The Michelson-Morley Experiment Explained by Five Various Methods

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Abstract – The Michelson-Morley experiment (MME) is still important to physics, and not just to the history of physics. The hypothesis of contraction of bodies in the direction of their motion arose as an ad hoc hypothesis about the "contraction" of the interferometer arm in the direction of its motion. Even today this experiment is the “strongest argument” of this hypothesis. The right explanation of the MME result would explain even the “length contraction”. In this work will be presented the explanation of the MME by means of five methods. The first method can be called the traditional method, which was applied by Michelson, but not quite correctly. The other methods are: explanation of the MME with interferometer located at an acute angle to the direction of Earth’s motion; with light clock; using general Galilean transformation; and using the Doppler effect formula. All of these methods give the same solution and in accordance with the experiment’s result. These solutions represent natural explanation for the result of the MME – without weird terms, unscientific assumptions or hypothesis.

Keywords: Michelson-Morley experiment, Galilean transformation, Doppler effect, light clock.