

Category and Reconciliation Errors

The golden ratio and growth, fractal geometry and natural scale invariance: such beautiful correspondence of mathematics and natural forms should not beguile us regarding mathematics in physics. The dire necessity for a reality framework for physics for reconciliation and categorization of the elements of reality will be demonstrated.

Foucault's pendulum set in motion swings in a fixed plane obeying Newton's first Law, while the Earth below turns. Meanwhile, an observer sees the plane of the pendulum rotating above the seemingly stationary Earth; The orbit of Io, seemingly irregular in pace due to the orbit of the Earth. These are examples of the relativity of all measurement at macroscopic and astronomic scales.

Realizing that different observers experience same events at different times and in different ways led Einstein to consider that events exist spread within a space-time continuum. This reasoning leads to the Grandfather paradox. An error in the assumption is that substantial reality rather than the output of sensory data processing is being seen. Sensory data persists in the environment receivable by different observers at same and different times, giving non simultaneity of events. It is not substantial events themselves that persist.

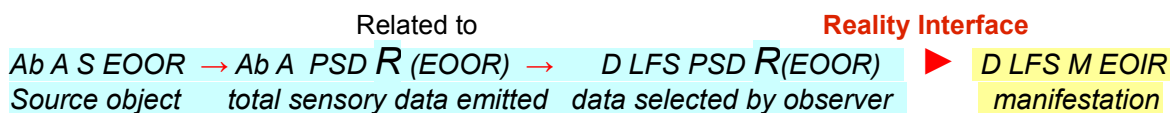
An absolute (as no reference frame applied), actualized element of Object reality

is not equivalent to a definite (as reference frame, viewpoint, applied), limited fixed state (selection of information giving a partial view of apparent topology) manifestation, element of Image reality.

To confuse them as the same thing is a **category error**.

$(Ab\ A\ EOOR)Grandpa \neq (D\ LFS\ M\ EOIR)Grandpa$
 Substantial Object Manifestation

Consider the relevance of projective geometry to Image reality formation .⁵ As the speed of light is so fast, at every day speeds and distances the image seen closely resembles an aspect of the topology of the absolute, actualized object. Absolute, as no reference frame applied, so all prospective viewpoints of it are equally valid.



The **manifestation** has a singular fixed state, produced from the **sub set** of sensory data received rather than many possibilities of the absolute object and pre-selection sensory data. Close to the speed of light the sub set of sensory data intercepted causes distortion of the **theoretical output** (ignoring limitations of sensors and visual systems likely to blur the output rather than give clear resolution of **images**). That the outputs are mere **manifestations** should be borne in mind when considering the Barn Pole type paradoxes.

The Andromeda paradox is understood simply by realizing there is a significant **category** difference between events in which substantial elements of reality interact, and Image reality **manifestations**. **EOOR** interactions occur in Object reality that is uni-temporal (same time everywhere) and can be considered the **causality front**. (Not yet received environmental potential sensory data can be named the **pre-written future**, not to indicate determinism but that the data to form **observable manifestations** exists prior to their experience. The Object reality or source reality, and Image reality experienced present manifestation are **not**

synchronized. When an event is observed via its **manifestations** is variable, but when an event happens in the source Object reality is definite, uni-temporal.

Demonstration that it is **potential sensory data** in the environment giving **present experience** and that the **experienced arrow of time** can be reversed. Firing a supersonic projectile with miniature microphone forming the tip portion, that will be ahead of the bow wave, through clearly identifiable sound waves. The **reversed signal output** from the experiment will be **proof of principle** and that it is only the inability to travel faster than the speed of light that prevents seeing of time reversal in **present Image reality**.

Is the moon there when I'm not looking?, fails to distinguish between **the knowledge / concept of the moon**, **manifestation of the moon** formed by an observers sensory system, input sensory data and **substantial moon object**.

