

GR 204 Postersitzung

Zeit: Dienstag 15:30–17:00

Raum: P

GR 204.1 Di 15:30 P

Precision test of the isotropy of speed of light using rotating ULE optical resonators — ●CHRISTIAN EISELE¹, ALEXANDER YU. NEVSKY¹, MAXIM OKHAPKIN^{1,2}, and STEPHAN SCHILLER¹ — ¹Institut für Experimentalphysik, Heinrich-Heine-Universität, 40225 Düsseldorf — ²Institute of Laser Physics, Novosibirsk, Russia

Recently, three high-precision Michelson-Morley-type experiments have been performed using lasers [1,2,3]. They led to strong tests of Local Lorentz Invariance for electromagnetic waves by comparing the resonance frequencies of two orthogonal resonators as a function of orientation in space. We are currently developing a new apparatus for such a test. The cavities are embedded in a rectangular ULE (ultra-low expansion glass) block, which is placed inside a vacuum chamber stabilized to a temperature where ULE has near-zero expansion coefficient. A Nd:YAG laser at 1064 nm is frequency stabilized to the cavities. Laser powers inside the cavities are stabilized using acousto-optical modulators. To minimize the influence of mechanical vibrations, the setup is placed on top of active-vibration isolation supports. The whole system can be continuously rotated. Variations of the tilt of the apparatus are actively compensated at the several microradian-level. We analyze the frequency of the beat signal between the two cavities as a function of orientation in space. We will report about the current status of the experiment.

[1] P. Antonini et al., Phys. Rev. A 71, 050101 (2005); S. Schiller et al. arXiv:physics/0510169 [2] P.L. Stanwix et al., Phys. Rev. Lett. 95, 040404 (2005). [3] S. Herrmann et al., arXiv:physics/0508097.