



Science

PHY 101: INTRODUCTORY PHYSICS OF TIME TRAVEL

Homework

The speed of light and relativity have come up quite a bit in class. This handout should help explain just a little more about their relationship, and how they fit into the world of time travel. Please read this before your next class, The Realities of Time Travel.

The Speed of Light and Relativity

The speed of light is a unique subject. It has some interesting characteristics that made even Albert Einstein think twice. Let's take a look at a few examples.

Imagine you are on a train moving at 10 mph. You throw a ball in the direction that the train is moving. Relative to you, the ball is going 40 mph. To an observer standing alongside the train, the ball would be seen as going 50 mph:

$$\begin{array}{r} 40 \text{ mph that you threw the ball} \\ + 10 \text{ mph that the train is moving} \\ \hline 50 \text{ mph to the observer} \end{array}$$

But let's bring the speed of light into the equation.

Now imagine that the train is traveling at the speed of light, 186,000 miles per second.

This time, instead of throwing a ball, you turn on a flashlight. Relative to you the light is seen as traveling 186,000 miles per second. To an observer standing alongside the train,