

Could consciousness shape space-time ?

Conference by Philippe Guillemant

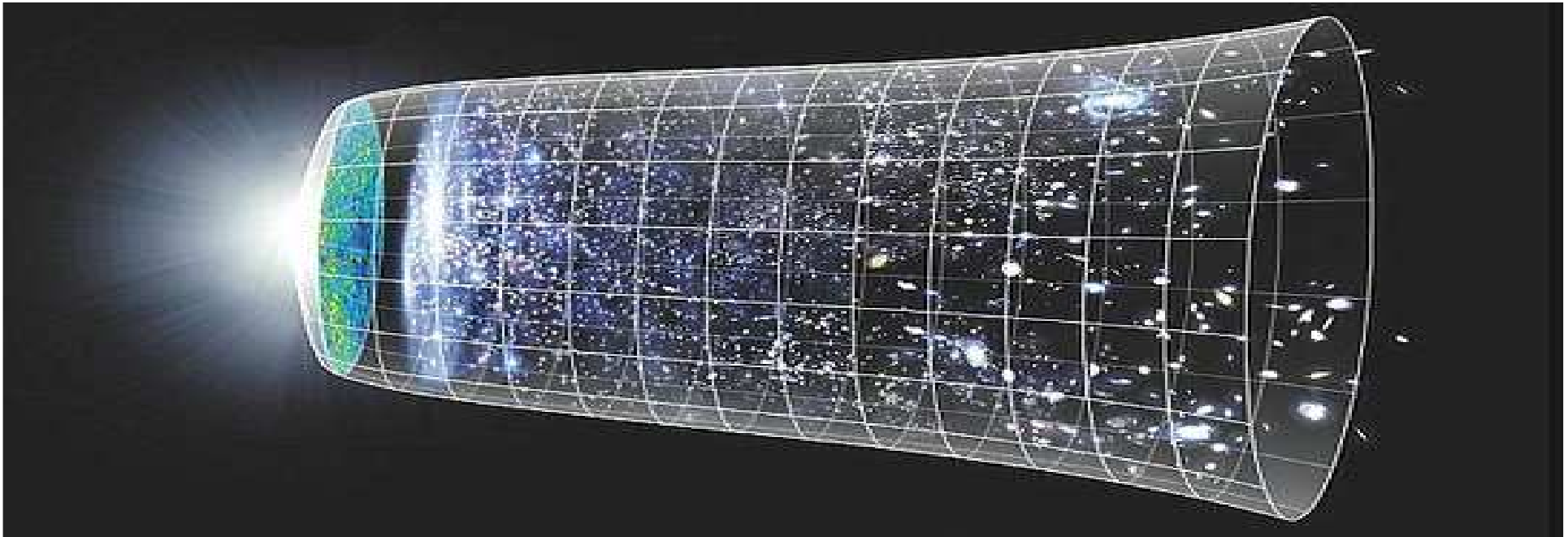
Physics ingeneer

Colloquium

« *Consciousness under the spotlight of science* »

