

Postulates of Special Relativity

B.Tech-I

The Postulates of Special Relativity

The postulates of relativity as stated by Einstein:

1. Equivalence of Physical Laws

The laws of physics are the same in all inertial frames of reference.

2. Constancy of the Speed of Light

The speed of light in a vacuum, $c = 3.00 \times 10^8$ m/s, is the same in all inertial frames of reference, independent of the motion of the source or the receiver.

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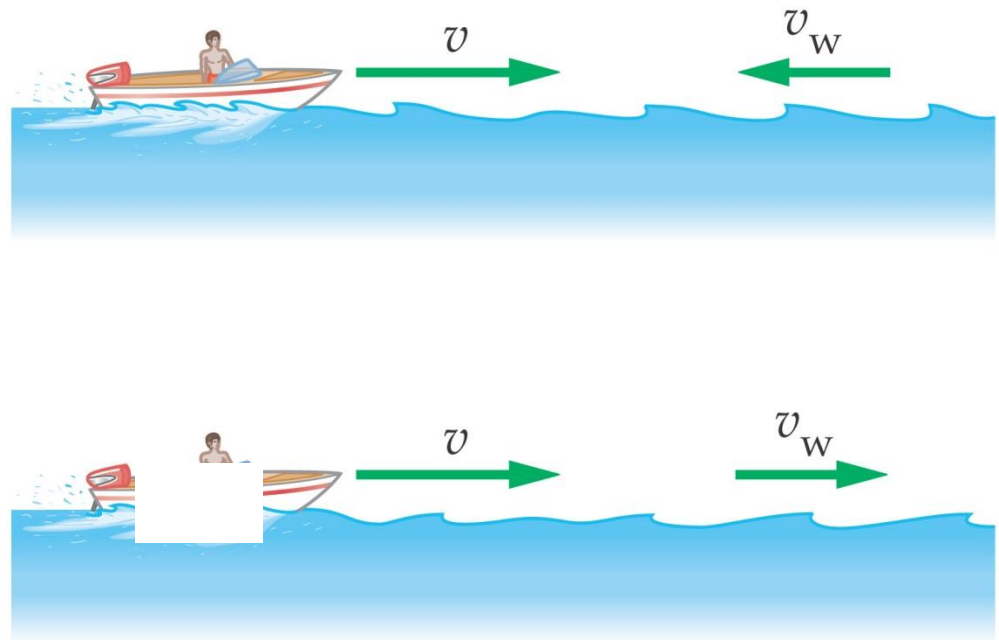
The first postulate is certainly reasonable; it would be hard to discover the laws of physics if it were not true!

But why would the speed of light be constant? It was thought that, like all other waves, light propagated as a disturbance in some medium, which was called the ether. The Earth's motion through the ether should be detectable by experiment. Experiments showed, however, no sign of the ether.

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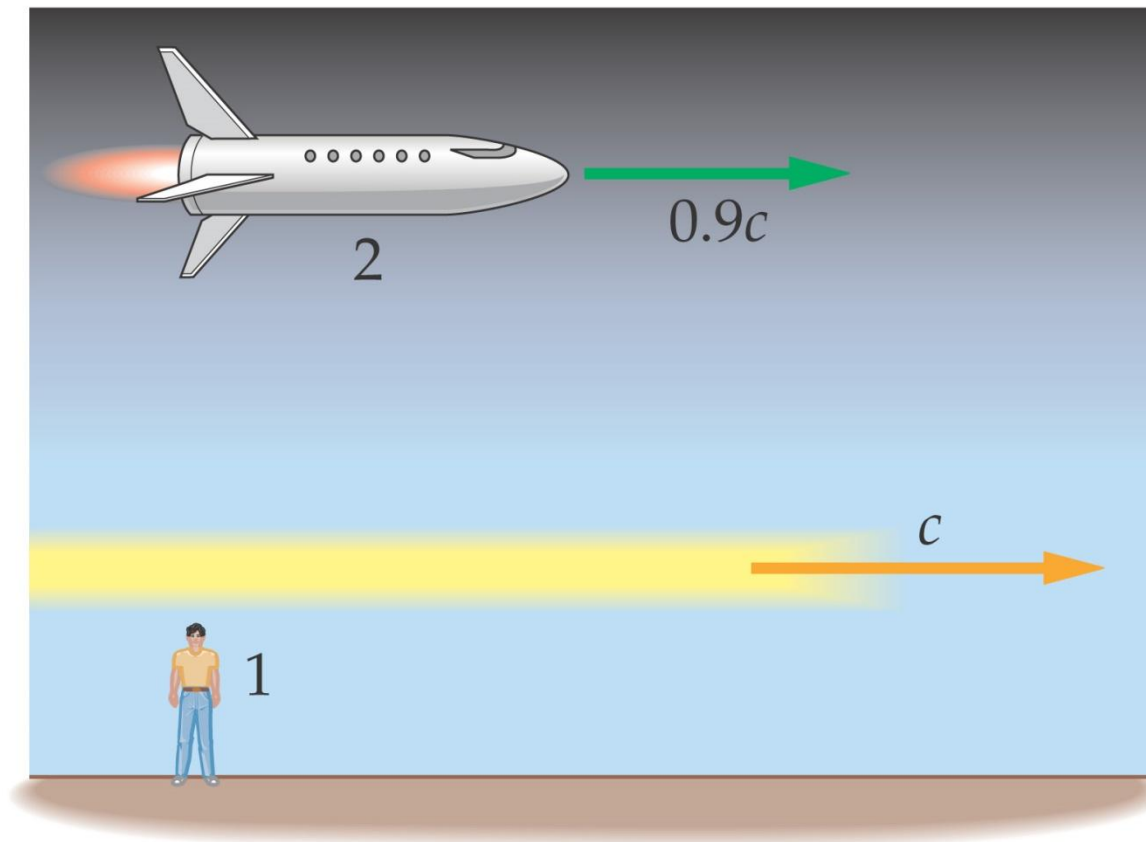
Other experiments and measurements have been done, verifying that the speed of light is indeed constant in all inertial frames of reference.

With water waves, our measurement of the wave speed depends on our speed relative to the water:



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But with light, our measurements of its speed always give the same result:



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The fact that the speed of light is constant also means that nothing can go faster than the speed of light – it is the ultimate speed limit of the universe.