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Péter Hráskó

Basic Relativity

An Introductory Essay

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 Springer

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Preface

Traditional presentations of relativity theory start with the introduction of Lorentz-transformations from which the peculiar phenomena of the theory (time dilation, Lorentz contraction, the velocity addition formula, etc.) follow. Though this is certainly the most logical approach, it seems rather unfortunate from a pedagogical point of view, since a convincing and conceptually transparent explanation of the Lorentz-transformation itself presents a task of considerable difficulty. Lorentz-transformation is based on both the constancy of the light speed and Einstein's synchronization prescription, and the interrelation between these two constituents is open to the frequent misunderstanding that constancy of the light speed is enforced by the special synchronization of clocks rather than being the law of nature. In order to avoid this pitfall an ad hoc though rigorous presentation of the theory's perplexing properties in Part 1 precedes the introduction of the Lorentz-transformation (and any synchronization procedure). After the introduction of these transformations in Part 2 those same relativistic effects are reconsidered this time in a systematic manner. Part 3 is devoted to the fundamentals of general relativity.

The book is based on the lectures given at the post graduate course in physics education at the Eötvös Loránd University (Budapest).

Budapest, December 2010

Péter Hráskó

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