$(Ab\ A\ S\ EOOR)Moon \neq (Ab\ A\ PSD)Moon$
Actualized Object *Total potential sensory data in environment relating to Moon object*

$(Ab\ A\ S\ EOOR)Moon \neq (D\ LFS\ PSD)Moon$
Actualized Object *Limited sub set of sensory data, relating to Moon, received by observer*

$(Ab\ A\ S\ EOOR)Moon \neq (D\ LFS\ M\ EOIR)Moon$
Actualized Object *Output manifestation of Moon*

When not looking there is no $(D\ LFS\ PSD)Moon$ or \blacktriangleright $(D\ LFS\ M\ EIOOR)Moon$
Sub set of sensory data *Output manifestation*

However there is still $(Ab\ A\ S\ EOOR)Moon$ and $(Ab\ A\ PSD)Moon$ within Object reality. i.e. The substantial actualized object and total sensory data in environment relating to Moon object, able to exist without their **Image reality manifestation** counterpart.

$(Ab\ A\ S\ EOOR)Moon$ and $(D\ LFS\ M\ EOIR)Moon$ belong to different categories of elements of reality, belonging to different facets of reality. **This makes the question inadequate**, as *the category of moon, oMoon-source object, PSDMoon-moon related sensory data or iMoon-manifestation or PsyMoon-concept* has not been specified, only an unspecific noun used.

QM **measurements** do not represent objective descriptions of a systems state independent of measurement i.e. pre-measurement OR amalgamation of the pre-measurement state of the element of reality and the ready state of the apparatus.

$(Ab.\ A\ EOOR)x$	$(D\ LFS\ \emptyset\ EOOR)R(EOOR)x$	$(D\ LFS\ M\ EOIR)x$
$(Ab\ A\ EOOR)apparatus$	$(Ab\ A\ EOOR)apparatus$	$(D\ LFS\ M\ EOIR)apparatus$
/protocol	/protocol	/protocol
Pre-measurement	At measurement observable formed	Observation -manifestations

The cat in a box

$(Ab\ A\ EOOR)$ exist in an absolute state because **no reference frame has been applied**. A coin in free fall is in all possible states in flux over time, not just the ones that can be **later observed** via the two possible intermediary observables. **As no frame of reference has been applied**, an atom considered over time can likewise be regarded as being in an absolute state of flux, objectively altering but also being all possible viewpoints (measurement outcome

possibilities)simultaneously. When a radioactive particle decays the scenario is utterly changed as two different elements of reality are **irreversibly** produced from the progenitor. This scenario of radioactive decay is not just a matter of **reference frame uncertainty** but physical/chemical change to the substantial elements of **Object reality** that do not require the formation of **Image reality** counterparts for their existence. The elements of object reality have independent existence.

Scenario 1

$(Ab A E O O R)X \rightarrow (Ab A E O O R)X$
 $Ab A E O O R)Live\ cat + (Ab A \Theta E O O R)Live\ cat R(Ab A E O O R)X \rightarrow$
 Source Object reality **Observable**
 $\rightarrow (DLFS M E O I R)Live\ cat R(Ab A E O O R)X$
 $\rightarrow Psy((Ab A E O O R)X)$

Scenario 2

$(Ab A E O O R)X \rightarrow (Ab A E O O R)X - (Ab A E O O R)y + (Ab A E O O R)y$
 $Ab A E O O R)Live\ cat + (Ab A \Theta E O O R) Dead\ cat R(Ab A E O O R)X -$
 Source Object reality **Observable**
 $(Ab A E O O R)y + (Ab A E O O R)y$

Via (PSD E O O R)reflected from cat E O O R $\rightarrow (DLFS M E O I R)Dead\ cat R(Ab A E O O R)X$
 $- (Ab A E O O R)y + (Ab A E O O R)y$
 $\rightarrow Psy((Ab A E O O R)X - (Ab A E O O R)y + (Ab A E O O R)y)$

Manifestations: $(D L F S M E O I R)Live\ cat R(Ab A E O O R)X$ OR $(D L F S M E O I R)Dead\ cat R(Ab A E O O R)X - (Ab A E O O R)y + (Ab A E O O R)y$

and knowledge: $Psy((Ab A E O O R)X)$ OR $Psy((Ab A E O O R)X - (Ab A E O O R)y + (Ab A E O O R)y)$

belong to the Image reality side of the reality interface. Image reality is formed from sensory data input originating in Object reality. Image reality does not **directly** have any influence upon Object reality. Object reality has independent existence and does not require observation for its existence.

