

# Simultaneity

## Simultaneous:

Pronunciation: \,sī-məl-'tā-nē-əs, -nyəs also ,si-\

Function: *adjective*

Etymology: Latin *simul* at the same time + English *-taneous* (as in *instantaneous*)

Date: circa 1660

1: “existing or occurring at the same time : exactly coincident”

Do you think that an event that is simultaneous in one reference frame is also simultaneous in another, different reference frame? **Yes No Unsure**

ONLINE:

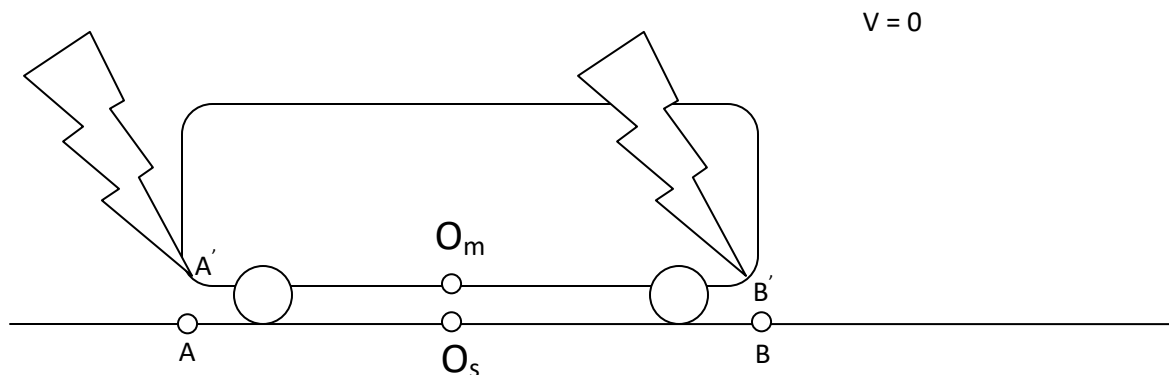
<http://www.youtube.com/watch?v=wteiuxyqtoM>

## Einstein's Thought Experiment

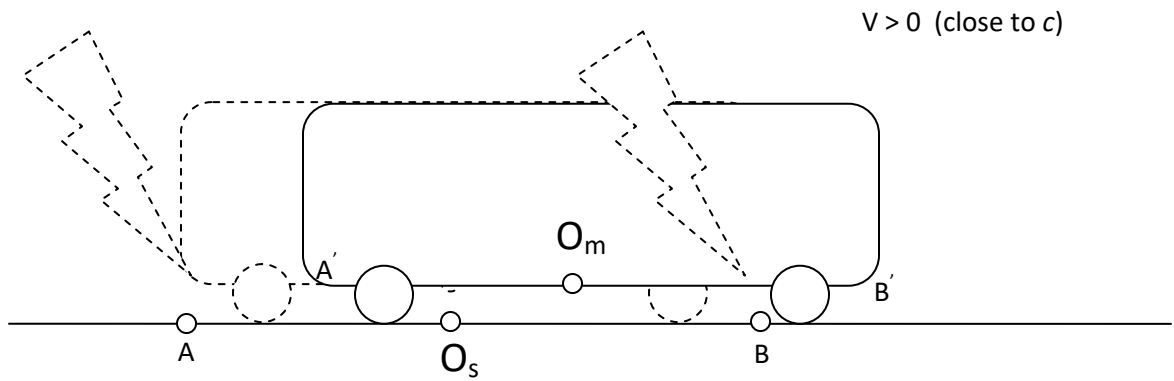
Consider a train that is stationary on a set of train tracks. One observer is inside the train and another observer is outside of the train watching. The train has no windows, can travel really fast and has sophisticated electronics to help with measurements. Consider two cases: one where the train is stationary and one where it is moving really fast (close to the speed of light). In each case lightning is going to strike the front and back of the train at the same time.

**What does each observer say about the simultaneity of the event in each of the two cases?**

### Case i) Stationary Train



Explanation:

**Case ii) Train Moving Close to the Speed of Light**

**Explanation:**

**Result of Thought Experiment:**