

Sixteenth Marcel Grossmann Meeting



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Teaching relativity: Dynamics first

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The teaching of relativity usually starts with kinematics: The invariance of the speed of light, clock synchronization, time dilatation and length contraction, the relativity of simultaneity, Lorentz transformation and Minkowski diagram. The change of the reference frame is a central topic. Only afterwards problems of relativistic dynamics are discussed. Such an approach closely follows the historical development of the Special Theory of Relativity.

We believe that this access to relativity is unnecessarily complicated, and especially unsuitable for beginners. We present the basics of a teaching approach in which the initial postulate of relativity is the identity of energy and relativistic mass. Reference frame changes are largely avoided.

The difference of the proper times for different world lines, which connect two points in spacetime, and which is usually discussed in terms of the twin paradox and calculated by means of the Lorentz transformation, is introduced as a basic relativistic phenomenon, which is a manifestation of the linkage between space and time.

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