The state of the particle in this case either remains in an absolute unobserved and unknown state or decays independently of observation. It does not require imposition of an observer reference frame to assume the decayed state. Opening the box only allows an Image reality counterpart of the box contents to be formed whereby the **outcome can be known.**

A non radioactive atom in an absolute state of stable flux - no reference frame or measurement applied - is a **different category** of element of object reality to a radioactive one that has a probability of irreversibly changing. When it will decay is not just unknown but unknowable. So while it is reasonable to represent the non radioactive particle as a **superposition of all possible states over time,** it is not reasonable to do the same for the radioactive particle's decayed or not state because it is not in a state of flux between decayed and non decayed states but definitely one or the other in Object reality. **Observation does not alter its state.**

All observed outcomes are formed from **intermediary observables** produced upon measurement. The element of reality - apparatus interaction. **The set of experimental outcomes** is limited to the ones that can be formed from the post element of Object reality- apparatus interaction, observables set. The observables are not pre-existent pure states but representative states formed by interaction with and transformation by the apparatus and measurement protocol. The statistical population of **measurement outcomes,** as it relies upon the set of observables as its reservoir of possible outcomes, excludes all counter-factually

definite outcomes. However counter-factually definite properties do belong to the absolute, actualized elements of Object reality considered over time, ie over the sequence of configurations of the Object universe. The observed outcomes have *not actually jumped into a fixed state existence* upon observation due to theoretical collapse of a representation of a supposed pre-measurement superposition of observable states in configuration space.

Source <i>EOOR</i>	Observable <i>EOOR</i>	<i>no alternative states to account for</i>
$(Ab A S EOOR)_x$	$\rightarrow (D LFS \Theta R(EOOR)_x)$	<i>no requirement for many worlds for observables not produced</i>
destructive measurement protocol		

Manifestation. Observed experimental outcome

► $M EOIR R D LFS \Theta R(EOOR)_x$

Most quantum experiments are of the destructive kind. Some gently interfere with the source *EOOR* not destroying it, though the interaction introduces uncertainty as the effect of the interaction on the *EOOR*.

$D LFS R(EOOR)_x$	►	$(D LFS M EOIR)R(EOOR)_x$
Observable		Manifestation (output of observers sensory system)

$D LFS R(EOOR)_x \neq (D LFS M EOIR) R(EOOR)_x \neq (Ab A EOOR)_x$
 AND
 $\neq (Ab A EOOR)_x$

Observables and source elements of reality, and **manifestations** are not equivalent. Observable and source element of reality are in a **different category** of elements of reality to the **manifestation** and belong on a different side of the **reality interface**.

An example is forming a heads -tails dichotomy from an absolute continuum of orientations - absolute because prior to measurement no reference frame or measurement protocol has been applied, so all possibilities are equally valid. The superposition of heads and tails **observables** does not faithfully represent the state of the coin element of Object reality prior to measurement, nor the pre-measurement coin state and ready state apparatus system. It represents an impoverished sub set of alternatives created by the measurement interaction.

$(Ab A S EOOR)_{Coin} +$	\rightarrow	$D LFS \Theta EOOR R(Ab A S EOOR)_{Coin@Tx}$
$(Ab AT EOOR)$ ready state Hand		Definite, limited fixed state observable <u>representing</u> coin element of object reality at time x

However: $Unmeasured (Ab A S EOOR)_{Coin@Tx} \neq D LFS \Theta EOOR R(Ab A S EOOR)_{Coin@Tx}$

Another example is horizontal and vertical polarization observables for light, output from polarization apparatus and measurement protocol. This gives an **impoverished representation** of the elements of reality that interacted.