Strasbourg, France

August 31th, 2018



The flexible block universe model

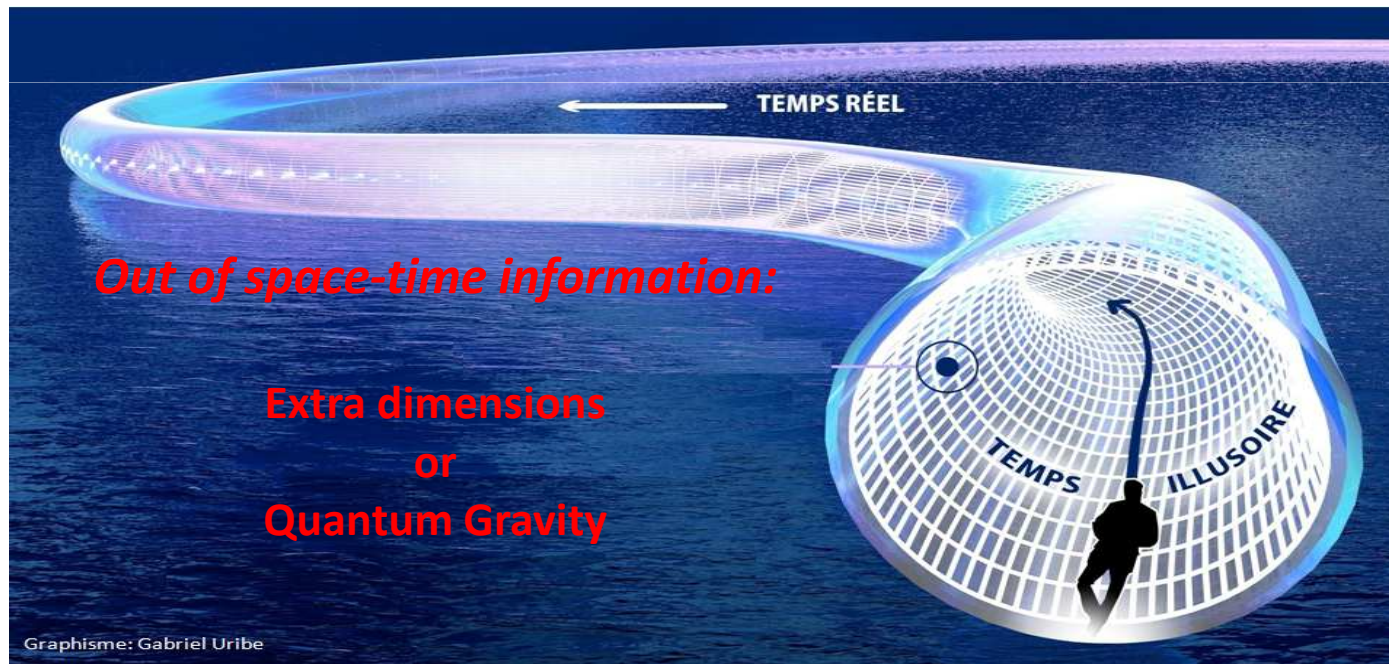
the metaphor of the invisible tunnel

Problems with mainstream model of space-time:

- (1) The block Universe is incompatible with quantum mechanics
- (2) The Multiverse is incompatible with Occam's razor

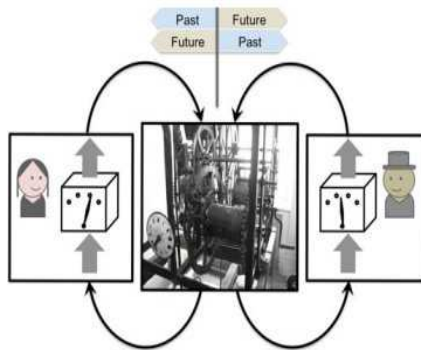
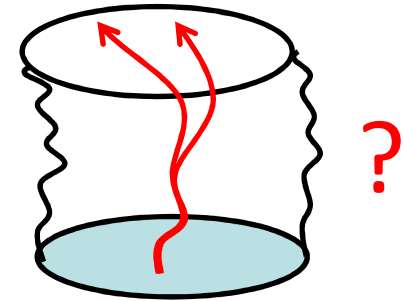
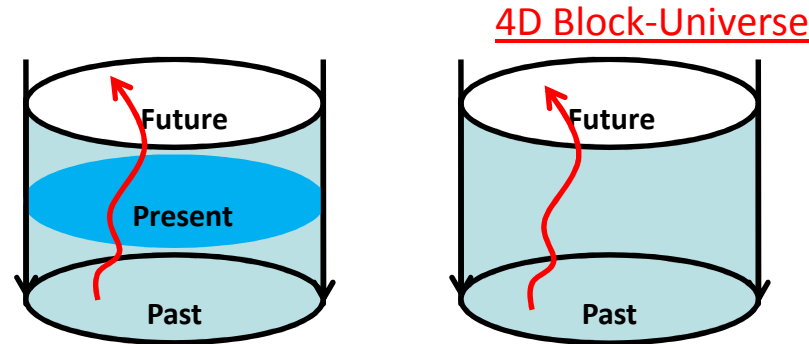
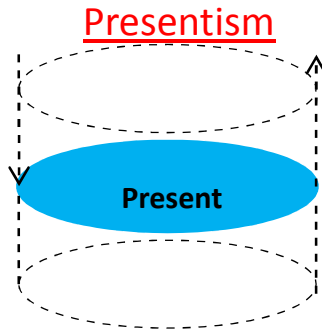
The proposition we develop here:

