Lorentz-Invariant Clocks Do Not Exist.

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Summary. – We give a general proof that (contrary to some statements in the literature) the theory of relativity forbids the existence of a Lorentz-invariant clock, *i.e.* a clock such that, when in motion relative to an inertial frame S, does not lag behind relative to a series of clocks synchronized *à la* Einstein in S.

SCHLEGEL [1-3] suggested that special relativity (SR) permits the construction, at least theoretically, of a clock whose rate is Lorentz-invariant, *i.e.* a clock such that, when in motion relative to an inertial frame S, does not lag behind relative to a series of clocks synchronized *à la* Einstein in S. He stated that the existence of such a clock is in accord with the principle of relativity (PR) by using his « interaction interpretation ». We are not going to comment here on the interaction interpretation proposed by SCHLE-GEL [2], even if we would like to observe that also in that interpretation the PR implies the impossibility of detecting absolute motion. We like here to show once more that the existence of a Lorentz-invariant clock is in disagreement with the PR, and to point out explicitly the fault in Schlegel's analysis [1].

A) Let S_0 be an inertial frame in which the standard clocks E_0 have been synchronized *à la* Einstein. Then in S_0 the light speed is « isotropic » the same in all directions when measured with the cloks of the set E_0.

B) Let S be a frame in uniform motion relative to S_0. Then it can be proved [4,5] that

   i) a set E of standard clocks in S synchronized *à la* Einstein will measure an isotropic light speed;

[1] R. SCHLEGEL: *Found. Phys.*, 7, 245 (1977).
[2] R. SCHLEGEL: *Found. Phys.*, 3, 169, 277 (1973).
[3] R. SCHLEGEL: *Found. Phys.*, 5, 197 (1975).
[4] W. A. RODRIGUES Jr. and J. TIOMNO: *Proceedings International Conference on Space-Time Absoluteness*, edited by S. MARINOV and J. P. WESLEY (East-West Publ. Company, Graz, Austria 1982), p. 147-150.
[5] W. A. RODRIGUES Jr. and J. TIOMNO: *Rev. Bras. Física*, **14**, 449 (1984).