$(Ab MS AS EOOR)_{input}$	\rightarrow	$(L MS A EOOR)_{output}$
Absolute mixed state prior to measurement		50% $(Ab MS AS EOOR)_{input}$
		Called Horizontal or vertical polarized
		$Psy(D SFS \Theta)_{output}$ but $R(LMSA EOOR)_{output}$
		assumed definite, singular fixed state observable
		$Psy(D SFS \Theta)_{output} \neq (LMSA EOOR)_{output}$.

To confirm $(D SFS \Theta)$ output a second polarizer at 90 degrees to the first is used, eliminating all further transmission. However this does not actually demonstrate that the output of the first polarizer was $(D SFS \Theta)$ light rather than $(LMS A EOOR)$ light, only that the light present is not able to pass through the second polarizer.

Demonstration that between the two polarizers is $(LMS A EOOR)$ light can be done by putting a 45 degree polarizer between the two sheets that allows some light to pass through and exit from the third.

The $(D SFS \Theta)$ state of the observable of the first polarizer is a mental construct. $Psy(D SFS \Theta) R (LMS A EOOR)$ as is a superposition of $(D SFS \Theta) H Pol.$ and $(D SFS \Theta) V. pol.$ between the two polarizers.

I.e. $Psy S(D SFS \Theta) H.pol. V.pol R(LMSA EOOR)$
 "superposition"

Re. two measurable electron spin states called spin up and spin down. There is reason to believe that it is interaction with the apparatus, such as Stern-Gerlach experiment apparatus, that generates the apparent clear dichotomy of spin states, rather than the existence of two pure states of spin in unmeasured Object reality. Prior to introduction to the measurement apparatus the electrons will be in an absolute state with no imposed orientation due to reference frame or apparatus orientation, so no up or down bias. It is the relationship with the magnetic field that causes discrimination between the absolute mixed state.

Like the polarizing sheets example, an arrangement of 3 electron spin traps in positions up, horizontal and down allow electrons through, whereas the two oppositely oriented spin traps do not. Spin flip in the presence of a magnetic or electric field also shows that the spins are not a fixed dichotomy.

Entanglement

Entangled pairs of photons: Frequency is phase matched and polarization can be same or perpendicular depending on the type of converter. Measurement of one of the photons allows knowledge of the other's existence. The correlation is produced upon production of the pair. It is random with no correlation between subsequent pairs.

Alice and Bob, the observers.

Prior to measurement

$(Ab A EOOR) Particle a$ **Unknown state of correlation** $(Ab A EOOR) Particle b$

Measurement

$PSD R (D FS EOOR)ax$ measurement of state x
 potential data or observable

No investigation of bx or by
 So both states x and y are undetermined by experiment therefore uncertain.

Observation

$(D FS M EOIR)ax$
 manifestation

Knowledge

$Psy(D FS M EOIR)ax + Psy(D FS EOIR)bx @Alice$
 measured inferred from known correlation

If $Psy(D FS EOIR)bx @Alice$ then
 by state is uncertain
 If $Psy(D FS EOIR)by @Alice$ then
 bx state is uncertain

Particle **b** does not know which state to keep uncertain, there is no faster than light communication. Both remain uncertain 'to Bob' until tested.

$Psy(D FS EOIR)bx @Alice \neq (D FS EOOR)bx$.

The particle **b** is unchanged by the remote knowledge of its state, post measurement of **a**, due to correlation at production and remains $(A b A E O O R) b$ - In an absolute state with no imposed measurement frame of reference.

The mainstream quantum explanation is that the particle pair must be considered as a singular wave function in configuration space which collapses upon observation of **a**, also immediately collapsing **b** into a definite correlated fixed state. This raises the problem of apparent faster than light communication.