- (1) The multiverse is our own (a field of possibilities for our free will)
- (2) Consciousness is an operator of free will (out of space time information)



The flexibility is due to extra dimensions or quantum gravity

The evolution of our idea of time



General relativity manifests a future already realized

- *Langevin traveler, GPS, atomic clocks*

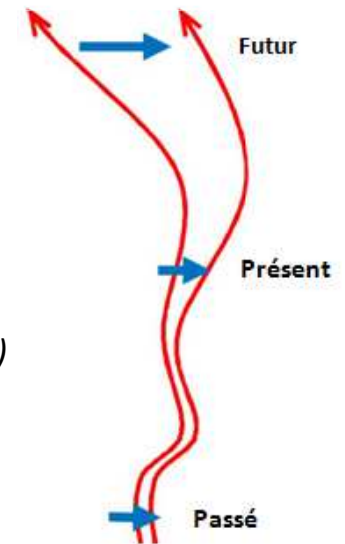
QM extends its non-locality to the time domain

- *Entanglement between past - present - future events*

Quantum gravity eliminates time

- *The t variable disappears from the equations (thermo illusion)*
- *Absence of global order of time (ref Carlo Rovelli)*

How can present moment disappear like this?



If time is like space, a solution is that the present time could have a thickness !

What if the present had a real thickness?

Take physics seriously: The future is already a little bit there (in our head)
Anticipating what happens in a time slot gives a thickness to time

Where is the illusion?

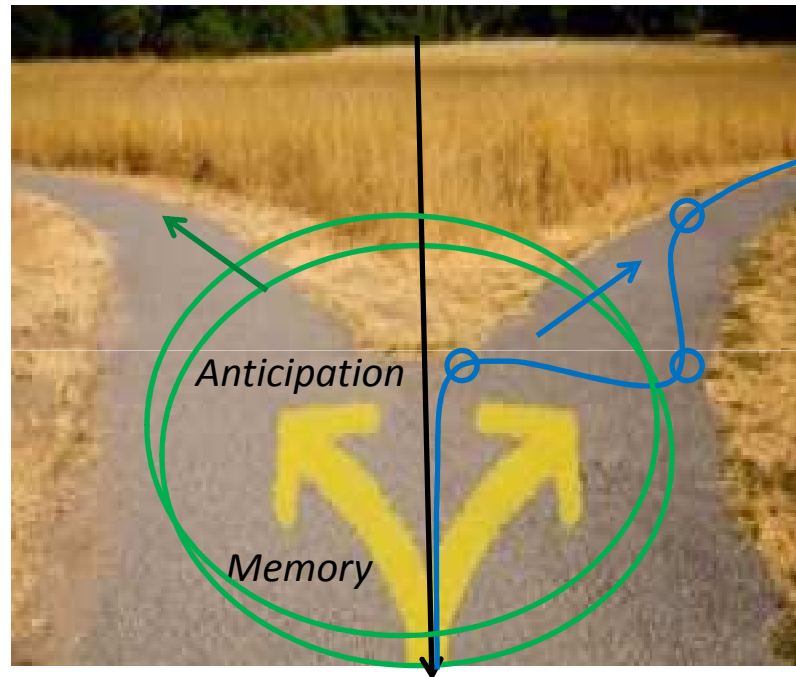
Sequential time?

(no thickness)

or

Thickness of time?

(Events)



Where is memory ?

Local space has a thickness: why not time?

The illusion of sequential time could come from the brain, which leads to sequential processing of information.

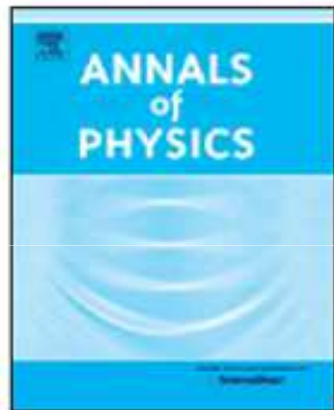
Anticipation of the future and memory of the (close) past could correspond to a real thickness of time, with variable geometry, making us witnesses of events rather than movements of matter.

A thickness of time imposes choices, but does physics allow free will ?

