Beyond the light-barrier -faster-than-light space-travel with controlled line-elements of coupled space-times in fourth order

Holger Andreas Walter Döring

Beyond the light-barrier - faster-than-light space-travel with controlled line-elements of coupled space-times in fourth order

Holger Döring
IQ-Wissen – Berlin
Germany
e-mail: haw-doering@t-online.de

Abstract:

It is possible to use ftl-travel with two spacetime-line-elements of second order in flat Minkowski-spacetime. These line-elements are coupled via a third, variable factor, whose controlling allows to regulate the resulting line-element of fourth order. Setting the coupling-factor to zero, there remains classical SRT line-element and both line-elements depart from each-other.The case of ftl can be done by real restmass, so no classical tachyons are described but the case included possible negative restenergy and negative kinetic-energy under special circumstances.For the case of appearing negativism, this is a function of the strength of the coupling-factor R, this negativism can be avoided by chosing a certain weak coupling-strength.

key-words:
ftl-space-travel; coupled-spacetimes; coupling factor; lineelement of fourth order; Minkowski-spacetime; controlling of line-element; damping-factor; damped local space-time; no light-barrier.

1.Introduction:

In coupled damped local space-times [1.], ftl is not something special, it is part of the normal physical conditions, which leads in classical SRT [6.] only to the half of the possible velocity spectrum and c is maximal limit-speed for physical objects resp. speed of energy (photons). Or the description causes tachyons with all their problems and contradictions in describing physical states over imaginary restmass [7.]
Now the local invariance-velocity of c (local light-speed in flat spacetime) is only seen as the eigenresonance-velocity of oscillating spacetime. This is a form of new paradigm in physics.
In coupling spacetimes there is only real restmass and if the coupling is chosen weak there can be avoided to get negative states of energy in both rest- and kinetic energy of the moving body. But then there are no ftl-states of great size which can be seen easily because the interval of getting positive values can be calculated. If there appear negative states , then the demanding of a modified dirac-equation in spacetime of fourth-order has to be described because of the relation between energies and charges. (which isn‘t part of this paper).

2.Calculation:

2.1. Developed Lorentz-factor and line element of coupled space-times:

If a differential-equation of second-oder is set with:

$$A\cdot\ddot{\psi}+(A\cdot C-D)\cdot\psi=0 \qquad \text{(1a.)}$$

there follows as amplitude of solution- function[2.],[3.]:

$$A_1=\frac{1}{1-\frac{v^2}{c^2}} \qquad \text{(1b.)}$$

which is the square of classical Lorentz-factor

$$\gamma=\sqrt{1-\frac{v^2}{c^2}} \quad . \qquad \text{(1c.)}$$

Also follows the mirrorterm of Feinberg for classical tachyons [2.],[7.]:

$$A_2=\frac{1}{\frac{v^2}{c^2}-1} \qquad \text{(1d.)}$$

In both cases are:

$C=\omega^2{}_{Pl}$; $D=\omega^2{}_{Pl}\cdot e^{i\theta}$ and phaseangle $\theta=0$.

If now the differential-equation is developed to its maximal mathematical size [4.] in description of:

$$A\cdot\ddot{\psi}+AB\cdot\dot{\psi}+(A\cdot C-D)\cdot\psi=0 \qquad \text{(2a.)}$$

with $B=\Omega^2$, interpreted as the damping frequency of local space-time or its analogon with other, yet not really cleared interpretation, and the phase-angle of:

$$\tan(\theta)=\frac{\frac{v}{c}\cdot\frac{\Omega}{\omega_{Pl}}}{1-\frac{v^2}{c^2}} \quad \text{with} \quad \lim_{v\rightarrow c}(\theta)=\frac{\pi}{2} \quad . \qquad \text{(2b.)}$$

then the amplitude-function of the solution leads to:

$$A=\sqrt{(1-\frac{v^2}{c^2})^2+\frac{na^2\cdot v^2}{c^4}} \quad , \qquad \text{(2c.)}$$

where $n\in\mathbb{N}$ and a coupling- velocity of analogy of damped spacetime-states. This is the square of the new, developed Lorentz-factor, which appears in the both coupled spacetimes [2.],[3.]

