



Design and analysis of lightweight components for silicon tracker detectors

Project code	62
Supervisor	Diego Alvarez Feito
Department	EP (funding only for 2 EP projects)
Title	
Design and analysis of lightweight components for silicon tracker detectors	
Description	
<p>In preparation for the High Luminosity era of CERN's Large Hadron Collider (LHC), the silicon trackers of the LHC experiments will be replaced by lighter and more efficient detectors. In this framework, the Detector Technologies (DT) group collaborates in the development and design of the future ATLAS Inner tracker (ITk) Pixel detector. So as to meet the stringent material budget and thermal performance requirements, this detectors will make extensive use of both advanced materials and lightweight technologies. However, the adoption of a layout configuration featuring tilted modules gives rise to a series of new engineering challenges, the answer to which will call for innovative approaches in the design of the support structures, the cooling strategy and the overall integration.</p> <p>You will contribute to the activities of the group in these exciting areas of research, playing an active role in the mechanical design of the local and global support structures for the next generation of tracker detectors. You will be involved in the design, prototyping and testing of these components, performing the necessary integration studies and participating to the development of the final production procedures and tooling. To drive the design process, the trainee would also analyse the thermo-mechanical behaviour of different components and assemblies using both analytical and numerical techniques.</p>	
Functions and Training Value	
<p>You would gain work experience on the design of complex mechanical systems, getting a better understanding of composites and lightweight structures. As part of the EP-DT Engineering Office, you would have access to state-of-the-art design and analysis tools (e.g. Catia V5, ANSYS) and testing facilities (e.g. new composites lab), while benefiting from close supervision of experienced CERN staff. In addition, you would have the opportunity of interacting with different collaborating institutes, taking part in internal and external workshops.</p>	
Qualifications/Skills	
<p>You should have working knowledge of CATIA V5 or a similar CAD package (e.g. NX, SolidWorks), previous experience with commercial FEA software (e.g. ANSYS, Abaqus, Nastran) and a basic understanding of carbon fibre composite materials knowledge would be advantageous.</p>	