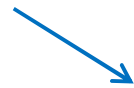
Does physics allow free will?

It has long been customary to consider that classical physics is deterministic but ...

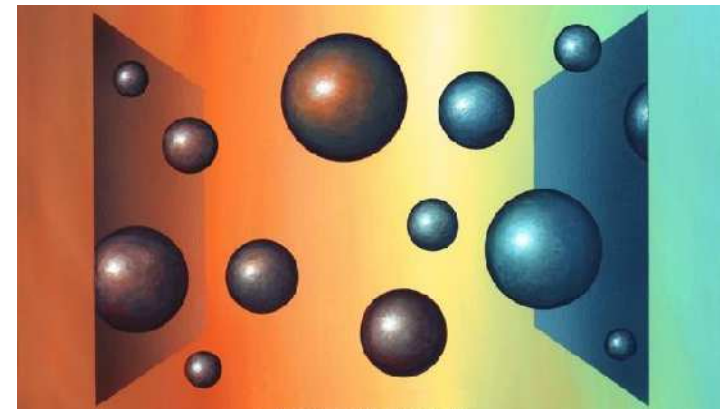
- *Chaos could release matter (T.X.Thuan's expression)*
 - *Real numbers may not be real (N. Gisin)*
 - *The multiverse could belong to us (A. Suarez)*



P. Guillemant et al:
« *A discrete classical space time could require 6 extra dimensions* »,
Annals of physics 388 (2018) 428-442



Conclusions:



Mechanics do not determine the course of events, except briefly or incompletely.

**+ 3 dimensions for the choice of destination
+ 3 dimensions for the choice of path**

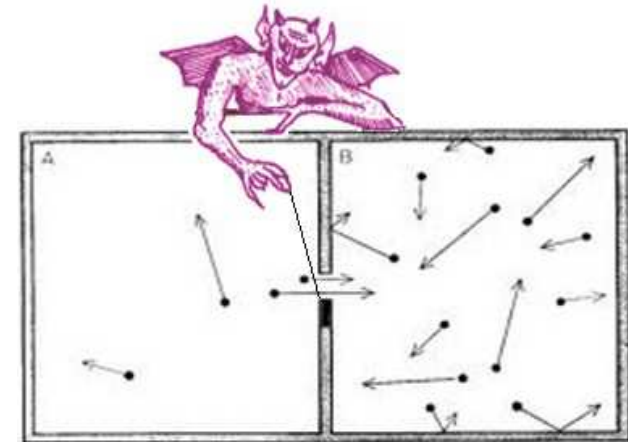
The choices of trajectories could be made out of time (via quantum gravity?)

At the origin of this fault of determinism on the macroscopic scale: information

Information: a physical quantity

- (1) At our scale: Information has an energy cost: allows to save the second principle (Maxwell's Demon Paradox).
Landauer principle: **manipulating bits costs energy = $k T \ln(2)$**
Verified exp. for the first time in 2012 (France, ENS Lyon)
- (2) Quantum scale: Heisenberg's Uncertainty Principle is interpreted as a **limitation of the density of physical information** of the 6-components phase of a particle.
- (3) Great Unification Theories: String Theory => no length smaller than the length of Planck ($1,616 \cdot 10^{-35}$ meter) makes physical sense. Likewise for loop quantum gravity theory:
All the information associated with any physical object is finite
(discretization of mass, energy, time, ...)
- (4) Perspective reversal: Space does not exist physically (holographic model, theories of simulation, Plato's cave, idealistic philosophy: everything is consciousness)

=> **EVERYTHING IS INFORMATION** (It from bit, John Wheeler)



