Do the Planck length, time and mass follow the Lorentz contraction?

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ABSTRACT

The Planck length, time and mass follow the Lorentz contraction. The speed of light is different in higher dimensions. The Gravitational Constant not Really Constant.

Keywords

Special Relativity, Lorentz contraction, higher dimensions, Planck length

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Introduction

Fitzgerald-Lorentz contraction

$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{{dX_1}^2})}} \text{------------------------------- } (1)$$

$$dX_2 = \gamma[dX_1 - vdT_1\sqrt{1-\frac{dX_{PL}^2}{{dX_1}^2}}] \text{ ------------------------------- } (2)$$

$$dT_2 = \gamma(dT_1 - \frac{v\sqrt{1-\frac{dX_{PL}^2}{{dX_1}^2}}}{C^2}\, dX_1) \text{ ------------------------------- } (3)$$

$$dM_2 = \gamma dM_1 \text{------------------------------- } (4)$$

A in frame S_1 and at rest, B in frame S_2 and at moves so Measurements B:

From equation (3) let $dT_2 = 0$

$$dT_2 = \gamma(dT_1 - \frac{v\sqrt{1-\frac{dX_{PL}^2}{dX_1{}^2}}}{C^2}\, dX_1) \text{ -------------------------------- (3)}$$

$$0 = \gamma(dT_1 - \frac{v\sqrt{1-\frac{dX_{PL}^2}{dX_1{}^2}}}{C^2}\, dX_1)$$

$$dT_1 = \frac{v}{C^2}\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}\, dX_1 \text{-------------------------------- (5)}$$

From equation (2), (5)

$$dX_2 = \gamma[dX_1 - v dT_1\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}] \text{ -------------------------------- (2)}$$

$$dT_1 = \frac{v}{C^2}\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}\, dX_1 \text{-------------------------------- (5)}$$

$$dX_2 = \gamma[dX_1 - v\frac{v}{C^2}\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}\, dX_1\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}]$$

$$dX_2 = \gamma[1 - \frac{v^2}{C^2}(\,1 - \frac{dX_{PL}^2}{dX_1{}^2})]dX_1 \text{ -------------------------------- (6)}$$

From equation (1)

$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} \text{-------------------------------- (1)}$$

$$\boldsymbol{dX_2 = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}dX_1} \text{ -------------------------------- (7)}$$

$$\boldsymbol{dX = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}dX_o} \text{ -------------------------------- (8)}$$

Proper time

We have equation

$$dX_1{}^2 + dY_1{}^2 + dZ_1{}^2 - C_1{}^2 dT_1{}^2 - \frac{G_1{}^2}{C_{M1}{}^4} dM_1{}^2 = dX_2{}^2 + dY_2{}^2 + dZ_2{}^2 - C_2{}^2 dT_2{}^2 - \frac{G_2{}^2}{C_{M2}{}^4} dM_2{}^2$$

-------------------------------- *(9)*

$$dS_1{}^2 = dS_2{}^2$$

-------------------------------- *(10)*

C_1 Speed of light and C_{M1} Speed of light at mass dimension at frame S_1

C_2 Speed of light and C_{M2} Speed of light at mass dimension at frame S_2

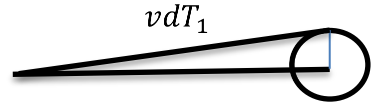
And $C_1 = C_2$

So $dX_1{}^2 + dY_1{}^2 + dZ_1{}^2 - C^2 dT_1{}^2 - \frac{G_1{}^2}{C_{M1}{}^4} dM_1{}^2 = dX_2{}^2 + dY_2{}^2 + dZ_2{}^2 - C^2 dT_2{}^2 - \frac{G_2{}^2}{C_{M2}{}^4} dM_2{}^2$

