

## Project Title

**Mechanical technician for thin film coatings and laser surface modifications**

## Disciplines

**Mechanical Engineering**

| Supervisor        | Group-Section | Budget Code             |
|-------------------|---------------|-------------------------|
| Pedro Costa Pinto | TE-VSC-SCC    | 91711 (50%) 98725 (50%) |

At CERN, the European Organization for Nuclear Research, physicists and engineers are probing the fundamental structure of the universe. Using the world's largest and most complex scientific instruments, they study the basic constituents of matter - fundamental particles that are made to collide together at close to the speed of light. The process gives physicists clues about how particles interact, and provides insights into the fundamental laws of nature. Find out more on <http://home.cern>.

*Diversity has been an integral part of CERN's mission since its foundation and is an established value of the Organization.*

Are you a mechanical technician looking for a challenging professional experience to further your career? If so, joining CERN's TTE programme may very well give you that challenge.

## Introduction

The Vacuum Surfaces and Chemistry group in the Technology Department (TE-VSC) is in charge of the development, operation and maintenance of vacuum in the entire CERN accelerator system, where particle beams circulate. The Surface Coating and Chemistry section is in charge of the surface preparation and characterization of the surfaces, which are exposed to the beam vacuum. This includes wet chemical surface treatments, thin film coating by physical vapour deposition and surface and chemical analysis.

You will integrate in small team operating on two main projects: the thin film coating of components for the High Luminosity LHC upgrade and the laser surface modification of so called beam-screens.

The thin films are made of amorphous carbon and are designed to mitigate the emission of secondary electrons from the surface, which face the beam in ultra-high-vacuum. Their implementation in new and existing parts of LHC is foreseen to improve the machine performance with High Luminosity beams.

Laser treatment of copper surfaces can generate very rough surfaces, which do not reflect visible light (appear black) and reduce the emission of electrons. For this reason they are an attractive technology for future accelerators. An ongoing project at CERN foresees to achieve the integration of such a treatment in tubes of 15 m length as those, which host the particle beam.

## Functions

As a Mechanical Technician, your main activities will consist of:

- Assembling an operating ultra-high-vacuum systems and handling of accurate clean parts
- Manufacturing on conventional machines (milling , turning) of mechanical components for the amorphous carbon coating plants
- Manufacturing of mechanical components for the laser treatment bench

- Designing and drawing CAD mechanical parts and assemblies;
- Providing the suitable documentation for the parts you have produced
- Integrating in the team to monitor and follow the production of thin films coatings

## Qualification/skills required

### Qualifications

In order to qualify for a place on the programme you will need to meet the following requirements:

You are a national of a CERN Member State or Associate Member State (<https://home.cern/about/member-states>);

You have a Technical Diploma or equivalent as Mechanical Technician ([careers.cern/ttediplomas](https://careers.cern/ttediplomas)), and no more than 4 years' relevant experience after finishing your diploma;

If you are currently studying, you are still eligible to apply, although you are expected to have obtained your qualification by the start of your appointment at CERN;

If you hold a BSc or MSc, you are not eligible. However you may be eligible for the Fellowship Programme.

You should have at least a working knowledge of English or French.

### Specific skills required for this job:

- Mechanical manufacturing with conventional milling and turning machines
- Reading and understanding of technical drawings;
- Production of technical documentation;

The following experience would be an advantage

- Operation of vacuum technology instrumentation
- Experience with precision mechanical parts
- Practical experience with CAD software

## Training Value

As a member of a team with experienced technicians and engineers from many European countries in charge of designing, manufacturing and operation of surface modification tools you will acquire or develop your skills in:

- The production of mechanical components dedicated to vacuum applications, thin film coatings and optics;
- The design of mechanical the elements mentioned above
- The operation of thin film coating systems
- The presentation of your work to engineers and physicists in project meetings;