

"Minkowski Spacetime and the Dimensions of the Present" —abstract

In Einstein-Minkowski spacetime, because of the relativity of simultaneity to the inertial frame chosen, there is no unique world-at-an-instant. Thus the classical view that there is a unique set of events existing now in a three dimensional space cannot be sustained. The two solutions most often advanced are (i) that the four-dimensional structure of events and processes is alone real, and that becoming present is not an objective part of reality; and (ii) that present existence is not an absolute notion, but is relative to inertial frame; the world-at-an-instant is a three dimensional, but relative, reality. According to a third view, advanced by Robb, Capek and Stein, (iii) what is present at a given spacetime point is, strictly speaking, constituted by that point alone.

I argue here against the first of these views that the four-dimensional universe cannot be said to exist now, already, or indeed at any time at all; so that talk of its existence or reality as if that precludes the existence or reality of the present is a non sequitur. The second view assumes that in relativistic physics time lapse is measured by the time co-ordinate function; against this I maintain that it is in fact measured by the proper time, as I argue by reference to the Twin Paradox. The third view, although formally correct, is tarnished by its unrealistic assumption of point-events. This makes it susceptible to paradox, and also sets it at variance with our normal intuitions of the present.

I argue that a defensible concept of the present is nonetheless obtainable when account is taken of the non-instantaneity of events, including that of conscious awareness, as (iv) that region of spacetime comprised between the forward lightcone of the beginning of a small interval of proper time t (e.g. that during which conscious experience is laid down) and the backward lightcone of the end of that interval. This gives a serviceable notion of what is present to a given event of short duration, as well as saving our intuition of the "reality" or robustness of present events.