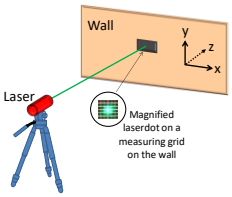


On a flawed Lorentz contraction paradigm caused by an erroneous Michelson-Morley model and null-result.

Private communication/publication

Etienne Brauns[a]

1.0

Keywords: Lorentz, contraction, Michelson and Morley, location, anomaly, paradigm, light, ray of light, laser, laser pulse, laser beam, photon, real space, real velocity, real location

Abbreviations: MM (Michelson and Morley), CS (contemporary science), CPBD (contemporary paradigms believer and defender), RS (real space), RV (real velocity), VS (virtual space), MWF# (My Website Figure) (a Figure at www.absolute-relativity.be ; including references to dynamic Figures through their internet web link since it is not possible to directly implement dynamic/animated time stamp type of Figures in a Word or PDF based publication/document)

Dynamic figures in this publication are referred to as e.g. MWF2 (see *Abbreviations*). By clicking the link in Table 1 those dynamic figures will automatically open in your web browser.

Table 1 : dynamic MWF figures and their link

MWF#	Link
MWF2	www.absolute-relativity.be/images2/G6_Animation.gif
MWF24	www.absolute-relativity.be/figures/Figure24_Animation.gif
MWF25	www.absolute-relativity.be/figures/Figure25_Animation.gif
MWF26	www.absolute-relativity.be/figures/Figure26_Animation.gif
MWF27	www.absolute-relativity.be/figures/Figure27_Animation.gif

a) Private research contact : all contacts should go through the Contact facility at the Home page of www.absolute-relativity.be

1. Abstract

In this short publication the CS Lorentz contraction paradigm is discussed. The Lorentz contraction was/is already discussed broadly in section 8 of (1) and previously at the website indicated in [a)]. In this publication the core information from section 8 of (1) was extracted to demonstrate that the Lorentz contraction is flawed. From (1,2,3) it should be clear that a straightforward type of laser experiment showed that multiple CS paradigms based on light/photons are flawed as a result of the massive anomaly demonstrated by that laser experiment. Moreover the multiple theoretical inconsistencies and anomalies reported in (1,2) also clearly show that CS paradigms based on light are flawed and should be reconsidered. When using photons in the analysis, this all becomes clear.

(1) Etienne Brauns, *A shattered Equivalence Principle in Physics and a future History of multiple Paradigm Big Bangs in "exact" science ?* ; this extended (notary registered) publication can be downloaded at http://www.absolute-relativity.be

(2) Etienne Brauns, *On multiple anomalies and inconsistencies regarding the description of light phenomena in contemporary science*
Website : http://www.absolute-relativity.be/pdf/MultipleAnomalies_EBrauns.pdf (version including the Annex)
Researchgate :
https://www.researchgate.net/publication/312190993_On_multiple_anomalies_and_inconsistencies_regarding_the_description_of_light_phenomena_in_contemporary_science
https://www.researchgate.net/publication/312591154_Annex_1_to_On_multiple_anomalies_and_inconsistencies_regarding_the_description_of_light_phenomena_in_contemporary_science

(3) Etienne Brauns, *On a massive anomaly through a straightforward laser experiment falsifying the equivalence principle for light.*
Website : http://www.absolute-relativity.be/pdf/ExperAnomLaser_EBrauns.pdf
Researchgate :
https://www.researchgate.net/publication/313030370_On_a_massive_anomaly_through_a_straightforward_laser_experiment_falsifying_the_equivalence_principle_for_light

(4) Etienne Brauns, *On the flawed Michelson and Morley experiment null-result paradigm*
Website : http://www.absolute-relativity.be/pdf/MichelsonMorley_EBrauns.pdf
Researchgate :
https://www.researchgate.net/publication/318969438_On_the_flawed_Michelson_and_Morley_experiment_null-result_paradigm

Note : A detailed discussion can be found within the extended publication (1) of over 400 pages which is downloadable at the website indicated in [a)]. The extended publication is informing in more detail about the existence/proofs of multiple flawed paradigms based on light/photons within CS and about important applications (on our planet and in space) resulting from those views. All information and contents related to (1), (2), (3), (4) and the website were registered in front of a notary and, in combination with the patent text, thus ensuring an author's copy right protection. The principle and result of the laser experiment was already published in a (notary registered) patent text and also already published at www.absolute-relativity.be.