The alternative given above shows that there is a **category error** if Alice's knowledge is assumed to be equivalent to the unmeasured state of Bob's particle. $Psy(D F S E O I R) b x @Alice \neq (D F S E O O R) b x$. Alice's knowledge comes from an Image reality manifestation of her particles state obtained from experiment. The experiment has altered the unknown absolute state pre-measurement into a fixed, definite measured state in Object reality and output Image reality. There is no equivalent fixed definite measured state in Object reality for Bob's particle or Image reality manifestation for Bob's unmeasured particle, it remains in its absolute state. $(A b A E O O R) Particle b$.

Mathematical superposition of the combined wave functions in configuration space can be regarded as representational of the combined lack of knowledge of **a** and **b**'s states while they remain in their absolute unmeasured states. Theoretical wave function collapse can be seen as representing a transition from considering Object reality to Image reality. I.e. Crossing of the **reality interface**. From Absolute unknown state in Object reality to Definite, Fixed state Manifestation in Image reality and resultant knowledge. Theoretical wave function collapse in configuration space does not itself cause any physical, substantial alteration to the particles under consideration.

As Bohr suspected, classical physics does not emerge from quantum physics. That is because Classical physics, Newtonian mechanics and Relativity are about what is observed - manifestations wholly in the Image reality realm. Manifestations of objects have limited fixed states determined by measurement, and are partial representations of absolute Objects. Though relativity relies upon observers obtaining sensory data from the environment from which their relative space-time Image reality manifestations are formed, and that sensory data is a part of Object reality.

Quantum physics is dealing with formation of observables, formed from unobservable elements of object reality and involves crossing of the **reality interface** when outputs of measurements are observed. The coin example demonstrates that the two sides of the **reality interface** are applicable at macro scales. Due to the very long distances light travels from distant stars, the corresponding element of Object reality that was the source of the received data may no longer exist or have changed significantly. The two facets of reality on different sides of the **reality interface** are not synchronized. This is because manifestations are formed from received sensory data and there are varying delays between signal production and processed output. This gives relativity and non simultaneity of events for different observers.

Despite the absolute nature of Object reality, the need to form observables prior to observation means that it is necessary to abandon local realism and counter-factual definiteness. Although the counter factually definite properties do relate to the unmeasured absolute elements of object reality considered over time (sequences of the Object universe configuration), absolute elements of Object reality are not known directly but only through the intermediary observables that exclude counter-factual measurements.

Theoretical wave function collapse in configuration space can be used to indicate a transition

across the **reality interface**. The representation then has no further usefulness. One snapshot viewpoint at measurement is chosen to become the **Image reality observed**. There is no need to speculate about the **formation of alternate worlds** in which the measurements not made happened. The alternatives are only **other viewpoints, not used, of the same absolute element of reality that was measured**. This means **we need have no moral dilemma regarding alternative selves in alternative worlds**. The world does not become two or more because a **singular observable** was formed from an **absolute element of object reality**.

Psy(50%x50%y(R EOO)a) **Experiment** → (D LFS Θ R(EOOR)a) ▶ (D FS M EOIR)a
knowledge pre experiment *singular Observable* *manifestation*
Aggregate behavioral characterization

(D FS M EOIR)a does not pre exist the experiment. For the data (to produce the **specific manifestation**) to exist, the experiment must already have been conducted. Recall the **space-time continuum is not substantial events in space-time** but there is **potential sensory data in the environment from which events can be manifest as Image reality**. There is no **substantial future**, it is not yet formed and so can be named the **un-written future**. This allows non determinism because singular causes do not necessarily have only singular possible outcomes, but as we can find by examining large numbers of outcomes, probabilities of occurring. As events in **image reality** must already have occurred to be observed, since the **sensory data must be available to form the manifestation**, this gives another future preceding the **experienced present**. That can be called the **pre-written future**, as it may become **present experience**, even though it emanates from events that have previously occurred. Reminiscent of the Ouroboros. It is not necessary to abandon freedom and accept complete determinism as adherence to the **substantial space-time continuum concept** would seem to demand for classical and quantum physics to be united. Belief in substantial past, present and future coexisting in space-time and local realism must go, as must inclusion of **couterfactual definiteness in the observables EOOR subset**.

