



Can you paint a painting without any canvas?

Abstract: The mathematical blueprint of the arrow of Time, in a nutshell.

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There is no water between water molecules. You can't paint a painting without any canvas ([John Baez](#)). But the 'canvas', separating all adjacent 'water molecules' depicted with consecutive black balls in Fig. 1 below, must exist in Nature. This *pre-geometric* Platonic 'canvas' must be exactly **nullified** in the physical 4D world located in **irreversible past**, after shifting it into the *potential* future of the [arrow of Time](#): read pp. 7-8 in [\[1\]](#).

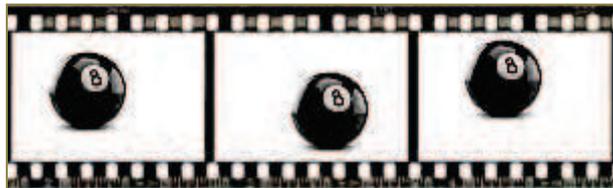


Fig. 1. Read p. 7 in [\[2\]](#).

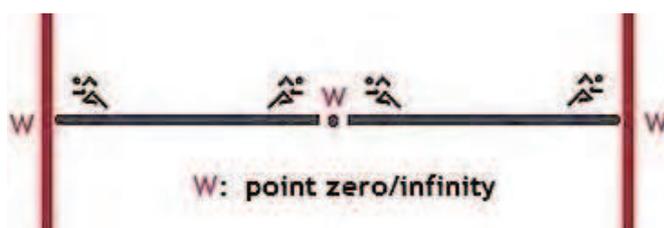
As an illustration, consider two [neighboring](#) balls from Fig. 1, presented in Fig. 2 with blue | yellow colors, and separated and wrapped by **red** 'canvas'.



Fig. 2

Robin Le Poidevin: If between any two points in spacetime there is always a third point, can anything touch anything else?

The blue and yellow drawings must be *separable* (Hausdorff), or else they will fuse into one single **green** blob, and we could not contemplate any **topological space** [3]. But on the other hand, the **red** ‘canvas’ must not be present in the physical world. Where *is* it, then? It is being shifted into the *potential* future in the **arrow of Time** (pp. 7-8 in [1]). We face the same puzzle in Quantum Mechanics, only now the ‘canvas’ in ‘**non-colorizable**’ (Q2/A2 in [1]), a bit like the *colorless* light that “collapses” to any specific color (*ibid.*, p. 8). Bottom line here is that the *potential* future, explained at p. ii, p. 5, and p. 10 in [2], does not exist as an ‘event’ in 4D spacetime, because every consecutive ‘event’ (Fig. 1) belongs exclusively to the **past** in the **arrow of Time**. The *potential* future exists as Platonic *propensities* “just in the middle between possibility and reality” (Werner Heisenberg). Thus, in quantum cosmology (Slide 12) we can never reach the Beginning of Time along the deflation time, because the Beginning does not exist as an ‘event’ in 4D spacetime. It will be *always* shifted into the *potential* future, and we can never actually reach it and stop there. Ditto to the End of Time along the inflation time. Once created (John 1:1), the Universe is “already” eternal – we can’t reach the Platonic World **W** as ‘event’ in 4D spacetime.



The Universe is like an unbroken ring with no circumference, for the circumference **W** is **nowhere** and the center **W** is **everywhere**.

Fig. 3. Read p. 5 in [1] and pp. 6-7 in [2].

To sum up, the ‘**non-colorizable**’ (Q2/A2 in [1]) invisible Platonic ‘canvas’ (p. 1) denoted with **W** above is the *ambient* infinite-dimensional Euclidean space in which all manifolds live [3], yet this *ambient* infinite-dimensional ‘canvas’ must be *exactly nullified* in the **physical** world in the irreversible **past**: the “gaps” *and* the background ‘canvas’ (Fig. 1) are shifted into the *potential* future of the **arrow of Time**. Thus, the **physical** 4D spacetime is a *perfect* continuum [4] endowed with non-trivial *dynamical* topology [5].

This is the blueprint of the [arrow of Time](#) in topology [3]. We need a brand new notion of 'zero' for 4D spacetime continuum [4] and new [Mathematics](#). I am ready to explain upon request all mathematical details, [from scratch](#).

Soli Deo Gloria.

1. D. Chakalov, Universal Holomotion. 30 July 2023, 11 pages.
<https://chakalov.net/waves.pdf>
2. D. Chakalov, *Platonic World: The Force of Life, Time and Gravity*. 31 May 2023, 42 pages. <https://chakalov.net/book.pdf>
3. John M. Lee, *Introduction to Topological Manifolds*, 2010, pp. 19-20.
4. John C. Baez, Struggles with the Continuum. 1 Feb 2020,
[arXiv:1609.01421v4](https://arxiv.org/abs/1609.01421v4).
5. D. Chakalov, The Fifth Force. 15 September 2022, p. 9 and pp. 12-15.
<https://chakalov.net/talk.pdf>

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