2. The flawed Lorentz contraction paradigm

2.1 The Lorentz contraction

In (1) and more specifically in section 8 of (1) a more detailed discussion can be found regarding the Lorentz contraction paradigm. In this publication the core information from (1) was extracted. The Lorentz contraction formula was derived in section 8 of (1) while being based on the graphical representation (Figure 8.1) by MM (Michelson and Morley) in their publication "*On the Relative Motion of the Earth and the Luminiferous Ether*" (November 1887 in the American Journal of Science as Art. XXXVI).The Michelson and Morley paper can be downloaded at :
www.absolute-relativity.be/pdf/MichelsonAndMorleyPaper1887.pdf
(or at the internet : http://history.aip.org/history/exhibits/gap/PDF/michelson.pdf)
The MM publication is also discussed in (4).

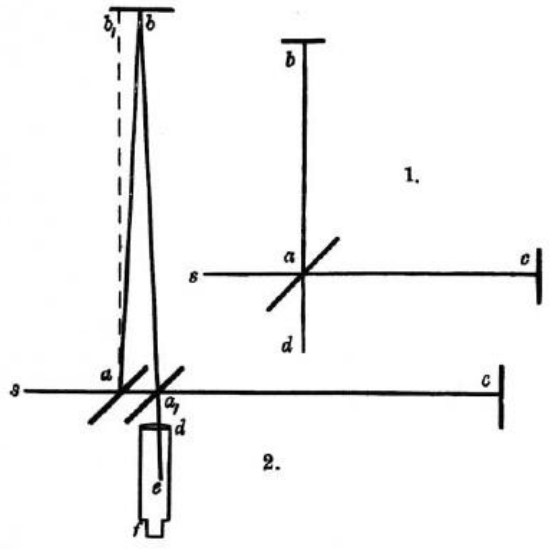


Figure 8.1 MM: copy of their original figure 1 showing part 1 and part 2 (paper 1887)

Next to the Lorentz contraction discussion in section 8 of (1), in this publication the additional Figures A and B are introduced in order to derive the Lorentz contraction equation and to point to the flaws made by MM/CS in the modeling in part 2 of Figure 8.1 of the light/photon phenomena in the MM experiment. For simplicity, in Figures A and B only two time instances t_1 and t_2 are considered. The photon is represented by a dot.

Consider thus in the left hand part of Figure A at time instance t_1 a set-up having:

- a 45° inclined mirror Mir1 and a horizontal mirror Mir2, both moving through RS at a horizontal velocity of v
- a photon which moves perfectly horizontal and hits, at the time instance t_1, Mir1
- a reference frame (colour red) at perfect rest in RS. That reference frame at perfect rest in RS is indexed as '_RS'.
- an observer Obs1 who is at perfect rest linked to the reference frame at perfect rest
- a reference frame (colour blue) which moves along with the set-up at the horizontal

velocity v through RS

- an observer Obs2 who is linked to the moving reference frame and thus moves along with the set-up at the horizontal velocity v through RS
- the moving reference frame linked to Obs2 is indexed as VS (virtual space)
- Obs1 will observe the photon hitting Mir1 at time instance t_1 in location F_{t1}^{RS} in the reference frame at perfect rest
- Obs2 will observe the photon hitting Mir1 at time instance t_1 in location F_{t1}^{VS} in the moving reference frame
- it is trivial that in the left hand part of Figure A the location F_{t1}^{RS} is equivalent to location F_{t1}^{VS}

