On the Origin of Space
Part 18: A Potential Dual-Layer State for Space in the Podkletnov Effects

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Abstract
In order to help in obtaining reproducible gravity shielding experiments, we investigate phenomenologically the possibility for the Podkletnov effect to come from a macroscopic split of space into a double layer within a space built by its contents. This effect would result then from an energetically favorable set-up that includes two layers of High-Tc superconductors, with one layer superconducting while the other being at the border of superconduction. More recent (reproducible) gravity “beam” experiments are also examined to reconfirm Einstein’s theoretical curvature approach to space as the only valid one, thereby discarding field formalisms set in flat space, such as “gravitons.”

Keywords: podkletnov experiment, zero-point energy, gravitation, high-tc superconductor

Introduction
The idea of space being a real entity was basic to Einstein’s discovery of General Relativity. (A discussion on this subject can be found in Gouin, 2004a). Yet, to this day, mathematicians have not been able to develop a formalism for physical systems where space and its contents (matter, radiation) are treated as one integral system. Matter and radiation have received an analytical/algebraic formalism called Quantum Theory, while space remains a classical entity treated via the 19th century theory of curved spaces originated from Gauss and Riemann, with its contents seen in the spirit of that century's view of separated elements.

One problem with the classical approach to space in Einstein’s theory is the fact it cannot handle a “void.” There has to be matter everywhere for the space metric considered by the theory to be determined everywhere. If there is a void, i.e. a “hole,” in the distribution of matter, this space metric is undetermined in that area. Present cosmology has maintained that there are no such holes in the universe, and this against the astronomical evidence. Yet this feature of the the-
ory has value since it leads to an understanding of space as a quantum entity, as indeterminism is a well-known characteristic of matter through QM.

We investigate elsewhere some consequences of space taken as a quantum entity via the concept of superposed spaces (Gouin, 2004a). Here we are going to look at spaces as able to have different quantum states, e.g. double layers. This idea was earlier pursued at length in the domain of living organisms and the supramolecular structures they contain (Gouin, 2004b). The question remains whether such different states of ordinary space could exist outside living organisms and at the macroscopic level. The experimentation run by Podkletnov may be hinting at an answer (Podkletnov, 1997; Podkletnov and Modanese, 2002).

A split of space

The idea we are pursuing is that, under certain specific settings, such as the ones described in the referenced experiments, the dynamics of a set of electrons interacting with nuclear spins (antiferromagnetic superexchange) in a crystal, as described in the latest High-Tc superconduction theory (Anderson et al., 2003), may find it energetically favorable to split space such that local atomic complementary conformations in the two spatial layers allow semi-free electrons to shuttle between them, thereby creating a “leptonic” space “in-between” these layers of space in a way similar to the effect envisioned in biological supramolecules, as discussed in Gouin (2004b). (There the configuration in tubes would make any effect of the dual layer in ordinary space confined to the core of the tubes.)

Now, if (1) we consider a disk made out of two bulk High-Tc superconductors, with one in the superconducting state while the abutting other one is not in that state, but is at the border of superconduction, i.e. right above its Tc, and (2) we use an alternating or quickly varying current induced in the disk to produce an electronic/nuclear spin dynamics where resonances can occur, there may be energetically favorable situations where the electrons dynamics in the non-superconducting layer will split space at the edge of its region such that these electrons can participate in (and thereby enlarge) the dynamics of the superconducting set next to them. Typically, collective quantum dynamical settings that are behaving as wholes demand less energy if they are less confined. The QM “potential well” behavior of a wave function tells us that fact at the elementary level (Pauling and Wilson, 1963). Leptonic space containing no atoms, only leptons and photons, will naturally sustain a coherent dynamics, although such a dynamics cannot be observed from ordinary space. (In a leptonic space there is no source of “decoherence” that could lead to disorder-entropy - This is in reference to the quantum decoherence theory worked out in the 1990s - Zurek, 1991) Dynamical resonances will then inflate the leptonic space such that the state of the ordinary space curvature on one side of the split will be less and less able to influence the state of the curvature on the other side.
In such settings, the conditions are envisioned to be quite specific in order to obtain a lesser energetic dual space layer for the dynamical evolution. This includes at least (1) the amount of supercurrent induced, and (2) the frequency spectrum of this current. A quickly varying current is seen to allow resonances in the collective dynamics of the electrons and nuclear spins within the domains of the crystal, resonances through which this dynamics could absorb the electromagnetic energy required for maintaining the split of ordinary space.

**The quantum aspect of space**

Indeed, if it were to exist, such a split of space would need energy for its maintenance in a gravitational field because it would lead to a non-zero (quantum) probability for the matter that generates this field located on one side to be no longer *seen* from the other side of the split area, being in effect “locally” part of another space. This is where the **quantum aspect of space** has to enter into play, something which cannot be covered by General Relativity since GR postulates an all-encompassing space: When we say “seen” we understand here that ordinary space is an [electromagnetic space](#), and this by the fact it is physically identified through a vacuum energy (the zero point energy of QM).

There is then no physical way the full “knowledge” about the existence of matter behind the dual layer can be obtained across that split of space. If a wave function defining space were to be used, the split would be seen as a potential barrier, and there would be a “tunneling effect” for the “presence of matter,” in analogy with the presence of an electron through such a barrier. The **determination of the space metric** at that location must take this situation into account.

