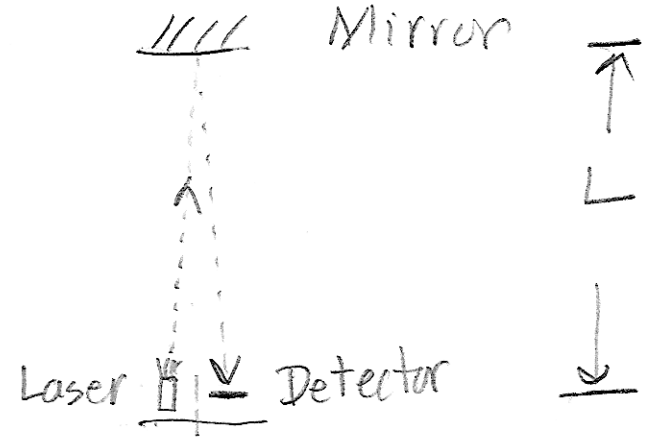
How can this be? Entire nature of space and time must be revised!

Time: ("dilitation")

Simple Clock:



Clock: $t=0$ "pulse" exits laser

"tick" → $t=\frac{2L}{c}$ detector fires, initiates a second pulse from laser

$\Delta t=\frac{2L}{c}$ → $t=\frac{4L}{c}$ " , third pulse

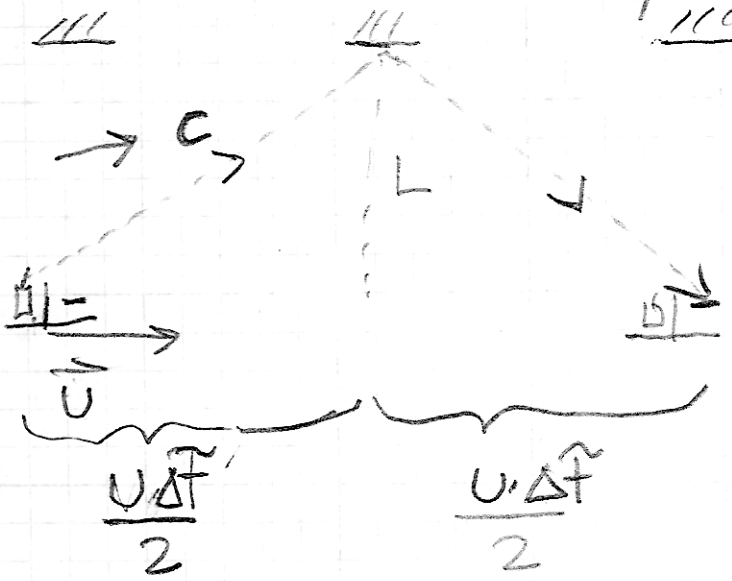
Now imagine two clocks, prepared identically. One stays at rest, #1, another gets pushed and accelerates, gets up to velocity $\vec{v}$ (#2). Compare time interval per tick:

#1 as observed by #1 → $\frac{2L}{c}$

#2 as observed by #2 → $\frac{2L}{c}$

#2 as observed by #1 . . .

#2 as observed by #1



Total distance traveled by light:

$$D = 2\cdot\sqrt{\left(\frac{v\Delta\tilde{t}}{2}\right)^2 + L^2}$$

Apparent time between #2's ticks, as seen by #1:

$$\Delta\tilde{t} = \frac{D}{c} = \frac{2}{c}\sqrt{\left(\frac{v\Delta\tilde{t}}{2}\right)^2 + L^2}$$

$$\left(\frac{c\cdot\Delta\tilde{t}}{2}\right)^2 = \left(\frac{v\Delta\tilde{t}}{2}\right)^2 + L^2$$

$$\left(\frac{1}{2}\right)^2\left(c^2 - v^2\right)\left(\Delta\tilde{t}\right)^2 = L^2$$

$$\Delta\tilde{t} = \frac{2L}{c}\cdot\frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}} = \frac{\Delta t}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$$

$\boxed{\Delta\tilde{t} > \Delta t}$ "Dilitation"

Means: #2, going $\frac{\sqrt{3}}{2} \cdot c$, for example, sees 1 second go by.

#1 sees: $\frac{1 \text{ second}}{\sqrt{1 - \frac{3}{4}}} = 2$ seconds go by.

Time Travel into the future is possible, just go very close to the speed of light.