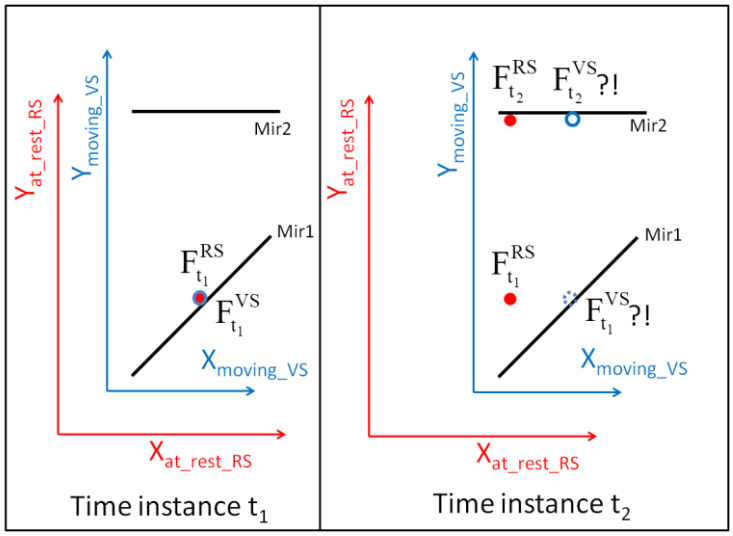


Figure A Graphical representations for two time instances t_1 and t_2

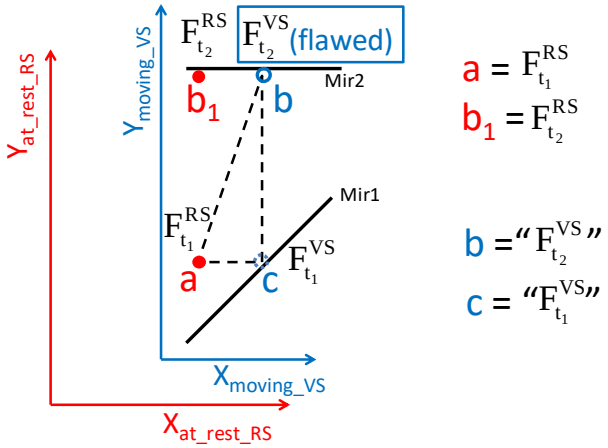


Figure B The rectangular triangle abc resulting in the Lorentz contraction formula

Figure A is then in fact corresponding to the set-up of MM in part 2 of Figure 8.1 regarding the reflection of light at the inclined mirror (Mir1) and the arrival of the reflected light at the upper horizontal mirror (Mir2). However, MM did not graphically represent the position of Mir1 at the time instance t_2 when the photon is hitting Mir2 after its reflection by Mir1 at the time instance t_1. In that respect, an explicit graphical representation of the time instance of the

light/photon hitting Mir2 is the purpose of the right hand part "Time instance t_2" of Figure A.

Regarding the right hand part of Figure A: in (1,2,3,4) it was explained that CS claims, from a very peculiar (direction selective) velocity inheritance principle, that the photon will always hit Mir2 in location F_{t2}^{VS} (the midpoint of Mir2) for whatever value of the velocity v. CS therefore also claims that in a laboratory on our planet in such type of set-up where:

- a fixed laser is sending a laser beam (thus continuously producing photons and sending those) horizontally towards the 45° inclined mirror Mir1
- the laser beam (thus all the photons in the laser beam) is (are) reflected upwards to the horizontal mirror Mir2

that in such a set-up the laser dot at Mir2 (or alternatively at a fixed horizontal measuring grid replacing Mir2) will always be observed by an observer Obs2 in the laboratory in a fixed position. In the case of Mir1 that fixed position would be according to CS the midpoint of Mir2. In the case of a measuring grid CS claims that the observer will observe a fixed laser dot on the fixed measuring grid. These CS claims of a fixed laser dot position at Mir1 or the alternative measuring grid are however totally flawed since a straightforward laser experiment as discussed already multiple times:

- in a patent text (see also Figure C)
- at the website www.absolute-relativity.be (MWF2)
- in (1,2,3)

clearly supports the validity of the statement that such CS claims are totally wrong.