$$\Gamma=\sqrt[4]{(1-\frac{v^2}{c^2})^2+\frac{n\cdot a^2\cdot v^2}{c^4}} \quad . \qquad \text{(2d.)}$$

This term leads directly to the underlying line-element of local space-time in fourth-order (in two dimensions described):

$$ds^4 = ((c \cdot dt)^2 - dx^2)^2 + dx^2 \cdot R^2 \qquad (3a.)$$

which also can be written as:

$$ds^4 = dx^4 - dx^2(2 \cdot dy^2 - R^2) + dy^4 ; y = c \cdot dt \quad , \qquad (3b.)$$

where R is the variable controlling-factor of the line-element spectrum, which is caused through the added velocity of a , which can be chosen any way one want. For $a \equiv 0$, there is description of classical SRT in flat Minkowski-space without any form of coupling and no FTL because the light-barrier then is intact (no „damping-state“). Logically consistent this leads as well to $R=0$ and classical Minkowski-space for local flat spacetime.Without the controlling-factor there is only this one static line-element.If the controlling-factor is introduced, there can be exist a very low form of coupling for avoiding negative-states of energy-conditions[5.].Some of these line-elements are described in [1.].

2.2 The transformation-equation:

The transformation-matrix $\boldsymbol{A}$ is a 8x8-Matrix because of the fourth order of the elaborated root of its lorentz-factor which the matrix must be represent. Every element $\boldsymbol{B}$ of this Matrix is a 2x2 matrix. Therefore the transformation-vector $\vec{r}$ has only four components but every component is a two-dimensional vector (or possible spinor),which components can be chosen both as valuable figures non equal to zero (coupling-state) or one of them to zero to describe the whole situation of both coupled spacetimes or only one of them.[1.].Of course the biquadratic-lineelement (3a.) has to be invariant under such transformations.This has to be proven.

2.3. Energy-conditions:

Under special circumstances the rest-energy as well as the kinetic-energy could become negative.To avoid theses conditions there must the superluminal velocity v chosen as is described in detail in [5.].

Rest-energy will fulfill the equation:

$$E_0 = \frac{m_0 \cdot c^2}{1 - \frac{n \cdot a^2}{2 \cdot c^2}} \qquad (4a.)$$

which can also written as:

$$E_0 = \frac{2 \cdot m_0 \cdot c^4}{2 \cdot c^2 - n \cdot a^2} \qquad (4b.)$$

where a is the outer damping-velocity of the system and $n \in \mathbb{N}$. For $a \equiv 0$ restenergy of course gives the limit of the classical Einstein-equation of

$$E_0 = m_0 \cdot c^2 \quad . \qquad (4c.)$$

Therefore there is the term for kinetic-energy given as:

$$E_{kin}=\frac{2\cdot m_0\cdot c^4}{2\cdot c^2-n\cdot a^2}\cdot\left(\frac{1}{\sqrt[4]{(1-\frac{v^2}{c^2})^2+\frac{n\cdot a^2\cdot v^2}{c^4}}}-1\right) \qquad (4d.)$$

which also goes over for the limit-condition of $a\equiv 0$ in the classical Einstein-form of kinetic-energy for a free particle.More of this theme can be found in [5.].

2.4. Lagrangian and Hamilton-function of the coupled space-time-system:

The Lagrange-function results to:

$$L=\frac{m_0\cdot c^2}{1-\frac{n\cdot a^2}{2\cdot c^2}}\cdot\sqrt[4]{(1-\frac{v^2}{c^2})^2+\frac{n\cdot v^2\cdot a^2}{c^4}} \quad . \qquad (5a.)$$

The result for the Hamilton-Function is similiar to classical SRT with varied additional terms:

$$H=\sqrt{(p\cdot c)^2+k\cdot m^2_0\cdot c^4} \quad , \qquad (5b.)$$

where the additional terms are:

$$p=\frac{m_0\cdot v}{1-\frac{n\cdot a^2}{2\cdot c^2}}\cdot[\frac{1}{\Gamma^3}\cdot((1-\frac{v^2}{c^2})+\frac{n\cdot a^2\cdot v^2}{c^4})] \qquad (5c.)$$

and

$$k=\frac{1}{1-\frac{n\cdot a^2}{2\cdot c^2}}\cdot\frac{1}{\Gamma^2}\cdot[(1-\frac{v^2}{c^2})\cdot\frac{1}{\Gamma^4}\cdot[(1-\frac{v^2}{c^2})+\frac{n\cdot a^2}{2\cdot c^2}]^2] \quad . \qquad (5d.)$$

