Why the Measured Speed of Light is Always Equal to the Constant *c*

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Abstract. The paper is devoted to a discussion of the most likely reason for the constancy of the measured speed of light. Particular attention is paid to the method of measuring the unidirectional speed of light using a rigid rotating rod equipped with slotted disks. It is widely believed that it is impossible to measure the speed of light in one direction (the one-way speed of light) without arbitrary assumption. Such an assumption in the work of Einstein in 1905 was the assumption that the speed of light was equal in opposite directions. The one-way speed of light is the starting point of all discussions on the problem of clock synchronization in special relativity. Is it true that there is fundamentally no physical way to measure the one-way speed of light? Strange as it may sound, not only does this method exist, but being almost evident, it has already been realized in S. Marinov's and Md. Farid Ahmet's experiments, and it is dealt with in many of their followers' works. Although the degree of certainty of such experiments up to now remains unclear, the principle used or proposed in research of this kind can hardly be described as less than perfect. The method of measuring the speed of light, used by Marinov and Ahmet, is based on the use of rigid synchronously rotating on the same axis slotted disks, through which a light beam passes. Marinov's experiment yielded a result different from constant *c* for the speed of light in one direction, while Ahmet's experiment showed that the speed of light is equal to constant *c*. Is it possible, without conducting additional experiments, to give preference to one of these results? To answer this question, we analyzed the behavior of a rotating rod simulated in a medium. The simulation showed that a rod simulated in a medium, when axially moving in a medium, is twisted so that the measured value of the speed of sound along the axis of the rod is equal to the speed of sound in the medium. This speed is equal to the speed of sound in water when simulated in an aqueous medium and to the speed of sound in air when simulated in an air environment. The simulation result can be considered as a consequence of the fact that measuring the speed of sound or light using a rotating rod equipped with slotted disks always gives the speed of sound or light propagation in the medium, even if the measurement is performed by a rotating rod moving in this medium. This gives reason to believe that the preference between the results of Marinov and Ahmet should be given to the result of Ahmet, who actually measured the speed of light in the medium (physical vacuum?).