Figure C Original photograph delivered to USPTO of the very high quality polished metal mirror being used in the laser experiment (photo converted by USPTO into Figure 10, of very low quality, in the USPTO Patent Application US2007/0222971 A1)

Even a straightforward laser experiment in which a very high quality polished metal mirror (Figure C and the indicated patent text) was introduced, in order to have a mirror in the set-up reflecting a laser beam, showed the very same result as the fully analogous laser experiment of which the result is shown in MWF2. In the patent text (see Figure C) the result for a red laser, while using the very high quality mirror, was reported. At the website and in (1,2,3) the result for a green laser experiment (MWF2) was reported. Both reproducible laser

experimental results showed the very same effect during a 24h experiment of a non-fixed, thus shifting, laser dot location at a fixed measuring grid and thus were fully consistent. The MM and CS views were/are thus in fact countered experimentally. Therefore CS is challenged to re-perform the straightforward type of laser experiment, even a laser experiment including a mirror. The confirmation by a university or a research centre of the laser experiment result such as reported (MWF2) and in the patent text (Figure C, including a mirror) will clearly prove that the CS views on the representation of photon phenomena (graphical representation, modeling) such as in part 2 of MM's Figure 8.1 or in MWF24, MWF25, MWF26 and MWF27 (discussion in (1,2,3)) are totally flawed. As a result: it is claimed in this publication that the photon arrives at Mir2 in location F_{t2}^{RS} and not in location F_{t2}^{VS} (which is indicated therefore as "F_{t2}^{VS} ?!" in Figure A).

(Note 1: the dotted circle indicated by "F_{t1}^{VS} ?!" in the right hand part of Figure A is also discussed further in this publication.)

[Note 2 : a CS velocity inheritance principle is only valid for materials objects. It is indeed classic knowledge in physics that a material object A being launched from a moving material object B will evidently "take over", in addition, the full velocity vector of object B. In fact A and B were travelling in sync of course at the moment of the launching of A from B and thus A already had the same velocity vector as B. So it is evident that the launching velocity vector of object A therefore needs to be added to the already existing velocity vector of object B (thus also in an equivalent way already existing for A) in a way that the resulting velocity vector of the material object A is the sum of both velocity vectors. In the case of material objects there is however certainly no direction selective velocity inheritance mechanism (as claimed by CS for light) between object A and object B. In the case of a photon (which cannot be compared with a material object) that photon shows an immediate extreme launching velocity in RS of about 300 000 000 meters per second in its direction of travel. It is trivial that the extremely high "launching" velocity itself of the photon certainly has nothing to do at all with the velocity vector of the material source of the photon. But in the case of a photon, CS and CPBDs defend an extremely peculiar direction selective velocity inheritance principle different from the CS (not direction selective) overall velocity vector inheritance principle for material objects. It is claimed in (1,2,3) and in this publication that a photon is not inheriting at all any velocity vector component in whatever direction from its (material object) source, thereby in conflict with the CS views.]

When now extracting the right hand part of Figure A, a Figure B can be produced in order to derive the Lorentz contraction formula from the CS views. As to use less complex symbols in the (CS views based) mathematical derivation of the Lorentz contraction formula, in Figure B the symbols are replaced as following:

- $F_{t1}^{RS} \rightarrow = a$
- $F_{t2}^{RS} \rightarrow = b1$ (my claim supported by the straightforward laser experiment)
- $F_{t2}^{VS} \rightarrow = b$ (claim by CS but flawed claim)
- $F_{t1}^{VS} \rightarrow = c$

A rectangular triangle abc is also introduced within Figure B. It can be noticed that location "a" in Figure B corresponds to location "a" in part 2 of MM's Figure 8.1. In the same way it can be noticed that location "b" in Figure B corresponds to location "b" in part 2 of MM's Figure 8.1. Since the set-up has a horizontal velocity v, the set-up will travel the horizontal distance in a time interval $\Delta t=t_2-t_1$.

