2021
May 24-25
Webinar

14th International Conference on
Optics, Photonics & Laser

Optical Interferometers and Their Application in Scientific Research

Michaela Laštovičkova *(Young Researcher)*

Student at Headington School Oxford, OX3 7TD, England, United Kingdom.

Optical Interferometers and Their Application in Scientific Research :The research group for application in molecular, biomedical and material science at ELI Beamlines needs to control the delay of synchronized laser beams down to femtosecond precision. The aim of this student project was to apply interferometry in femtosecond delay line stage tests for atomic, molecular, and optical sciences and for coherent diffractive imaging. For this purpose, a Michelson Interferometer was built using ELI in-house resources. Using a beam splitter, a laser beam was split into two arms and then recollected to create an interference pattern. This pattern was detected by a fast 2GHz Thorlabs photodiode, DET025A/M, with à 400-1000 nm sensitivity range and rise/fall times of 150 ps, in order to calibrate a femtosecond delay line stage. The Aerotech PRO190SL/SLE was used as the translation linear stage. This stage served as the main component of the delay line tests. Further, Attocube sensors based on the Fabry-Perot Interferometer technique were added to the set-up to improve the precision and reliability of the calibration method. The advantages, disadvantages and limits of this method as well as lessons learned will be discussed from both an educational and scientific point of view.

Biography

Michaela Lastovickova is a 6th form student at Headington School Oxford and at the moment is completing her A-Levels. Prior to this Michaela simultaneously completed Primary School education in Montenegro and in the UK, advancing her linguistic skills. She is multilingual and speaks Montenegrin, English, French, German and passively Czech. In 2018, Michaela successfully conducted a project within the research programme for Applications in Molecular, Bio-medical and Material science. Along with active researchers at ELI Beamlines, she conducted a project using a Michelson interferometer and Attocube sensors to measure and investigate the precision and reliability of a motorized linear translation stage. In 2020 she did a research project on how laser accelerated ions could be used to enhance existing cancer therapies and has recently successfully contacted scientists at the University of Oxford, expressing her interest in their project on biomedically-engineered bubbles as à form of drug delivery and is looking for an opportunity to advance her knowledge in drug delivery through breakthrough technologies combining bioengineering and nanotechnology.

l00196@headingtonschool.com