

In defence of Einstein

Abstract

The debate on whether simultaneity is absolute or relative, despite appearances otherwise, is not closed after the successes of special relativity. Different interpretations of that theory – or different versions of it – still fascinate many philosophers of science, some scientists, and a great many number of metaphysicians. Usually, those who challenge the most well-accepted version of the theory point to empiricist and verificationist commitments at the heart of its arguments. Since Einstein himself admits to empiricism, to point out flaws in such underlying epistemology would be a way of challenging some theses shared by classic versions of relativity, such as, for instance, the relativity of simultaneity. But will it suffice, in order to challenge well-established results, to show the frail empiricist basis? In this paper, I shall attempt a defence of the idea that, despite Einstein's well-known adherence to empiricism, the result known as relativity of simultaneity does not have to be understood as essentially dependent on any form of verificationism. Thus, I shall defend relative simultaneity while taking into consideration both its purported advantages and the difficulties pointed out by its critics.

Keywords: relativity, simultaneity, verificationism, empiricism, time.

2 Introduction

The philosophical questions related with Einstein's successes are many. Particularly important is the issue of whether or not simultaneity is relative. Its importance is due to the fact that endorsing an answer to that question has momentous consequences, directly influencing philosophical debates, namely, *eternalism* versus *presentism*, *tenseless* versus *tensed* theories of time, etc. Those debates, many of which precede Einstein's successes, were reinvigorated with the 1905 paper "On the Electrodynamics of Moving Bodies". Since then, relativity of simultaneity, a consequence of the theory's postulates, has been advocated and rejected, as well as the philosophical theses on time that hinge on that theoretical adherence. The rejection of the relativity of simultaneity (henceforth, RoS), despite surprising, is quite common, especially in the within properly philosophical circles. Authors such as Čapek (1961, 1968), Craig (2001, 2008), Smith (2008), Markosian (2004) and many others, of different philosophical traditions, reject RoS and endorse different interpretations of the theory. Basically, these authors suggest, there may be a privileged referential, relative to which the speed of light is always c . Thus, the speed of light will always be c in the referentials that are at rest relative to the absolute or privileged referential, but only in these. In referentials that move relative to that one, the luminous signal will suffer, depending on the direction of movement, a delay or acceleration. What

acts as an absolute referential may vary from author to author, i.e., the luminiferous ether” – the compensatory response of ether; absolute Newtonian space; the divine perspective – capable of distinguishing absolute from relative time; Robertson-Walker metric – dubbed “cosmological fluid”; cosmic microwave radiation – a remnant from the beginnings of the universe; electrodynamics in quantum vacuum – as proposed by Dirac (Dirac, 1951, p. 906-7), etc. The authors who accept some version of these interpretations (which I shall summarise under the label “Lorentzian”) are convinced that proposals that preserve absolute simultaneity have at least the following virtues, comparatively: a) empirical equivalence – there are at least as much evidence for Lorentzian interpretations as for those accepting RoS; b) metaphysical advantage – the Lorentzian version is superior from the point of view of the associated metaphysics, since it preserves common sense (which, generally, favours tensed theories of time and presentism), without involving any revolution or rupture from Newtonianism, at least as an ontological or philosophical account; c) a better associated epistemology – the versions taking RoS as factual would be seriously flawed from the start, due to the underlying verificationism.

In what follows, we shall discuss the supposed advantages in Lorentzian interpretations, with special emphasis on the alleged dependence of RoS on empiricist verificationism, inherited from Mach and others. A defence of interpretations accepting RoS will then be shown to be motivated.

References

ČAPEK, M. (1961) *The Philosophical Impact of Contemporary Physics*, Princeton University Press.

—— (1968) ‘Time in Relativity Theory: Arguments for a Philosophy of Becoming’, in J. T. Fraser (ed.), *The Voices of Time*, Penguin, pp. 434–54.

CRAIG, W. L. (2001), *Time and the Metaphysics of Relativity*, Springer Netherlands.

—— (2008), The metaphysics of special relativity: three views, in Willian Craig Lane and Quentin Smith (ed.), *Einstein, Relativity and Absolute Simultaneity*, Routledge.

DIRAC, P. (1951) Is There an Aether? *Nature* 168, 906–7.

MARKOSIAN, N. (2004), A defense of Presentism, In Dean Zimmerman (ed.), *Oxford Studies in Metaphysics Volume 1*. Oxford University Press.

SMITH, Q. (2008), A radical rethinking of quantum gravity: rejecting Einstein’s relativity and unifying Bohmian quantum mechanics with a Bell-neo-Lorentzian absolute time, space and gravity, in Willian Craig Lane and Quentin Smith (ed.), *Einstein, Relativity and Absolute Simultaneity*, Routledge.

