

# Can a worldview contradict experiment: can experiment decide whether spacetime represents an evolving present, a block universe or a growing block universe?

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*Note that there is no dynamics in space-time: nothing ever happens there. Space-time is an unchanging, once-and-for-all picture encompassing past, present, and future.*

Robert Geroch [1]

The issue of whether experiment can prove or disprove a worldview is controversial. On the one hand, a worldview is supposed to reflect adequately what exists which means that a worldview must be based on observations or experiments. On the other hand, both observations and experiments may have more than one interpretation which implies more than one view of the world. What further complicates this issue is that some philosophers still seem to believe that philosophical views about the world are exempted from the scrutiny of experiment, which leaves open the obvious question – how can it be determined whether such views have anything to do with the external world?

I will first provide arguments which I believe show that any knowledge about the world (not just science) must be based on the existing experimental evidence and be amenable to test by experiment. Then I will consider the main theme of the conference – the nature of spacetime – as a case study and will examine whether the existing experimental evidence is sufficient to rule decisively on whether spacetime should be regarded merely as an abstract mathematical notion which models an evolving present, or spacetime represents a block universe or a growing block universe.

In other words, as the dimensionality of the world is an integral feature of reality, the examination of the experimental evidence will determine whether the crucial question of what the dimensionality of the world is can be unambiguously answered.

I will begin the case study by rigorously examining Minkowski’s insistence, made in his 1908 lecture “Space and Time,” that the spacetime view of the world (introduced by him and often called block universe) “arose from the domain of experimental physics” [2] and will show why his assertion is correct which means that a worldview can indeed be tested by experiment. Then I will discuss whether there is any support from experimental physics for the other two main worldviews – the evolving present and the growing block universe.

## References

- [1] Robert Geroch, *General Relativity: 1972 Lecture Notes* (Minkowski Institute Press, Montreal 2013), pp. 4-5
- [2] H. Minkowski, Space and Time, new translation in [3].
- [3] H. Minkowski, *Space and Time: Minkowski’s Papers on Relativity*, edited by V. Petkov (Minkowski Institute Press, Montreal 2012).