According to Lorentz (and according to CS, still up to now):

- Obs1 in perfect rest observes the light to travel from a to b (Figure B and Figure 8.1 are of course equivalent in that respect) in RS (in the perfect at rest frame).
- Obs2 in the moving frame (in fact a virtual/mathematical "space") would "observe" the light to travel from c to b

Evidently a paradox, according to the Lorentz view and still the CS views, then emerges since Obs2 would be observing a shorter trajectory cb than Obs1 who observes, still according to CS views, a trajectory of length ab which is longer than cb. Lorentz concluded thus from the type of graphical representation (model) such as the part 2 within the MM Figure 8.1 that the only solution to solve this baffling paradox is to introduce an even more baffling statement that an observer Obs2 in a moving frame needs to apply a contraction formula to calculate the shortening of the length of a measuring rod... So, that Lorentz contraction formula can be very simply obtained from the rectangular triangle abc and from the Pythagorean theorem:

$$bc^2 + ac^2 = ab^2 \qquad (1)$$

Since in Figure B and in Figure 8.1, according to the views by CS, ab thus must be the trajectory of the photon as observed by Obs1:

$$ab = c \cdot \Delta t \qquad (2)$$

thus according to CS views:

$$\Delta t = \frac{ab}{c} \qquad (3)$$

As observed by Obs1, Mir1 is displaced over the distance ac during the time interval Δt:

$$ac = v \cdot \Delta t \qquad (4)$$

Equation (3) can be substituted in equation (4), thus obtaining :

$$ac = v \cdot \frac{ab}{c} \qquad (5)$$

By substituting equation (5) in equation (1):

$$bc^2 + (v.\frac{ab}{c})^2 = ab^2 \qquad (6)$$

or :

$$bc^2 = ab^2 - (v.\frac{ab}{c})^2 = ab^2\left[1 - (\frac{v}{c})^2\right] \qquad (7)$$

thus according to Lorentz and CS:

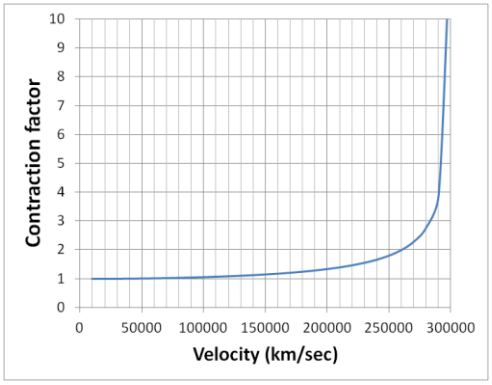
$$bc = ab \cdot \sqrt{1-(\frac{v}{c})^2} \qquad (8)$$

Lorentz and CS (http://en.wikipedia.org/wiki/Length_contraction) thus reason(ed) that, in order to find the value L (being the length of an object in motion at a velocity v) the proper length L_0 of the object (L_0 being the length of the object in a frame at rest) can be obtained from :

$$L = \frac{L_0}{\gamma} = \quad L_0 \cdot \quad \sqrt{1-(\frac{v}{c})^2} \qquad (9)$$

The Lorentz contraction factor γ is :

$$\gamma = \frac{1}{\sqrt{1-(\frac{v}{c})^2}} \qquad (10)$$



If the velocity v=0 then the contraction is zero (thus the Lorentz contraction factor is 1 and the object thus keeps its length since $L=L_0$ then). However, the higher the velocity value of v the higher the contraction. An object that travels at light speed thus should show a length L equal to zero since the value of γ then is infinitely high according to equation (10): v is then equal to c, thus v/c=1, thus $\gamma = 1/0 = \infty$.

2.2. The errors in the Michelson-Morley model and a resulting flawed Lorentz contraction paradigm

MM and CS claim that Obs2 who travels along with the set-up in Figure 8.1, Figure A and Figure B observes the light/photon always to perfectly arrive in "b" (F_{t2}^{VS}), the midpoint of Mir2 (see also the critique in (4)) for whatever value of v. However, the straightforward laser experiment discussed in details in (1,2,3) and at the website (MWF2) proves that Obs2 is in fact not observing such at all! The arrival of the photon in F_{t2}^{VS} is fictitious in a virtual "space" VS of the "reference frame" of Obs2, thus an erroneous graphical representation of the arrival location of the photon at Mir2. That is a first severe error being made by CS.