-------------------------------------- *(11)*

When $(\frac{dX_2}{dT_2})^2 + (\frac{dY_2}{dT_2})^2 + (\frac{dZ_2}{dT_2})^2 = 0$

from Redefinition of the point as a circle the length of it the radius Equal the length of the Planck cT_{pl}



$$dX_1 = v\sqrt{dT_1{}^2 - \frac{c^2}{v^2}(dT_{pl}^2)}$$

$$dX_1 = vdT_1\sqrt{1 - \frac{c^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$$

$$\frac{dX_1}{dT_1} = v\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}$$

In three dimensions

$$\sqrt{(\frac{dX_1}{dT_1})^2 + (\frac{dY_1}{dT_1})^2 + (\frac{dZ_1}{dT_1})^2} = v\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}$$

so

$$(\frac{dX_1}{dT_1})^2 + (\frac{dY_1}{dT_1})^2 + (\frac{dZ_1}{dT_1})^2 = v^2(1 - \frac{dX_{PL}^2}{dX_1{}^2})$$

------------------------------------- *(12)*

So from (9), (10), (12)

$$dS_1{}^2 = v^2(1 - \frac{dX_{PL}^2}{dX_1{}^2})dT_1{}^2 - C^2 dT_1{}^2 - \frac{G_1{}^2}{C_{M1}{}^4} dM_1{}^2 = 0 - C^2 dT_2{}^2 - \frac{G_2{}^2}{C_{M2}{}^4} dM_2{}^2$$

----------------------------- *(13)*

$$dS_1{}^2 = [v^2(1 - \frac{dX_{PL}^2}{dX_1{}^2}) - C^2 - \frac{G_1{}^2}{C_{M1}{}^4}\left(\frac{dM_1}{dT_1}\right)^2]dT_1{}^2 = -[C^2 + \frac{G_2{}^2}{C_{M2}{}^4}\left(\frac{dM_2}{dT_2}\right)^2]\, dT_2{}^2$$

--------------------- *(14)*

But $\frac{dM_1}{dT_1} = 0$ *and* $\frac{dM_2}{dT_2} = 0$

So

$$dS_1{}^2 = [v^2(1 - \frac{dX_{PL}^2}{dX_1{}^2}) - C^2]dT_1{}^2 = -[C^2]\, dT_2{}^2$$

--------------------- *(15)*

$$dT_2{}^2 = [1 - \frac{v^2}{C^2}\left(1 - \frac{dX_{PL}^2}{dX_1{}^2}\right)]dT_1{}^2$$

--------------------- *(16)*

$$\boldsymbol{dT_2 = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}\, dT_1}$$ -------------------------------- ***(17)***

$$\boldsymbol{dT = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}\, dT_o}$$ -------------------------------- ***(18)***

From (4) and (1)

$dM_2 = \gamma dM_1$-------------------------------- *(4)*

$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}}\text{--------------------------------}\ (1)$$

$$dM_2 = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} dM_1\text{--------------------------------}\ (19)$$

$$dM = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} dM_o\text{--------------------------------}\ (20)$$

Contribution

$$\textbf{Let}\quad \mathbf{v} = v\sqrt{1-\frac{dX_{PL}^2}{dX_1{}^2}} = \frac{dX}{dT} = \frac{dX}{dX_o}.\frac{dX_o}{dT_o}.\frac{dT_o}{dT}$$

$$= \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}}.\mathbf{v}_o.\gamma$$

SO $\mathbf{v} = \mathbf{v}_o$-------------------------------- (21)

By using the equations

$$dX = \sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} dX_o\ \text{--------------------------------}\ (8)$$

$$dT = \sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} dT_o\ \text{--------------------------------}\ (18)$$

$$dM = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} dM_o\text{--------------------------------}\ (20)$$

$\mathbf{v} = \mathbf{v}_o$-------------------------------- (21)

Then

$$\hbar = \frac{dM.\mathrm{v}.\mathrm{d}\lambda}{2\pi} = \frac{dM.\mathrm{v}.2\pi.\mathrm{dX}}{2\pi} = dM.\mathrm{v}.\mathrm{dX} = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} dM_o.\mathrm{v}.\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} dX_o$$

$$\hbar = dM_o.\mathrm{v}.dX_o = \hbar_o$$

Then

ħ = $\hbar_o$-------------------------------- *(22)*

$$\mathbf{v}_f = \mathbf{v}_i + \mathbf{a}dT = \mathbf{v}_i + \mathbf{a}\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}\, dT_o$$

$$\mathbf{v}_f = \mathbf{v}_i + \mathbf{a}_o dT_o$$

So

$$\mathbf{a}\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}\, dT_o = \mathbf{a}_o dT_o$$

$$\mathbf{a}\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} = \mathbf{a}_o$$

$$\mathbf{a} = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}}\mathbf{a}_o \text{-------------------------------- (23)}$$