Maxwell's demon reverses time



Plato's cave relativizes space

In physics, the assumption of finite density of information becomes unavoidable

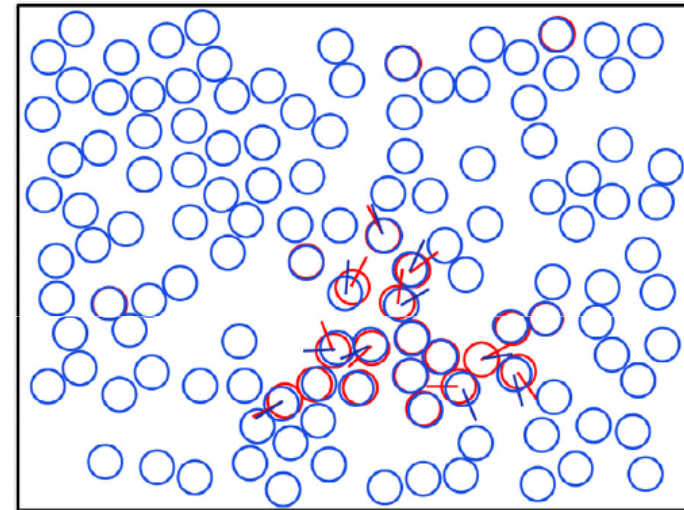
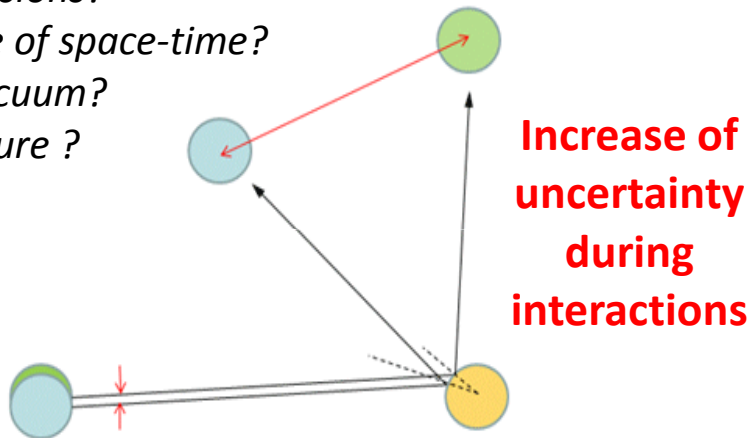
The paradox of determinism

Mechanics can not calculate beyond a certain amount of information, of the same order as that included in the initial conditions (much lower if N_b or T_v high)

The basic laws of mechanics are not laws of creation but of "deployment"

To determine events extra information is required:

- extra dimensions?
- from outside of space-time?
- quantum vacuum?
- from the future ?



The team of Thierry Bodineau who received the award « The research 2016 » on the Brownian movement that settles in a billiard:

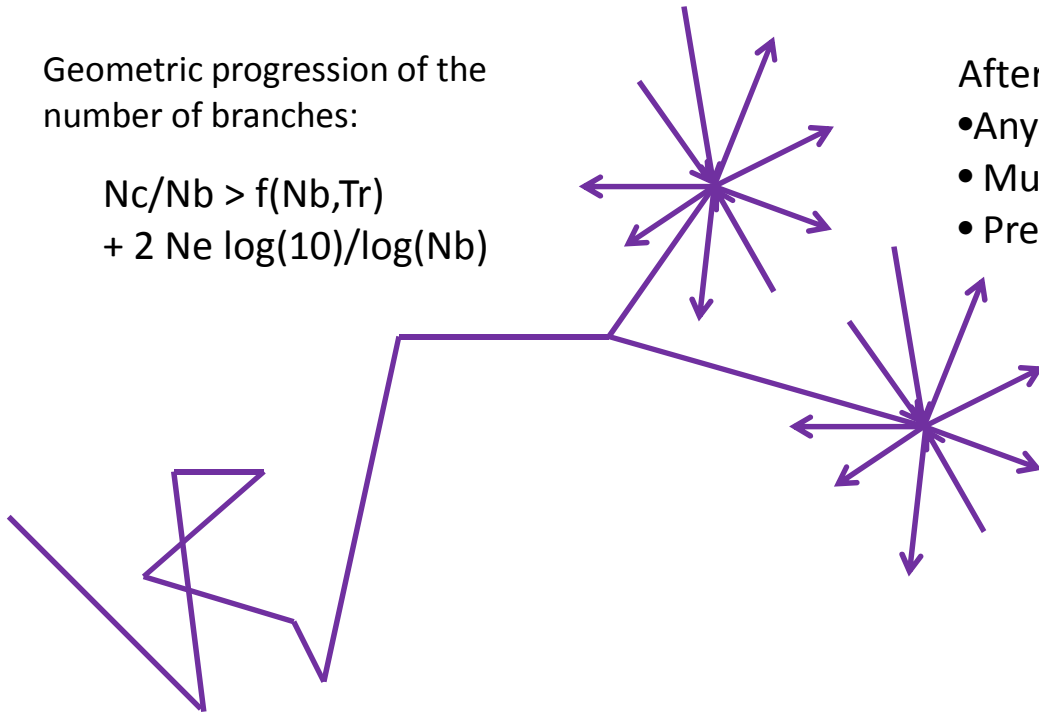
« *A remarkable aspect in [our] result is that starting from deterministic equations - the equations of hard spheres clashing - [we] managed to show that after a long time, a random process with no memory (the Brownian) appears* »

