

3 worlds: Bit, It, Reality

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April 13, 2013

Abstract

To find out the answer to the topical question "It from Bit or Bit from It?" we are looking for the **relationship between three worlds of "Bit", "It" and "Reality"**. But do we agree what is the meaning of Bit, It, Reality? Answers can differ from one scientist to another. At that fundamental level of discussion the very important are two components: a common language that offers us established definitions and obviously some good math. The good math in terms of physics shall always be confronted with an experiment. Looking for that type of mathematics, we will propose the **experiment** that possibly allows us to prove whether John Wheeler's "It from Bit" is right.

The essay consists of only 5 pages (strictly speaking 2 - excluding abstract, references and technical endnotes).

The considerations are presented in the condensed form of Table 1 and Figure 1.

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The table below contains the discussion of topical dilemma together with all the definitions needed (in blue). All the content is briefly summarized. Some explanation can be found below the table and a lot more in the references [1-9] or technical endnotes ⁽ⁱ⁻ⁱⁱⁱ⁾

Table 1. Three worlds connection analysis

object	basic definitions and notions (concept)[3] <i>three worlds territory</i>	physical description	mathematical description	connection between objects and <i>three worlds</i>	evolutionary succession of objects [2] chicken and egg problem
Bit	<u>conformally flat spacetime</u> (particles, fields, observers do not exist) Platonic mathematical world	<u>immaterial</u> fabric of everything (instruments detect nothing as they do not exist)	pure geometry (immaterial information)	Bit from Reality <i>Platonic from Mental</i>	ancestor of Big Bang (and finally maybe also descendant of Big End?)
It (self-organized Bit)	<u>deformed spacetime region</u> Physical world	<u>material</u> physical wave* (being dynamical deformation of spacetime)	geometrodynamics (materialized information)	It from Bit <i>Physical from Platonic</i>	descendent spacetime deformations self-organization ⁱⁱⁱ
Reality (perception of It)	conscious <u>observers in the universe are creators of illusion</u> [1] Mental world <u>science</u>	physical wave <u>interpretation</u> creates particles and energy (being only observers' perception of physical waves) experiment (physical proof of theoretical predictions)	geometry description / metric <i>New quantum geometrodynamics with a new universal metric***</i> observers develop physical theory GR** / QM (notion of information)	Reality from It <i>Mental from Physical</i> perception ⁱ⁾ theory[3]	descendent Darwinian Theory of Evolution scientists

*wave = wave packet; not only well-known electromagnetic wave i.e. photon, but every field or particle

**from Albert Einstein we know that *gravitation is not a force field but a manifestation of spacetime geometry* (only our *perception* causes that gravitation seems to be a force). Why not apply the same concept to the rest of known "force fields" i.e. electromagnetic, strong and weak nuclear? And even with a little more courage the same concept apply to particles (matter)ⁱⁱ. In that case the matter would be also a spacetime deformation just like a field however described using another metric that we do not have got yet[3][4]. Unfortunately Einstein GR failed outside the Solar System [8] and Wheeler-deWitt geometrodynamics failed totally (see below). QM does not offer any metric

***we are looking for the one, universal, distance scale invariant metric, reducing to Einstein GR metric within Solar System distance scale and having ability to generate predictions. The first prediction of concept [3] is the experiment [4] outcome. Depending on the outcome we shall create proper metric. We cannot accept Wheeler-deWitt geometrodynamics theory as it has the well-known flaws: the problem of time, the problem of Hilbert space and others [7]. The other theories using canonical approaches (connection dynamics, loop dynamics etc.) or covariant approaches (perturbation theory, path integrals etc.) and string theories also have not acceptable flaws or generate no predictions

As in Roger Penrose's three worlds analysis, physical world (It) comes from Platonic mathematical world (Bit); mental world (Reality) comes from physical world (It), and in turn, mental world (Reality) tries to understand Platonic mathematical world (Bit). *The mysterious connection* between the three worlds is the self-organized spacetime in the form of dynamic deformations (waves) being physical world and perceptual experience (mental world) at the same time but "created" out of the fabric (again the spacetime itself being platonic mathematical world). See below, three worlds inspired by Penrose's Road to Reality [9].