The reality (see the laser experiment) however is that Obs2 will observe the photon to arrive in b_1 (thus according to F_{t2}^{RS}). Obs2 thus will observe the photon to arrive at Mir2 at a location which will show a horizontal lateral displacement b_1b at Mir2 which will increase with an increasing value of v (see therefore also the patent indicated in Figure C regarding a

device to measure RV in RS, or (1) or the website in that respect). As a result the Lorentz contraction analysis is based by CS on a flawed graphical representation. Obs1 does not observe the trajectory ab of the photon but the trajectory ab1 in Figure B and Figure 8.1 according to the real displacement of the photon in RS from location F_{t1}^{RS} to location F_{t2}^{RS}.

A CPBD should experience a Gestalt Switch from the result of the straightforward laser experiment shown in MWF2 and from the theoretical inconsistencies discussed in (1,2). The CPBD should recognize the errors in the CS views with respect to the flawed graphical representation of the photon phenomena in figures of the type of Figure 8.1 and should thus finally accept $b_1= F_{t2}^{RS}$ to be the location of arrival of the photon at Mir2. Thus not a location of arrival of the photon "always in the midpoint of Mir2" since that kind of reasoning is merely a fictitious and expectation based view by CS and by an Obs2 type of CPBD in a virtual space type of reference frame. If the CPBD experienced the Gestalt Switch but then still would argue that Obs2 then thus must "observe" the trajectory cb1 (from the dotted circle location indicated $c=F_{t1}^{VS}$ towards the location $b_1=F_{t2}^{RS}$) then a second severe error can be pointed to, being made by the CPBD. In Figure A the "in fact" location F_{t1}^{VS} as depicted in the left hand part of Figure A is linked to the time instance t_1. Thus the location F_{t1}^{VS} as depicted in the left hand part of Figure A for the time instance t_1 is indeed a correct representation of the photon being located there in RS in the location F_{t1}^{RS} being equivalent <u>at that moment</u> to F_{t1}^{VS}. For both Obs1 and Obs2 there is thus a full consistency in claiming F_{t1}^{RS} and F_{t1}^{VS} to be the location of the photon at time instance t_1 (in either of both reference frames). F_{t1}^{VS} thus saves the reality of F_{t1}^{RS}.

Regarding the "Time instance t2" representation in the right part of Figure A and in Figure B however, it should be clear for the CPBD that her/his claim that the dotted circle location indicated by $c=F_{t1}^{VS}$ does not save in any way the phenomenon of the photon being located in RS in F_{t1}^{RS} at time instance t_1. The CPBD thus should experience a second Gestalt Switch and finally also should accept the fact that Obs2 is indeed not "observing" the photon to travel from c to b_1 (thus from the dotted circle location indicated F_{t1}^{VS} in Figure B towards the location $b_1=F_{t2}^{RS}$). The CPBD thus suddenly should realize that (s)he even would make a second massive error (by only producing a virtual reality statement not linked to any reality in RS at all and thus not saving at all in the frame of Obs2 the photon's travelling phenomena in RS) when claiming a cb_1 photon "trajectory". Since modeling in the virtual space reference frame of Obs2 needs to save the real phenomena in RS, the CPBD thus needs also to abandon her/his eventual statement that Obs2 will observe the photon to "travel" from c to b_1 in the reference frame of Obs2. Such would be again a wrong mathematical model (wrong graphical representation of the real phenomena of the photon in RS) in the reference frame of Obs2.

As a result the CPBD should then also realize that the "representation" by F_{t1}^{VS} (dotted circle location "c") in the right hand part of Figure A and in Figure B is totally flawed. In particular it can be concluded that, in the case of the past t_1 location of a photon in RS, it is in fact impossible to graphically represent correctly that past location in the mathematical/virtual reference frame of Obs2 (moving in RS)! See more details in (1).

