

Variations in the speed of light at the surface of the Earth – observed, confirmed and documented multiple times by the use of a Mach-Zehnder-Interferometer

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Abstract: The authors have performed several measurements in the years 2008 and 2009 using an instrument of type Mach-Zehnder-Interferometer (MZIM). Fast variations of the speed of light in the relative magnitude of 10^{-6} could be measured. These variations were isotropic – they did not depend on the direction of the propagation of light. However they were only observed in the open air and did not occur, when the laser beam was running inside a shielded cage.

The sensitivity of the MZIM is more than 1000 times greater than that of the well known Michelson-Morley-Interferometer.

The functioning of this instrument can be explained by applying the "Cage Hypothesis" (corresponding to the Faraday cage) to these experiments. The results of the measurements confirm this hypothesis.

The link below documents in detail the measurements taken including small videos, which show the interference pattern of the MZIM and where variations of the speed of light can be observed.

<https://mediatum.ub.tum.de/doc/1071784/1071784.pdf>

Furthermore a theoretical calculation, which is based on a system theoretical approach, is included.

<https://mediatum.ub.tum.de/doc/1071280/1071280.pdf>