Is the Gravitational Constant Really Constant?

$$\mathbf{a} = \frac{G.dM}{dX^2} = \frac{G.\frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}}dM_o}{(\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}dX_o)^2} = \frac{G_o.dM_o}{dX_o{}^2}\frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}}$$

$$\frac{G}{(\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})})^2} = G_o$$

$$G = G_o[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^2 \text{-------------------------------- (24)}$$

But we have from the

$$X_1{}^2 - C^2 T_1{}^2 - \frac{G_1{}^2}{C^4} M_1{}^2 = X_2{}^2 - C^2 T_2{}^2 - \frac{G_2{}^2}{C^4} M_2{}^2$$

$$G = G_o[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} - - - - - - - - (25)$$ [1]

But the correct

$$X_1{}^2 - C_1{}^2 T_1{}^2 - \frac{G_1{}^2}{C_{M1}{}^4} M_1{}^2 = X_2{}^2 - C_2{}^2 T_2{}^2 - \frac{G_2{}^2}{C_{M2}{}^4} M_2{}^2$$ [2]

$C_M \neq C$

And we have

$$\frac{G_O{}^2}{C_{M1}{}^4} = \frac{G^2}{C_{M2}{}^4}[\frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}}]^2$$

$$\frac{G_O{}^2}{C_{M1}{}^4} = \frac{G_O{}^2[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^4}{C_{M2}{}^4}[\frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}}]^2$$

$$\frac{1}{C_{M1}{}^4} = \frac{1[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^4}{C_{M2}{}^4}[\frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}}]^2$$

$$C_{M2}{}^4 = C_{M1}{}^4[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^2$$

$$C_{M2} = C_{M1}\sqrt[4]{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} - - - - - - - - (26)$$

PLANCK

$$l_{pl} = \sqrt{\frac{G\hbar}{C^3}}$$

$$l_{pl} = \sqrt{\frac{G_o[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^2\hbar}{C^3}}$$

$$l_{pl}rest = \sqrt{\frac{G_o\hbar}{C^3}}$$

$$l_{pl} = l_{pl}rest\sqrt{1 - \frac{v^2}{c^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} - - - - - - - - (27)$$

$$t_{pl} = \sqrt{\frac{G\hbar}{C^5}}$$

$$t_{pl} = \sqrt{\frac{G_o[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}]^2\hbar}{C^5}}$$

$$t_{pl}rest = \sqrt{\frac{G_o\hbar}{C^5}}$$

$$t_{pl} = t_{pl}rest\sqrt{1 - \frac{v^2}{c^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} - - - - - - - - (28)$$

$$m_{pl} = \sqrt{\frac{C\hbar}{G}}$$

$$m_{pl} = \sqrt{\frac{C\hbar}{G_o[\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})]^2}}}$$

$$m_{pl}rest = \sqrt{\frac{C\hbar}{G}}$$

$$m_{pl} = l_{pl}rest \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}} - - - - - - - - (29)$$

Conclusion

$$dX = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} dX_o \text{ -------------------------------- } (8)$$

$$dT = \sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})} dT_o \text{ -------------------------------- } (18)$$

$$dM = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}} dM_o \text{-------------------------------- } (20)$$

$$\mathbf{v} = \mathbf{v}_o \text{-------------------------------- } (21)$$

$$\hbar = \hbar_o \text{-------------------------------- } (22)$$

$$\mathbf{a} = \frac{1}{\sqrt{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}}\mathbf{a}_o \text{-------------------------------} (23)$$

$$G = G_o[\sqrt{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}]^2 \text{-------------------------------} (24)$$

$$C_{M2} = C_{M1}\sqrt[4]{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} --------(26)$$

$$l_{pl} = l_{pl}rest\sqrt{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} --------(27)$$

$$t_{pl} = t_{pl}rest\sqrt{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})} --------(28)$$

$$m_{pl} = l_{pl}rest\frac{1}{\sqrt{1-\frac{v^2}{c^2}(1-(\frac{dX_{PL}^2}{dX_1{}^2})}} --------(29)$$

References

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