



Production of PCB hybrid circuits for the CMS Tracker Upgrade

Project code	59
Supervisor	Georges Blanchot
Department	EP (funding only for 2 EP projects)
Title	
Production of PCB hybrid circuits for the CMS Tracker Upgrade	
Description	
<p>CMS is one of the two experiments at CERN's Large Hadron Collider (LHC) that, in 2012, announced the discovery of the Higgs boson. It is one of the largest, most complex and highly performant experiments in history and has so far taken <5% of the total expected data. It will continue operation until around 2040. In order to operate efficiently for this length of time, in the harsh radiation environment of CMS, several subsystems must be upgraded in the coming years. One of the biggest upgrade projects is that of the CMS Tracker detector, based on around 200 square metres of high-resolution silicon strip and pixel detectors. The existing Tracker will be completely replaced in 2024-2025 with an enhanced version. This upgrade will include thousands of new front-end electronic modules made of silicon strip detectors connected to high-density flexible hybrid circuits. These circuits contain flip-chip ASICs, power ASICs, optical fibre modules and are wirebonded to sensors and auxiliary circuits. You will join the electronics engineering team in the EP-ESE group at CERN to contribute to the development, production and tests of these future front-end hybrid circuits and their auxiliary electronics.</p>	
Functions and Training Value	
<p>The main activities will be:</p> <ul style="list-style-type: none">Support the production and the tests of front-end hybrid circuits.Develop a production-scale test setup for these front-end hybridsDevelopment of software and firmware tools to test the hybrid circuits.Laboratory test and measurement of electrical properties of the circuits.Radiation tolerance tests of hybrid circuit assemblies.Participation to module engineering and electronics engineering meetings within the collaboration. <p>You will be trained in:</p> <ul style="list-style-type: none">particle physics experiments.silicon detectors and related electronics systems.Performance requirements of low mass radiation tolerant hybrid circuits.Performance tests of front-end and service hybrid circuits for production acceptance and detector performance.Participation to module engineering and electronics engineering meetings within a multi-cultural collaboration. <p>The experience gained will give the candidate an excellent grounding in real-world cutting-edge electronics design and testing that can be applied in R&D environments as well as in industry.</p>	
Qualifications/Skills	



Design and fabrication of printed circuits.
Quality control and production acceptance.
Computing: programming production scale applications.