

# Introduction to special relativity

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## 8.20 Introduction to Special Relativity, January (IAP) 2003

Einstein explained the same effect in a simpler way using the relativity principle. But an inner voice tells me that it is not yet the real thing.

### Introduction to Special Relativity

The word relativity might conjure an image of Einstein, but the idea did not begin with him. This is one of over 2,400 courses on OCW. I, at any rate, am convinced that He is not playing at dice.

### Introduction to Special Relativity

Beginning with the behaviour of and all other, the theory of special relativity draws conclusions that are contrary to everyday experience but fully confirmed by experiments that examine s at high speeds or measure small changes between clocks traveling at different speeds. There were several articles before Einstein's trying to explain how this could happen. It seems that, provided all the directions in which a thing can be tilted or arranged are represented within a coordinate system, the coordinate system can fully represent the length of a thing.

### Introduction to Special Relativity

This is shown in the illustration below: Clocks delays and rods contractions Being on planets, both Bill and John think they are stationary, and just moving through time. The meter was defined independently of time, as a fraction of the distance from the equator to the north pole, and was standardized as the length of ruler kept in Paris. Have you ever looked up at the night sky and dreamed of traveling to other planets in faraway star systems? For Special Relativity this means that when small speeds much less than the speed of light are involved, the equations should reduce approximately to a familiar Newtonian form.

### Introduction to special relativity : Resnick, Robert, 1923

The General theory requires knowledge of an extremely complicated mathematical formalism in order to be stated and appreciated in its full form. The following discussion, however, will only focus on the section on the Lorentz equations.

## **Introduction to special relativity**

Modify, remix, and reuse just remember to cite OCW as the source. To John, it is as if Bill's time axis is leaning over in the direction of travel and to Bill, it is as if John's time axis leans over. This can be imagined as a world line when the two other space dimensions are suppressed.

## **Introduction to Special Relativity**

If her reference frame is moving along with the light, then the speed of light relative to her is slower, but the contraction of the length of her instruments and the slowdown of her time are exactly enough for her to measure the speed of light as  $c$ .

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