After the critical stage, a multiverse appears 😊

Explosion of the multiverse branches of a billiard

Geometric progression of the number of branches:

$$N_c/N_b > f(N_b, Tr) + 2 N_e \log(10)/\log(N_b)$$



After a few dozen interactions:

- Any possible final condition FC reached
- Multitude of alternative paths between IC and FC
- Precision does not change anything

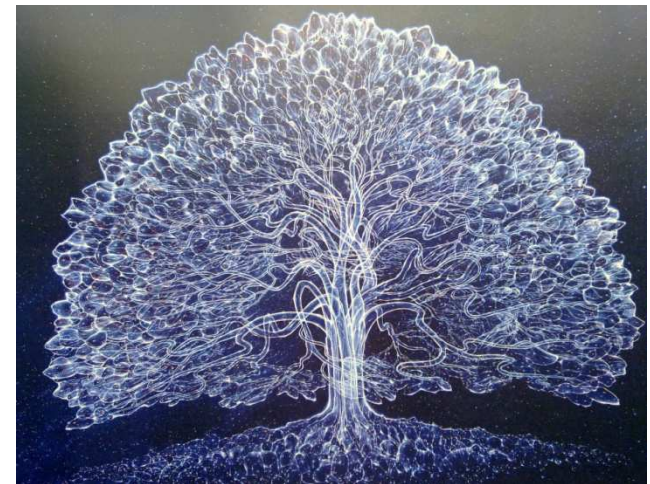
***Non-isolated system:
Decoherence prevents
our reality from being quantum
but does not delete the multiverse***

Important new result:

The quantity of bifurcations is independent of density or accuracy



Degree of generality: All types of interactions?
All complex dynamic systems?
Human scale? Everyday life?
We are now entering into **speculations:**



Trajectories or time lines could switch in the future => manage instability

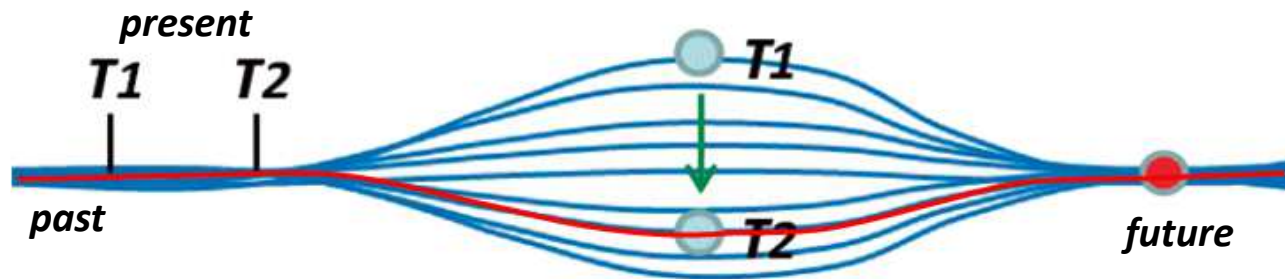
How to model an unstable future?



