Interaction of the Past of parallel universes

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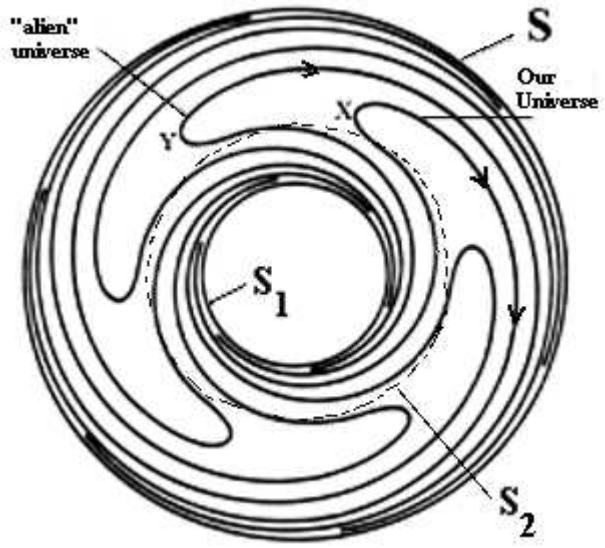
ABSTRACT

We constructed a model of five-dimensional Lorentz manifold with foliation of codimension 1 the leaves of which are four-dimensional space-times. The Past of these space-times can interact in macroscopic scale by means of large quantum fluctuations. Hence, it is possible that our Human History consists of "somebody else's" (alien) events.

In this article the possibility of interaction of the Past (or Future) in macroscopic scales of space and time of two different universes is analysed. Each universe is considered as four-dimensional space-time V^4, moreover they are imbedded in five-dimensional Lorentz manifold V^5, which shall below name Hyperspace. The space-time V^4 is absolute world of events. Consequently, from formal standpoints any point-event of this manifold V^4, regardless of that we refer it to Past, Present or Future of some observer, is *equally available to operate with her*. In other words, modern theory of space-time, rising to Minkowsky, postulates absolute eternity of the World of events in the sense that all events exist always. Hence, it is possible interaction of Present with Past and Future as well as Past can interact with Future. Question is only in that as this is realized. The numerous articles about time machine show that our statement on the interaction of Present with Past is not fantasy, but is subject of the scientific study. In articles [1, 2, 3] we used theory of foliations for construction one of the possible ways of travel to the Past (Future). Exactly this theory seems to be useful for decision of problem on interactions "nearby" universes.

So, it is assumed that manifold V^5 has foliation $\mathcal{F}$ of codimension 1, but our Universe is a leaf F_0^4 in him. Other leaves represent different universes.

Consider five-dimensional manifold that is got by multiplying on $\mathbb{R}^3$ of axial section of foliation of Reb in the torus $S^1 \times D^2$ ([4, 468], refer to Pic.1).



Pic. 1.

Model Hyperspace of Reb with interacting Past

Our Universe and we as its Observers are not single in this mathematical theory of Time. In Hyperspace other worlds are also situated. Fix certain spatial section X in leaf F_0^4. It represents "Present". Similar "Present" we will fix in other leaves, for example, section Y in leaf F_1^4 which is near to leaf F_0^4 (see Pic.1). We shall consider only those universes, i.e. leaves, which are situated in certain neighborhood of our Universe and, accordingly, Present of "somebody else's" (alien) universes are situated in sufficiently small neighborhood of "Present" of our Universe.

For this model of five-dimensional Reb Hyperspace it is distinctive that Past of our Universe and Past of "someone else" (alien) universe are approached that more strong, than further from Present will run away past epoches. On Pic. 1 ring is image of Hyperspace, curly lines are universes, each with its Observers. One line is our four-dimensional Universe F_0^4, we are its Observers. Beside we see "someone else" (alien) four-dimensional universe F_1^4 with its own observers. Our Present is point X, Present of "someone else" universe is a point Y. If we begin a trip to the Past against of the streem of time, we shall move in our World against the arrow on line 1 (point X) and coil all more and more on the circle S_1. Similarly, travel in the Past in nearby universe F_1^4 or line 2 (point Y) is a coiling motion around the circle S_1 along line 2 against the arrow of time. Past of two worlds are approached in topology of Hyperspace. That can one occur?

