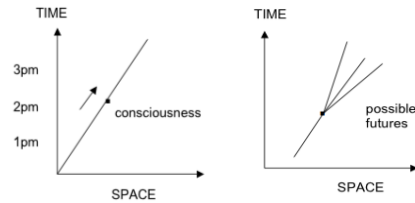
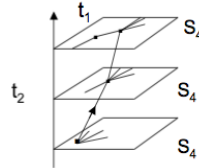
## Einstein: No privileged present



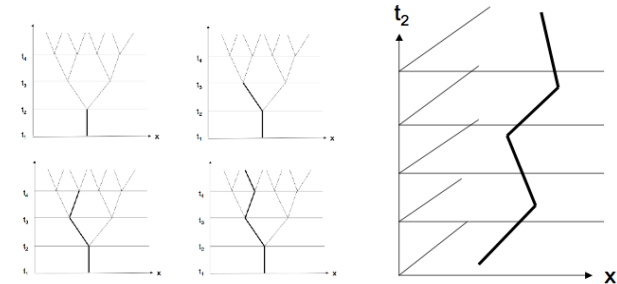
Einstein's letter to family of Michele Besso (1955)

"Now he has departed from this strange world a little ahead of me. That means nothing. People like us, who believe in physics, know that the distinction between past, present and future is only stubbornly persistent illusion"

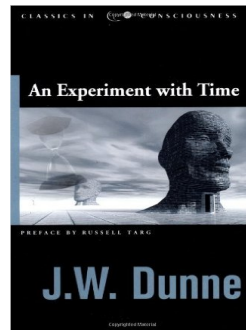
C.D. Broad

Extra dimension ( $t_2$ ) can describe time flowAccess possible futures  $\Rightarrow$  precognition

## EVOLVING BLOCK UNIVERSE

Showing how potential future  $t_1$  worldlines are actualized in  $t_2$ 

## PRECOGNITION



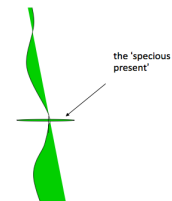
## SPECIOUS PRESENT

E. Robert Kelly [Clay] (1882)

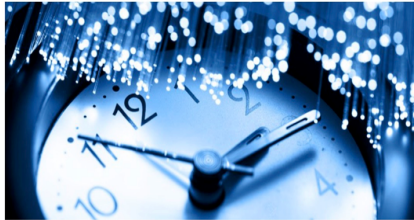
"The present is really a part of the [recent] past, delusively given as being a time that intervenes between past and future. Let it be named the Specious Present."

William James (1890) "The prototype of all conceived times is the Specious Present, the short duration of which we are immediately and incessantly sensible."

C.D. Broad (1930) "To see a second-hand moving is a quite different thing from seeing that an hour-hand has moved."



Consciousness occurs in 'time slices' lasting only milliseconds, study suggests



### Time Slices: What Is the Duration of a Percept?

Michael H. Herzog, Thomas Kammer, Frank Schamowski

Published: April 12, 2016 • <http://dx.doi.org/10.1371/journal.pbio.1002433>

### VARIATIONS IN SPECIOUS PRESENT

*Decrease*

Trapeze artist

Crisis

Tea time

*Increase*

Balance artist

Fever

NDE life review



### Tea time (extreme slowing down of time)

#### Dining-Room Tea (Rupert Brooke)

*A wonderful freeze frame account of Brooke's spontaneous experience of what he called an "immortal moment". The poem starts with the normal, flow of time ("careless transience"), then freezes into a timeless moment of eternity before "Time began to creep. Change closed about me like a sleep" and he is back into the flow again*



.....From the dark woven flow of change  
Under a vast and starless sky  
I saw the immortal moment lie.  
One instant I, an instant, knew  
As God knows all. And it and you  
I, above Time, oh, blind! could see  
In witless immortality.  
I saw the marble cup, the tea,  
Hung on the air, an amber stream;  
I saw the fire's unglistening gleam.  
The painted flame, the frozen smoke.

.....Dazed at length  
Human eyes grew, mortal strength  
Wearied; and Time began to creep.  
Change closed about me like a sleep.  
Light glinted on the eyes I loved.  
The cup was filled. The bodies moved.  
The drifting petal came to ground.  
The laughter chimed its perfect round.  
The broken syllable was ended.