Although the **EOORs of Object reality are absolute**, they can interact and are in relation to each other, giving the physics that can be implied via **intermediary observables and sensory data**.

Object reality gives a **substantial realm in which fields and particle interactions can exist as embodied flux in space over time i.e. sequences of arrangements of the Object universe**. The physics occurring in the **Object reality side of the reality interface** is not predetermined. So there is freedom, the experimenter can decide what experiment to conduct etc., **the unwritten future does not exist**. Absolute changes in arrangements and relations between the universal elements of Object reality gives an irreversible Object reality “arrow of time” and universal configuration by configuration absolute passage of time. The irreversibility of the subjective, experienced “arrow of time” can be recognized as being due to the inability to **exceed the speed of transmission of the sensory data from which Image reality manifestations are formed**.

Physics must leave behind enchantment with mystery **due to Incomplete reconciliation of information** and misdirection of category errors; adopting the *Essential* structure of reality as a **necessary framework for physics**, not required by pure mathematics.

(D LFS M EOIR)Hat@AudienceT1 → (D LFS M EOIR)Rabbit /(D LFS M EOIR)Hat@audienceT3
 Psy(D LFS M EOIR)Hat @AudienceT1 **Magic** Psy(D LFS M EOIR)Rabbit /(D LFS M EOIR)Hat@audienceT3

Key

- MS Mixed state
- D Definite
- LFS Limited Fixed State
- M Manifestation
- EOIR Element of Image Reality
- PSD Potential sensory data
- R Related
- EOOR element Object reality
- AB Absolute
- A Actualisation (substantial reality,
- Θ Observable

Essential structure of reality (for physics)

Relative
Image Reality
 $D LFS M EOIRs$



reciever generated effects

Image reality side

Image reality side

Reality Interface



Object reality side

Object reality side

Absolute Object Reality

Ab, Object Reality

$LFS PSD R(EOOR)\Theta$
OBSERVABLE

Data pool

Interaction of EM radiation with substantial EOORs

Data pool

$Ab A PSD EOOR$
Potential sensory data

Transformation and selection by apparatus and protocol



ENTIRETY OF SUBSTANTIAL REALITY
 $E_{(Ab A EOOR)}$

Magic due to incomplete reconciliation of information

(D LFS M EOIR)Hat@Magician

(Ab A S EOOR)Hat@Magician T1 Source of hat manifestation
 + Object reality
 (Ab A Θ EOOR)Rabbit@Magician T1 Unseen observable.

Psy(D LFS M EOIR)Hat+ (Ab AEOOR)Rabbit @MagicianT1

Ab A S EOOR)Hat@Magician T1

Hat Object

+

(Ab A S EOOR)Rabbit@Magician T1

Rabbit object source of manifestation via PSD

→ (PSD EOOR)Rabbit / (PSD EOOR)Hat@MagicianT2 ▶
 (D LFS M EOIR)Rabbit / (D LFS M LFS M EOIR)Hat@MagicianT3