**Gravity shielding effect**

For example, if the disk is laid horizontally in a gravitational well, the dynamical mixed superconduction of the disk will then result in a [lessening of gravity on the upper side of the spatial dual-layer area](#). What will the geometry of the “shadowed” area be? Well, it can only have the shape resulting from a [local step change in the space metric](#). A quantitative result could be obtained via Einstein’s equation, with the step entered as a constraint, and this to cover the fact that equation covers a single space. In the absence of quantitative data, a qualitative outlook seeing that equation as a type of Poisson equation leads to the picture of a hydrodynamic phenomenon. If we further take a 2D view of space through that picture, the gravitational well will be less steep “above” the step, and so the shadowed area may look like a [plume in a wind tunnel](#), i.e. its length may depend on how deep the well is, and on the relative height of the step change in curvature. (The experimental report talks about a cylindrical zone, but no data is available about the effect.
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farther than 3 meters away from the disk, with “no change” measured there. The air seen rising above the disk could continue its motion higher just via the convection started from below.) The fact there is a negligible amount of matter on one side of the disk (above it) compared to the other side explains also why the effect is **one-sided**.

**Transient geodesic effect**

Placing the superconducting disk **vertically**, as in Podkletnov and Modanese (2002), instead of horizontally, is giving us a chance to identify the proper theoretical approach to space for the phenomenon in question: In that case, the gravitational well steepest descent runs perpendicular to the axis of the disk, so the equilibrium of matter defining this well will be destroyed for the period when the split exists. Indeed, as “seen” from each side, the matter on the other side is no longer there, thereby creating a transient curvature in ordinary space due to the matter on one side being no longer compensated by the matter on the other.

The imbalance in the “presence of matter” has to be felt on both sides of the initial space split, if indeed a split is occurring. Then, in order to decrease such a differential, and in light of the symmetry of the gravitational well, the split will have no other choice but to go around the well (in a sense as a “curved beam”) at the speed of light (space being an electromagnetic entity), and in opposite ways at the same time (through the quantum multiple reality feature of space). The path of the resulting two splits will have to remain on a geodesic since any other path would increase the differential vertically along each split at each step of its move. Finally, the splits will vanish when the same presence of matter will be obtained on both sides of each split, i.e. at one quarter of the way around the well from their start position.

Here we have the good luck that the experimenter failed to look at the other side of his apparatus (at least in his report) to find out whether the effect is single-sided or double-sided. So an immediate confirmation of the physical picture presented here can be obtained if the so-called “beam” seen by the experimenter were to be verified as felt on both sides of the apparatus generating the space split.

**Conclusion**

We shall not discuss the large literature about the Podkletnov effects, and especially all the various uses of “quantum gravity,” (as Modanese put out a large number of papers on this subject - One typical reference is Modanese, 1996) since none of the theories we came across appear to give (so far) a predictable geometry or in general predict anything. Especially none appear able to give hints about the factors that could permit a reproducible experiment in the
case of Podkletnov (1997), unlike the phenomenological approach described here. Separately, the shape of the shadowed area we describe for that experiment, and as calculated through Einstein’s equation, is another way to confirm the approach.

In the case of the Podkletnov and Modanese (2002) experiment, it is obvious that the experimenter saw a “beam” going in only one direction due to the fact the theory he used is not considering the quantum structure of space, and only the “graviton” picture invented with QED 50 years ago. Here the correctness of the quantum space split approach seen by the two-sided “curved beam” effect would confirm that space can only be seen as curved, as Einstein saw it, with the “graviton” of QED legacy out of the picture at last.

The environment and objects above the disk in Podkletnov (1997) are of great importance for the experimental result since the energy to create the spatial dual layer must depend on the energy needed to balance the lessening in gravitational energy in the region above the disk. This set of circumstances may be the main origin of the problem in reproducing this first kind of Podkletnov experiment. In other words, since the apparatus has no means to adjust the energy supplied to maintain the needed split in space according to the load demand, a quickly changing environment above the disk (including the atmosphere) would generate a shutdown of the effect. We need then to obtain the shape of that area theoretically, and Einstein’s equation appears indeed adequate for that purpose.

Separately, coming up with the proper layering of superconductors and current generation without a quantitative theory of the phenomenon at the microscopic level is another source of problems. The present theory of High-Tc superconductors is just not adequate to cover mixed states of superconduction. Even though Anderson (2002) lately claims there is no longer any mystery in the phenomenon of High-Tc superconductors, the present theory cannot predict the behavior of their mixed states, especially when the “pseudo-gap” right above Tc is involved (Anderson et al., 2003). However, this is a separate issue that does not affect the question about the theory of the space split effect discussed here.

Another point is that, from the study on living materials done previously (Gouin, 2004b), supramolecular structures found in Life may be an easier physical basis for realizing gravitational screens (if not “beam emitters”) than superconductors.

To finish, we will add a note of caution: If found at last reproducible, the effect in Podkletnov (1997) could at best be used in a levitating system, certainly not in the design of an independent flying machine, and this since Einstein’s Principle of Equivalence (Wald, 1984) must be met within both sides of the dual layer of space: The screen itself can only be supported mechanically on the ground. So we are merely looking at an alternative to mag-lev systems, just
not requiring complementary coils on the levitated object. As to the “force beam” of Podkletnov and Modanese (2002), being dependent on the gravitational well where it is “emitted,” it could hardly be seen as a space travel propulsion means. Its use would be still open to the imagination in other areas though.

References
Pauling and Wilson (1963), Introduction to Quantum Mechanics, Dover