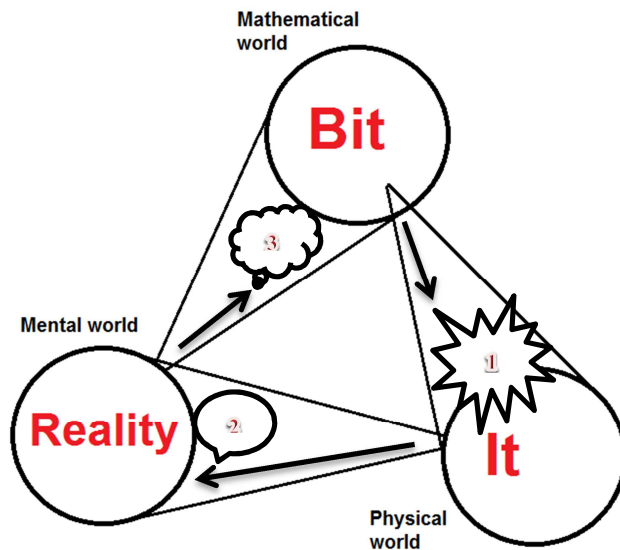


Fig. 1. Three worlds connection analysis

1. **It from Bit**
2. Reality from It
3. Bit from Reality

The mysterious connection between three worlds may lay down in the spacetime geometry described by a new universal metric. The final answer to the question if we agree with the famous Wheeler "It from Bit" is likely to be found in the real experiment outcome [4]. This spin experiment is simple and has only two possible outcomes. The first one is consistent with Standard Model. It would deny Wheeler statement and deny also the idea that everything is only a manifestation of spacetime geometry. The second one would confirm "It from Bit" and would give us the awaited breakthrough in physics. At the moment this experiment is probably the only one that could possibly get us closer to that breakthrough without having a unification theory ready. Unfortunately the first outcome would leave us with nothing new.

The conclusion

Do we find the answer before June 28, 2013? Every laboratory of physics is equipped sufficiently to perform this simple experiment. As I am "non-academic" entrant here I cannot do it myself. Maybe you, dear reader or yours students, would like to know first?

Oh, one more thing: closer look at Table 1 informs us that information can be immaterial, material or observer's description. The relationship between them is the same as between three worlds. After all everything is the spacetime itself and the rest is only our definition.

Einstein said: "reality is merely an illusion, albeit a very persistent one".

References

- [1] Wheeler J.A. The chemistry of geometry. 846, chapter 34 (1969)
- [2] Safuta J., Spacetime Deformations Evolution Concept. *vixra.org/abs/1102.0026* (2011)
- [3] Safuta J., Spacetime Deformations Theory. *vixra.org/abs/1006.0005* (2010)
- [4] Safuta J., A simple spin experiment. *viXra.org/abs/1304.0027* (2013)
- [5] Hoffman D. The interface theory of perception: Natural selection drives true perception to swift extinction. In *Object categorization: Computer and human vision perspectives*, S. Dickinson, M. Tarr, A. Leonardis, B. Schiele (Eds.) Cambridge, UK: Cambridge University Press, pp.148–165 (2009)
- [6] Ansari H.M., Smolin L. Self-organized criticality in quantum gravity.
arXiv:hep-th/0412307v5 (2005)
- [7] Shestakova T.P. The Wheeler – DeWitt Quantum Geometrodynamics: its fundamental problems and tendencies of their resolution. *arXiv:0801.4854v1 [gr-qc]* (2008)
- [8] Mannheim Philip D. Conformal Gravity Challenges String Theory.
arXiv:0707.2283v1[hep-th] (2007)
- [9] Penrose R. The Road to Reality. Vintage London 2005

Technical endnotes

- i) *humans' specific perception*; A detection is a wave reception using a detector e.g. an ear, camera, LHCb etc. In the detector one wave is changed into another one e.g. inside the inner ear an acoustic wave (longitudinal) is changed into an electromagnetic wave (a transverse wave in a nervous system). An interpretation is a process of comparison the current and previous (recorded) detections and/or future detections (expectations usually based on the past). The interpretation is also a change of one wave into another e.g. in a human brain, computer or another appliance however created for the human observer and expressing the interpretation of what the observer calls the reality. "Our perceptions are a species-specific user interface. Space, time, position and momentum are among the properties and categories of the interface of H. sapiens that, in all likelihood, resemble nothing in the objective world"[5]
- ii) *the real experiment proposal in brief*; a source emits a right-handed photon, the photon impinges almost perpendicularly a mirror being reflected to a detector set up to measure the spin of particle. According to Standard Model the reflected photon's spin is *the opposite* to that of the photon emitted at the source. According to the thought experiment presented in [4] the 'reflected' photon's spin is *the same* as that of the photon emitted
- iii) the observable objects (particles and fields) have been originated due to the spacetime deformations self-organization. For details of self-organized critical systems that naturally evolve without fine tuning to critical states see [2]. This is a kind of chaos where the general *behavior of the system can be modeled on one scale while smaller- and larger-scale behaviors remain unpredictable* [6]