→ Psy(D LFS M EOIR)Hat+ (D LFS MEOIR)Rabbit @MagicianT3

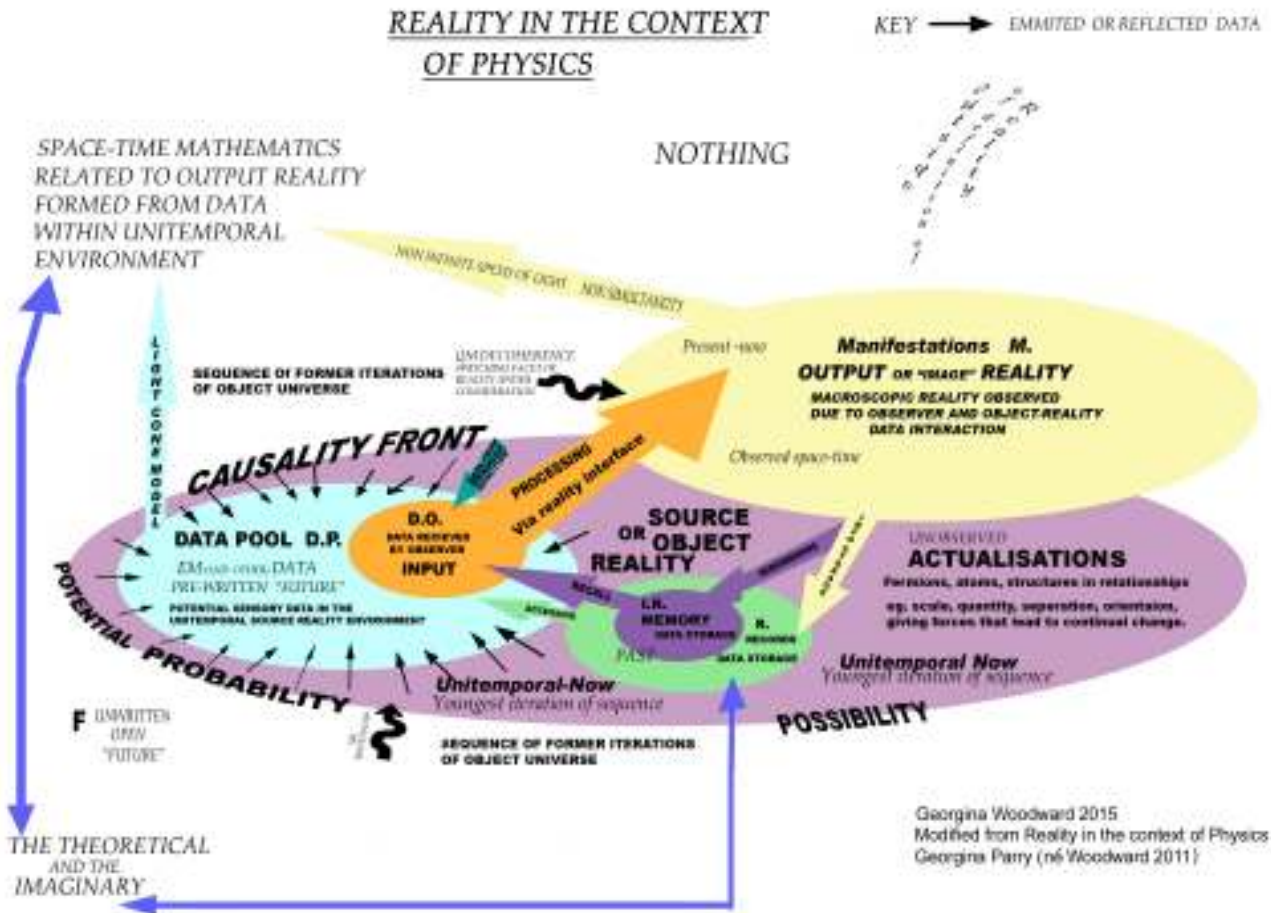
KEY

Object reality
 Image reality
 Knowledge
 T= TIME

Image reality only

(D LFS M EOIR)Hat@AudienceT1 → (D LFS M EOIR)Rabbit / (D LFS M EOIR)Hat@audienceT3
 Psy(D LFS M EOIR)Hat @AudienceT1 Magic Psy(D LFS MEOIR)Rabbit / (D LFS MEOIR)Hat@audienceT3

incomplete reconciliation of information
 gives no source for the observed rabbit



Resources

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