For the answer to this question we will use geometrodynamics ideas of Wheeler which we shall apply to five-dimensional theory of gravitation. Amplitude of probability of transition from Universe F_0^4 to universe F_1^4 will represent by means of Feynman integral over 5-geometries:

$$< F_0^4 | F_1^4 >= \int\limits_{F_0^4}^{F_1^4} \mathcal{D}g^{(5)} \exp\left[-\frac{iS}{\hbar}\right], \tag{1}$$

where

$$S = \frac{c^3}{8\pi GT} \int R^{(5)} \sqrt{-g^{(5)}} d^5x \tag{2}$$

is action in five-dimensional Lorentz geometry [6, p.52] with metrics $g_{AB}^{(5)}$, moreover T is a constant with dimensionality [cm], connected with 5-th coordinate (for instance, it characterizes cyclicity on the fifth coordinate in the Kaluza-Klein theories). From (1), (2) it follows [5] that (1) is not changed under quantum fluctuations of five-dimensional geometries $g_{AB}^{(5)}$ $(A, B = 1, ..., 5)$:

$$\Delta g^{(5)} \sim \frac{L^*}{L} \sqrt{\frac{T}{L_0}}, \tag{3}$$

where $L^* \sim 10^{-33} cm$ is constant of Plank, but $L^4 \times L_0$ is a size of 5-region of fluctuations.

Formula (3) means that as soon as Past of universes F_0^4 and $F_1^4 2$ are approached "sufficiently close", quantum fluctuations of metrics begin to change topology and geometry of two universes; they begin to stick together by means of wormholes; one will appear the tunnel transition between worlds. This means that at least on the microscopic scale the Past of these two worlds are indistinguishable.

Formula (3) is not contradictory with classical four-dimensional formula for quantum fluctuations

$$\Delta g^{(4)} \sim \frac{L^*}{L}, \tag{4}$$

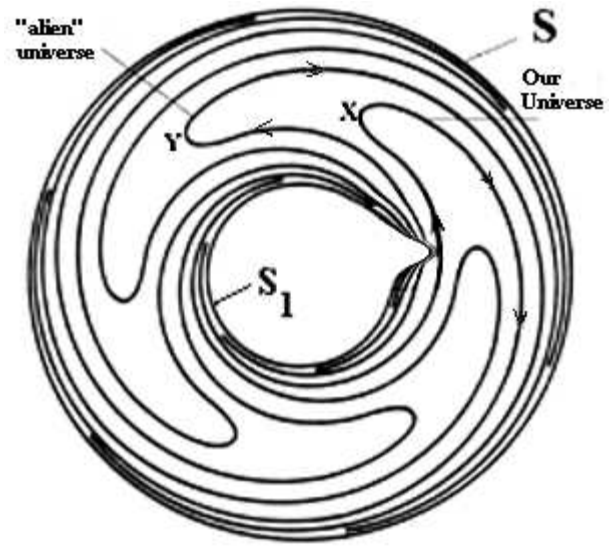
because it was got under assumption $\sqrt{det\ g^{(4)}} \sim 1$ [7].

But fluctuations are significant on the macroscopic scale too. In fact, suppose that $L \sim 1\ km$. This corresponds the time interval $\sim 3 \cdot 10^{-6}\ sec$. Then, as it follows from (3), quantum fluctuation of 5-metrics $\Delta g^{(5)} \sim 1$, if $L_0 \sim 10^{-76} T$. In other words, to begin the Past of our Universe and universe F_1^4 to interact by means of formation of wormholes between them in considered model of Reb Hyperspace, it is necessary that it was sufficiently removed from Present. Otherwise, to interact leaves F_0^4 and F_1^4 must powerfully draw together. Herewith one interact spatial regions of size $1km$, and time of interaction is $10^{-6}\ sec$. For more extensive spatial regions time of interactions increases. In principle it become possible a transition between universes meaning exchange of the Past. Past our Universe can contain events which are not belonging to our History.

Note that large quantum fluctuation, i.e. those that could arise at large spatial scale, are essential detail of four-dimensional quantum theory [7]. In five-dimensional theory one can be found an universe F which is contained in sufficiently thin neighborhood of our Universe. It follows from (3) that there exist large quantum fluctuations which are the interactions between Present of our Universe and "Present" of universe F. The existence of such interactions is very serious question. It possible that such interaction at scale $L_0 < T_0, O < T_0 < T$ in fifth dimension are suppressed by, for example, scale-dependent cosmological term $\Lambda(L, L_0)$ or some external field [7].

Hyperspace of Reb can be a subject of compression of part of ring one border of which is cylinder S_1 and other is cylinder S_2 labeled on Pic.1 by means of dotted line (Pic.1). If S_2 tends to points X, Y, then interacting Past will all closer to the current epoch.

Hyperspace of Reb can be a subject of local compression (Pic.2). Then we shall have a model of periodic "strong" interactions of chosen epoches of the Past.



Pic. 2.
Model of hyperspace with interacting nearby Past

Wholly it can turn out to be that principal details of explored model situation will found in the Reality and this has direct relations to the problems in the historic science, which were open N.A.Morozov, A.T.Fomenko and his co-authors [8]. Historical text-books are contradictory, and this is objective Law of Nature [9]. Human History contains many different variants of events. Maybe, one is openned prospect of building of Multivariant World History of Human Civilization which can conciliate supporters of traditional and new chronology [10].

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