Obs2 (/CPBD) thus now should accept that her/his virtual frame moves in RS and that:

> 1) location b_1 (the location F_{t2}^{RS}) in Figure B represents correctly a now position (time instance t_2) of the photon and that the view of CS with respect to the location b of the location of the photon at time instance t_2 is flawed
> 2) location "c" (location F_{t1}^{VS}) in the right hand part of Figure A and in Figure B does not represent correctly the past position (time instance t_1) of the photon. This is explained in more detail in (1): it is stressed there that multiple CS paradigms based on light/photon phenomena are flawed as a result of the virtual space (VS) Obs2 approach by the human mind. That actual CS virtual approach (mathematical modeling) in the VS frame of Obs2 is simply unsuitable to save the real phenomena of photons in RS. As a result, a total new mathematical approach needs to be introduced in CS with respect to saving the real phenomena of a photon in RS in a suitable mathematical representation in a moving Obs2 frame. The consequence is also that multiple CS paradigms based on light/photons are flawed and need to be reconsidered and even abandoned.

It can be remarked in addition that location "c" at Mir1 in the moving reference frame of Obs2 is only representative for a photon event (photon hitting Mir1 at time instance t_1) at a 'now-time-instance' (thus t_1 in that case) but not for any other time instance $t<t_1$ in the past. If in the set-up a laser thus would send photons continuously horizontally to Mir1 only that photon which hits Mir1 at the "now time instance" can be correctly represented by the "c" location in Figure B. If a CPBD would claim the "trivial evidence" that all photons were and are reflected in the "c" location at Mir1 then such CPBD again forgets the reality that Mir1 is moving through RS and the fact that the "c" location is not a correct representation in the Obs2 frame for a photon being reflected in the past, thus that the trajectory cb1 is still a flawed representation in the Obs2 frame of the trajectory of a photon travelling through RS from the time instance t_1 to time instance t_2. Thus cb1 is not saving in the Obs2 frame the real phenomena of the photon. Therefore the CPBD/Obs2 should also understand and consider in her/his mind that the photon in reality travelled in RS the distance ab1 (thus in RS from a= F_{t1}^{RS} to the location b_1= F_{t2}^{RS}) and that in the virtual space of the reference frame of Obs2 a graphical representation would need another, totally different, mathematical approach, as already suggested at the website (MWF10) or in section 8 (e.g. Figure 8.8) of (1) with respect to e.g.a "virtual/symbolical representation" in the Obs2 frame of a past photon's RS real location. The extremely specific conclusion from all this is that such new approach in the reference frame of Obs2 even proves that for Obs1 and Obs2 there will be no difference in the trajectory length of the photon in both reference frames! Thus that both Obs1 and Obs2 will consider the very same trajectory length for the photon travelling in the time interval between t_1 and t_2! Thus thereby evidently also saving the trivial fact that the velocity of photons in RS must be a constant for both observers Obs1 and Obs2 after a correct observation/modeling of the photon phenomena in their own reference frame!

Multiple paradigms based on light/photon which exist at the moment in CS are thus flawed as the result of a wrong approach in the mathematical modeling within the virtual space of an

Obs2 type of reference frame (whatever actual type of mathematical reference frame introduced by CS) moving in RS. The flawed paradigms are thus merely a fiction, created by the human mind on the basis of a flawed use of virtual space reference frames of the Obs2 type in the case of photons (eg. the flawed Figure 8.1 with the MM/CS model or the flawed CS based MWF24, MWF25, MWF26, MWF27 as discussed in (1,2,3)). Up to now and after many years, CS still seems to be very reluctant to accept such (see section 13 in (1)). However, at the moment that the result of the straightforward type of laser experiment (MWF2) will be confirmed independently by a university or a research centre the title of (1) will become very relevant ...

3. Conclusions

In this publication the cause of a flawed Lorentz contraction paradigm is explained. Again a stringent call to a university or a research centre is made to re-perform a straightforward laser experiment (even including a mirror). In the case of the confirmation of the result of the laser experiment (as demonstrated in MWF2) the consequences for specific CS paradigm based on light/photons are enormous.