

# Why the Velocities of Material Bodies Cannot achieve the Speed of Light in a Vacuum

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It is generally known that the velocities of material bodies not only cannot exceed, but cannot even achieve the speed of light in a vacuum, and this is assuming that the speed of light,  $c$ , itself is not so great, at least for elementary particles, many of which move at velocities only slightly lower than the speed of light. The inability of tangible objects to achieve the speed of light and the impossibility of any tangible objects moving at superluminal velocities fall within the framework of everyday “common” sense and are generally explained by the prohibitions against this movement that are contained in the special theory of relativity. However, such explanations only make it possible to state the fact of the finiteness of the velocity of tangible objects and do little toward making its underlying causes comprehensible.

Why are material bodies fated to move at a velocity lower than the speed of light? What is the reason that a material body, no matter how and how long it is being accelerated, never achieves the speed of light in a vacuum? Why does the speed of light, being finite, behave as if it is infinite and is therefore unattainable for materials bodies?

In our presentation a possible cause of the finiteness of the velocity of tangible objects is demonstrated without reference to the provisions of the special theory of relativity. A condition is formulated on the basis of which the assumption of the movement of tangible objects at any prescribed velocities proves to be self-contradictory in instances when the prescribed velocities of the objects exceed a certain value. This condition consists of the presence of interaction signals and carrier particles in material bodies that are propagated at a velocity greater than any prescribed velocity of the material bodies. The condition is as follows: “*Interaction signals and carrier particles that have no mass (at rest) are always present in material bodies, which, being propagated at a velocity,  $V$ , that is unattainable for physical bodies and particles that do have mass (at rest), continuously initiate interactions and processes in these bodies*”.

The results of our work may be useful when discussing the subject of superluminal velocities, which recently again captured the attention of specialists in the wake of questionable publications [1-3] concerning experimental observations of these velocities.

1. G. Nimtz, A. Stahlhofen. Macroscopic violation of special relativity: <http://arxiv.org/abs/0708.0681>.
2. H. Winful. Comment on "Macroscopic violation of special relativity" by Nimtz and Stahlhofen: <http://arxiv.org/abs/0709.2736>.
3. Opera Collaboration: T. Adam, et al. Measurement of the neutrino velocity with the OPERA detector in the CNGS beam: <http://arxiv.org/abs/1109.4897>.