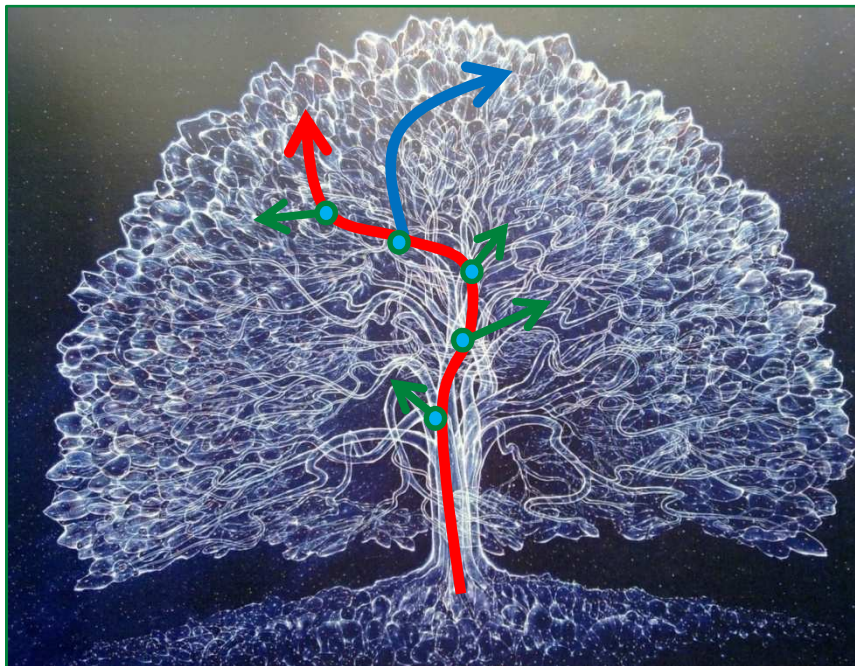
Speculative Proposal:

If our timelines can switch

then the multiverse could be fully included in our reality



*Extra dimensional
informations (chance?)
determine paths and
commutations*



Where does this information come from?

Free will?

Our brain / consciousness system
as a navigation system?

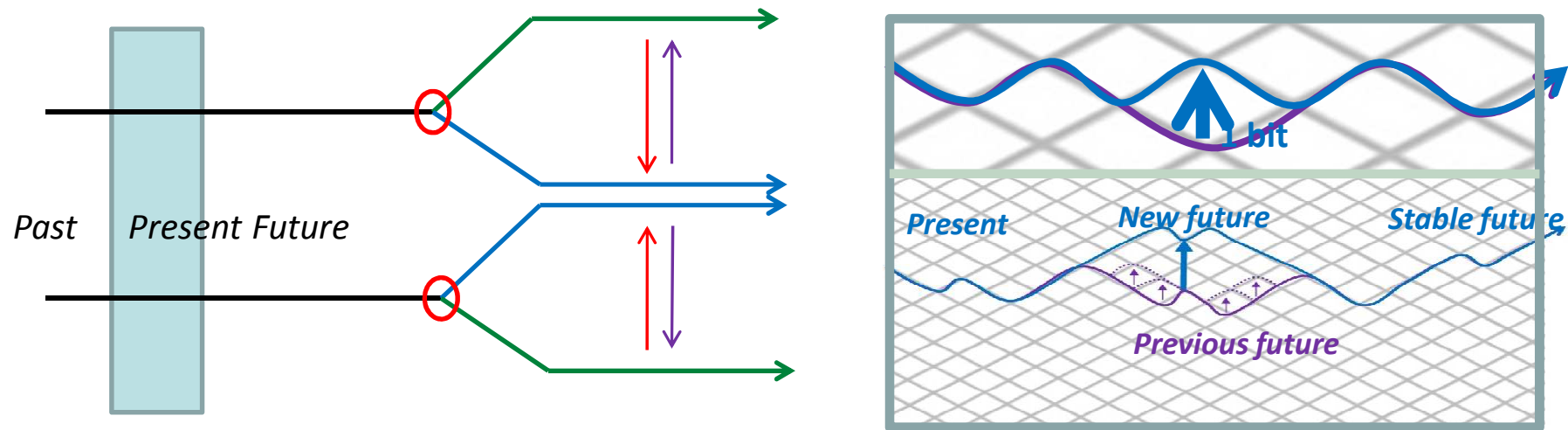
How to make these commutations
compatible with each other?

Macroscopic entanglement?

Neural networks and quantum entanglement

Switching timelines out of time

Changes in the future => macroscopically entangled time lines



More stable future => Retrocausality

(E.K. : "to put the QM in the Block Universe, one must accept the retrocausality")



O. Costa de Beauregard



Y Aharonov

(Accommodating Retrocausality with Free Will)



HG Nielsen



J Sarfatti

Retrocausality helps to better understand time

The great mystery of time... or consciousness?

