Comment on the Comment by G. Schäfer on the Paper "Non-kinematicity of the Dilation-of-time Relation of Einstein for Time-intervals" by S. Golden

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In his comment G. Schäfer [1] points out that S. Golden's [2] time-dilation equations (12) and (13) are of kinematic type and that the title of Golden's paper is therefore a misconception. He also states that Golden's treatment of the time-dilation problem is incomplete, since Golden has not considered particle decay in his paper. I should like to present my comment on these two points raised by G. Schäfer.

Although Golden describes his equation (13) as "spatially dependent," he says at the beginning of Sect. 4 of his paper that his equations (12) and (13) can be regarded as "either velocity dependent or spatially dependent." But this is not at all the essence of his paper. The essence of his paper is that the two time-dilation equations that he has derived do not imply "any actual dilation-of-time in clocks that may be stationed in the systems." Hence he concludes that Einstein's time-dilation relation is merely a transformation relation and that the motion of the systems does not affect "the intrinsic time-rates of any clocks stationed within them."

In order to judge the significance of Golden's paper, it is important to remember that Einstein arrived at the ideas of kinematic time-dilation and length contraction in moving systems not as a result of a rigorous deduction from any mathematical, physical or logical relations, but simply by *interpreting* in his own way the physical significance of transformation equations for space and time (Lorentz transformation equations) [3]. Ever since the publication of his 1905 article, Einstein's ideas of kinematic length contraction and time dilation have been the subject of a major controversy. The experimental investigations designed to demonstrate the reality of kinematic length contraction and time dilation (according to Einstein, the two effects are inseparably linked together) have not produced unequivocal results: length contraction has never been manifested experimentally and the slowing down of moving clocks, although manifested experimentally, has a plausible explanation as a dynamic, rather than as a kinematic, effect [4].

Moreover, a recent investigation of the invariance of Maxwell's electromagnetic equations under relativistic transformations [5] shows that Maxwell's equations in the form used by Einstein in his 1905 article are incompatible with relativistic (kinematic) length contraction and, hence incompatible with relativistic (kinematic) time dilation. Since Einstein's 1905 article is critically dependent on the relativistic invariance of Maxwell's equations, the incompatibility of Maxwell's equations with relativistic length contraction and time dilation constitutes an additional argument for questioning the reality of these two effects.

In my opinion, Golden's calculations present a very strong new evidence that the relativistic time dilation (the kinematic slowing down of moving clocks) is not a real physical effect.

G. Schäfer believes that Golden has made a serious error by not taking into account the variation of life times of decaying particles in different inertial systems. This would be quite true if the variation of the life times were a kinematic effect. But the fact is that, since we do not know the mechanism or forces that govern the rate of particles decay, there is no way to prove that the variation of life times of rapidly moving particles is a kinematic rather than a dynamic effect. However, we do know that in the case of elementary electromagnetic clocks the rate of the moving clocks is controlled dynamically by forces responsible for the functioning of the clocks [4].

It would be unreasonable to assume that, whereas the slowing down of the rate of moving electromagnetic clocks is a dynamic effect, the slowing down of the rate of decay of moving particles is a kinematic effect.

[1] G. Schäfer, Z. Naturforsch. **55a,** 845 (2000).
[2] S. Golden, Z. Naturforsch. **55a,** 563 (2000).
[3] A. Einstein, Ann. Phys. **17,** 891 (1905).
[4] O. D. Jefimenko, Z. Naturforsch. **53a,** 977 (1998).
[5] O. D. Jefimenko, Z. Naturforsch. **54a,** 637 (1999).

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