

My Most Dangerous Idea

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My most dangerous or disconcerting idea is that Einstein's dictum that the constant c is the 'velocity of light *in vacuo*' is a misinterpretation of the true facts. The basic observational fact, as Olaus Römer discovered in 1676, is that astronomical distances are also times in a constant ratio of units, c . This constant relation between distances and times was later confirmed by the astronomer James Bradley and, in other areas of observation by the likes of Armand Fizeau and A.A. Michelson.

The standard orthodox interpretation of this constant relation is that it is the measure of 'the velocity of light in a vacuum', as stated by Einstein in his second postulate of Special Relativity. As a point of pure logic, however, from the fact that all velocities are measures of distance-divided-by-time it does not follow that all distances-divided-by-time are velocities.

Moreover, an essential characteristic of what is properly called a velocity is that it is a measure of the motion of an identifiable material object, also that the measure conforms, both in magnitude and vectorially, to the law of the composition of velocities. Neither of these criteria are satisfied by c .

Furthermore, if that so-called 'velocity' is ascribed to particles of light, as in Einstein's concept of the 'photon', then any idea of that particle being something properly conceived as *material* becomes untenable. This is because according to Relativity, anything properly called a particle, no matter how small we may be imagine it to be, becomes infinitely massive at the 'speed c ', whereas the only mass that can be ascribed to a light-quantum in the visible range of the spectrum (*i.e.*, its spectral energy divided by c -squared) is in the minuscule order of 10^{-35} kilogram.

In any case, as for c being a 'velocity', how can that 'velocity c ' be measured relative to a *vacuum*? With respect to what datum can that 'velocity' be measured when the light is travelling all alone (as imagined) in the void between its source and sink? And if, instead of thinking of light in that way, we think of it as waves, (after Huygens, *et al.*), then what can possibly *wave* in a vacuum? (The customary conception of 'electromagnetic waves as field vectors *in vacuo*' is completely *ad hoc* and notoriously unempirical.)

All sorts of ways can be contrived of answering these awkward questions regarding 'light velocity'. However, it has been proved that all the practical consequences of relativity theory can be deduced in an extremely simple way without involving this mind-bending plethora of problems raised by the customary interpretation of c as a 'velocity'. In the relevant equations, c is the same c regardless of whether it is interpreted as the 'velocity of light' or as no more than a dimensional constant – what Herman Bondi describes as distance-time 'conversion factor'.

So why do we persist in thinking of light as 'travelling', when all true evidences are to the contrary? This is where the 'danger' comes in. The philosophical consequences of relinquishing the 'velocity in space' interpretation of light promise to be socially catastrophic. This is because it entails a truly Copernican 'flipover' from thinking of light as travelling in space to the opposite logical alternative of thinking of all space and time as being *in the light* – not light as it is thought of as travelling in space but light as it is actually observed, optically

or instrumentally, in its full spectral range. What does this mean? It means that in relativistic proper-time, the interacting atoms are in direct quantum contact, regardless of observational distance, that on the quantum-informational level there is no such thing as distance, a quantum being an irreducible amount of energy transacted in zero proper time. This means that at the quantum-informational level the transactions take place in terms of pure proper-time-instantaneous action-at-a-distance ^[1]. What we perceive as ‘distance’ is then an observational extrapolation out of statistical numbers of these proper-time-instantaneous quantum events, in a manner similar to the way in which distance is projected by the viewer of a video scenario from informational patterns and sequences of otherwise randomly occurring screen events, and what we measure as the time-delay of that observational interaction is just another solution of the relative equations.

In short, this ‘Copernican flipover’ matches, in physics, the radical shift, in modern information technology, from ‘analog’ to ‘digital’. In modern communication, the basic informational units are discrete and unconnected ‘bits’ (binary digits). In physics they are *quanta*, that is, irreducible units of Planck’s quantum h . These do not ‘travel’ across space, any more than the pixel events do across the video-screen. Like those pixels, the quanta simply *occur*.

What, then, is the danger of this radical switch taking place from its traditional mechanics-based to a modern information-based Physics? That danger may not be so much to Modern Physics as to anyone proposing this resurgent phenomenalism. As it is said, ‘whether the pitcher strikes the rock or the rock the pitcher, it is bad for the pitcher’.

¹ See *Immediate Distant Action and Correlation in Modern Physics: the Balanced Universe* is a collection of contributions, by an international group of scholars, following a series of workshops held at the University of Wales, Swansea. Eds. N. V. Pope, A. D. Osborne and A. F. T. Winfield, The book was officially launched, at UWE (University of West of England) Bristol, on Thursday 19 January 2006. It is available from the Edwin Mellen press, website: <http://www.mellenpress.com/>