



Alignment systems and 3D measurements methods for the HL-LHC project

Project code	54
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Department	EN
Title	
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Description	
<p>The High Luminosity LHC (HL-LHC) is an upgrade of the LHC to achieve a number of collisions a factor five larger than the LHC nominal values. The project will involve the replacement of 1.2 km of accelerator components such as magnets, collimators and radiofrequency cavities in 2024. It relies on a number of key innovative technologies. The alignment solutions chosen to answer the requirements of the project are challenging as well. Specific alignment systems and 3D measurement techniques are being developed, at the cutting edge of the technology and need to be validated.</p>	
Functions and Training Value	
<p>You will be part of the High Precision Alignment Technologies section in the Survey Mechatronics and Measurement group. You will have the opportunity to integrate a multi-disciplinary team consisting of mechatronics engineers, surveyors and electronics engineers. You will work on the HL-LHC project and more specifically on the alignment solutions being developed. You will validate alignment sensors through cross-comparison tests, will perform calibration measurements and will be in charge of the preparation of procedures concerning the validation installation and analysis of such sensors.</p> <p>You will be trained on these new techniques allowing to reach for the first time micrometric accuracy of alignment in particle accelerators, e.g. on the alignment sensors and Frequency Scanning Interferometry developed in-house. You will learn how to perform high accuracy 3D measurements using laser trackers and Romer arms during assembly measurements. You will receive a specific training on data analysis of measurements using least square algorithms, in order to apply this knowledge on the new methods developed.</p>	
Qualifications/Skills	
<p>Surveying engineer, topographic engineer, geographical engineer, geodetic engineer. Technical skills: experience in laser tracker measurements, least square adjustment method. The knowledge of Matlab would be a plus. Behavioral competencies: working in teams, managing self, communicating effectively.</p>	