### MYSTICAL EXPERIENCE I.K.Yaimni "The Science of Yoga"

*"There is interesting similarity between the description of mystical experiences produced through the stages of Samadhi characterised by Patanjali and an early anatomist twisting the focus of a microscope. It's as though the meditator is adjusting the focal length of his mind and encountering systematically different worlds depending on the settings achieved."* (Ed Kelly)

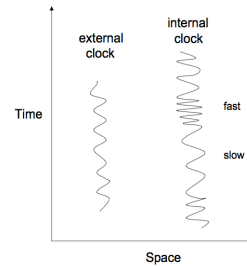
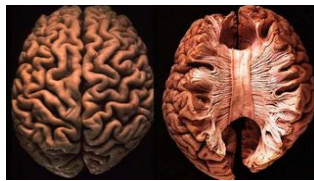
More dramatic changes of specious present?

SP may expand to infinity or shrink to zero!

Pure consciousness ("purusa") transcends space and time?



Do brain processes explain these variations in specious present?

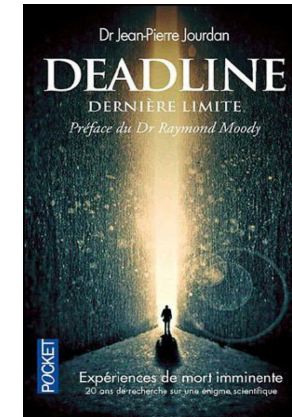


Consciousness decouples from brain => more dramatic change?

## SPACE & TIME DISTORTIONS IN NEAR DEATH EXPERIENCES



Jean-Pierre Jourdan



*"It's very difficult to explain, but I was able to see the bed and my body simultaneously from all directions. I could see the top of my head and in the same time I saw my left and right sides, and the bed from below and from above, and all the room like that, I was everywhere at the same time, you see?"*

*"I was surprised to have a 360° vision. I could see at the same time in front of and behind me, my sight was simultaneously a distant and close one. I was able to see through objects. I could see all the operating room, and in the same time under the operating table... Another surprising fact was that I could "read" the thoughts of people. I heard their words before they pronounced them."*

*"I have seen my body on the operating table. I was above, and I could see everything, everywhere, even through the surgeon. I was able to see through objects, and I passed through the walls."*

*"I could see everything around me, and I saw the inside of my body."*

*"There was no more time, in fact. It was like a moment of eternity."*

*"I had the feeling of being able to fly over time."*

*"They call that the past, it's because they reason within time. But there is no time out of the body. There is no past. Neither present nor future. Only an everlasting present."*

*"All I can say, even if I'm unable to explain it, is that I existed in a kind of absolute timelessness. As that whole journey out of my body unfolded out of time. No body: no time."*

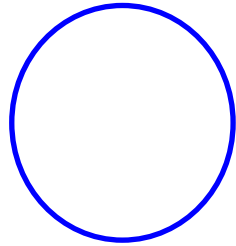
*"Then, I saw my life backwards. I say 'after' but there is no after. When you come into that state, there is no more past nor future. Here are some past and future, but they are part of an everlasting present. I can't explain that, there is nothing left but an absolute present... And everything is included in that present. At the same time I could see my 26 years unfolding, from now up to my birth, you see.. I was the spectator of my life which was there as a whole."*

**Strassman (DMT)** *"Past, present, future merge into a timeless whole."*

## CONSCIOUSNESS AND SPECIOUS PRESENT

Conscious time only exists between upper and lower limits

0.02 sec  $\Rightarrow$  40 Hz



## CONSCIOUSNESS AND SPECIOUS PRESENT

Conscious time only exists between upper and lower limits

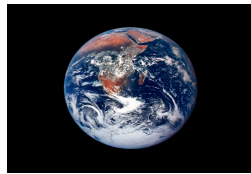
100 yr!



## EVOLVING HIERARCHY OF CONSCIOUSNESS



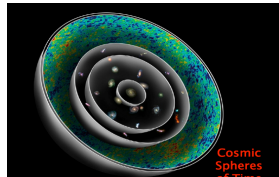
human  $10^{-2}$ s



terrestrial  $10^5$ s



galactic  $10^{16}$ s



cosmic  $10^{17}$ s

## PSI AND SPECIOUS PRESENT

Thouless and Wiesner (1947): focus of mind is usually brain but psi-gamma (receptive) and psi-kappa (expressive) act on surrounding penumbra in space and time

Hypothesis: specious present gives scale of penumbra  
 $\Rightarrow$  precognition/retrocognition on timescale SP  
 $\Rightarrow$  clairvoyance within range  $c \times$  SP but PK weak

ESP needs increase in SP, PK needs decrease in SP

