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A laser tracking system for sample positioning

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In the frame of the LEAPS-Innov pilot project, the ESRF together with ALBA, Soleil, PTB and HZB have developed a position measuring system based on fibered laser interferometers and beam steering mirrors that track the position of the object to be measured thanks to a closed loop control system. The global objective is to measure the position of objects moving in a plane along 3 degrees of freedom (2 translations and one rotation), with a typical range of a few millimeters and a few tens of degrees and with a repeatability of 10 nanometers. This system could typically be used for measuring sample position in experimental stations. The project was divided in 2 parts, the first one being dedicated to the characterization of periodic non linearities of commercially available fibered interferometers by all project partners and continued with the design and construction of a 3 axes prototype system at ESRF. I will present the results of the interferometers characterization, the design of the mechanical, optical and control systems used to implement this prototype and the experimental results obtained.

Footnotes

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Author: VILLAR, François (European Synchrotron Radiation Facility)

Co-authors: DEHAEZE, Thomas (European Synchrotron Radiation Facility); CLEMENT, Jose Maria (European Synchrotron Radiation Facility); GOT, Pierrick (European Synchrotron Radiation Facility); BONNEFOY, Julien (European Synchrotron Radiation Facility); FRIEIRO, Juan Luis (ALBA Synchrotron (Spain)); DUCOURTIEUX, Sébastien (Synchrotron soleil); FLUEGGE, Jens (Physikalisch-Technische Bundesanstalt); KIEFER, Klaus (Helmholtz-Zentrum Berlin für Materialien und Energie); FIOLE, Daniel (European Synchrotron Radiation Facility)

Presenter: VILLAR, François (European Synchrotron Radiation Facility)

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