Remark: Since this a very ugly equation, the probability of its real existence tends to zero, because nature or physics always is beauty.Therefore the probability of the whole theory tends to zero. Anyhow, the limital cases are again those of classical SRT for $a\equiv 0$ .For the momentum there is the classical case of SRT and the stretching factor k will come to $k=1$ as it has to be for limital cases of former theories like classical SRT in flat Minkoski-Space.

3.Conclusion:

A case with moving in ftl for a free particle can be constructed by coupling of two local space-times with low coupling-factor. This will lead to a line-element of fourth order, where the two space-times are coupled by a variable factor, which can be chosen in any way one want but there are some choice-conditions, which have to be followed. Both energies, rest-energy or kinetic-energy can be assumed as to be negative for some of the chosen circumstances but always can be regulated as positive through the regulation-factor of R resp. of a . Though then there are only small ftl-velocities allowed. If the concept of negative energies is accepted, there can be constructed very high ftl- velocities after this theory. If negative energies arise, the problem of Dirac-equation occurs and spontan changing of charges may affect as a function of velocity at a special size.[1.],[4.]

Causal problems may not be arise because of the non - coupling of linear spacelike and timelike elements in one productterm (like in Goedels solution for GRT), but also the problem of isotropy of space-time has to be proven. Non-linear coordinate-squares of timelike and spacelike symbols are coupled. By low coupling of the two spacetimes the measuring may be difficult. Another question of problem is, if normal quantum-effects of classical quantum mechanics or quantum electrodynamics can measure space-time-isotropy on this needed scale because quantum theory lies on space-time like an algae-slick on an ocean. All in all the disadvantages of such a theory seem more difficult than its positive sides – so the theory probably has to be rejected – but some measurements on its demandings could be made, for this is a real challenge in question to nature because of the possible existence of coupling, which could be weak but non- zero and so may cause some small effects which could be measured.

4.Summary:

If the model of undamped oscillation states is used on SRT and its local describing space-time and the theory is developed to description of damped states, then there can be a faster-than-light-scenario constructed where the invariance-velocity c for vacuum-states of flat Minkoswki spacetime is no longer the maximum of speed for material particles but could be only interpreted as eigenresonance-velocity of an oscillating spacetime. But this construction of ftl-states causes some interpretation problems and some real physical problems like possible spontan charge-changing or non -isotropy of spacetime.

5.References:

[1.] Döring,H., SRT as a fourth-order-theory with Analogy-model of Damped Resonance. *Preprints* **2021**, 2021040433 (doi:10.20944/preprints 2021104.0433v1). (https://www.preprints.org/manuscript/202104.0433/v1).

[2.] Döring,H., Lorentzian SRT-transformation-factors as solutions of oscillation-equations.Preprints **2021**,2021050242 (doi:10.20944/preprints 2021105.0242.v2). (https://www.preprints.org/manuscript/202105.0242/v2).

[3.] Döring, H., Einstein-Lorentzian SRT transformation factor as solution of Planck-scaled oscillation equation.**2021** hal-03364641. (https://hal.archives-ouvertes.fr/hal-03364641), (https://vixra.org/abs/2109.0218).

[4.] Döring, H., Developed Lorentz-Einstein SRT-k-factor of fourth order as an amplitude solution of damped planck-scaled oscillation equation.**2021** hal-0337981. (https://hal.archives-ouvertes.fr/hal-03379818v1).

[5.] Döring, H., Energy conditions in advanced SRT of fourth order.**2021** hal-03430522v1. (https://hal.archives-ouvertes.fr/hal-03430522v1).

[6.] Einstein,A., Zur Elektrodynamik bewegter Körper, Annalen der Physik,**322**, 10, 1905. (https://doi.org/10.1002/andp.19053221004).

[7.] Feinberg, G., Possibility of faster-than-light-particles, Phys.Rev.**159**,1089, (1967).