If we take seriously everything that physics suggests

- Reality would not be created in time, but in another way ...
- Time in the sense of the "already created front" would not exist
- The past would still exist and the future would already be there, but flexible
- The future could affect the present: key point!
- It would be possible to travel in time, in both directions!

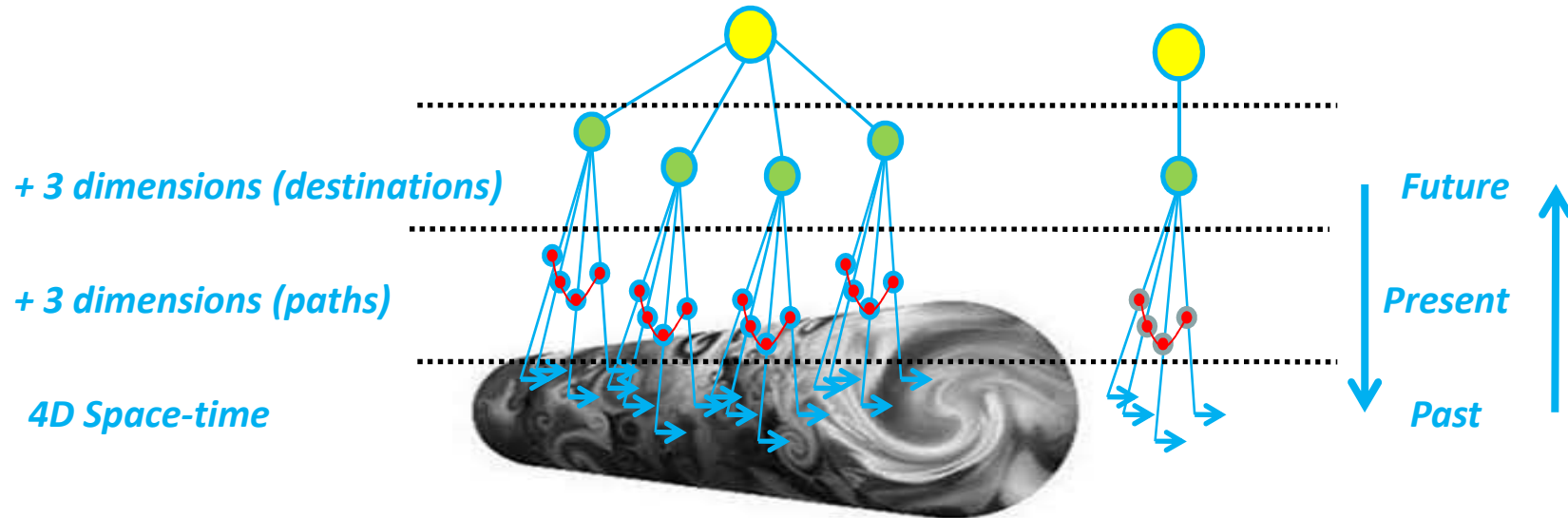


Cyber point of view: to create the future, it is much safer to start from a future already created and make it evolve by commutations, via additional dimensions ...

... introducing information that could be expressed through quantum gravity ...

A multistage cybernetic model

which assumes that information models space-time in additional dimensions



Double causality: a falsifiable theory?

The problem:

Testing the flexibility of space-time or influence of the future

Explored tracks:

Introduction of chance in advertising or web robots

The principle:

Research of statistical anomalies or serendipity effect

Conclusion

Cybernetic design of a flexible space-time:

- constrained simultaneously by *initial and final conditions*
- solves *temporal paradoxes* through double causality
- takes into account *information external* to 4D space-time

That implies:

- to relativize the *ontological scope of the equations* (= tools)
 - determinism and continuity incompatible with reality
- to find *appropriate cybernetic models*:
 - fractal model, or multiscale, or neuronal ...
 - able to connect entanglement and dimensions or stages
- to accept the idea of an *acausal parameterization* in physics
 - hard sciences: the need to inform about the final conditions already exists
 - human sciences: avoid confusing brain and consciousness (source of information)
- to accept the search for experimental protocols to falsify or demonstrate *the influence of the future on the present*: The Internet and big data offer promising leads on this subject

