

SELECTION AND EXAMINATION OF MATERIALS FOR HIGH ENERGY PHYSICS APPLICATIONS

Project Description

State of the art materials, material structures and material connections for Novel High Energy Physics applications, like the ITER Tokamak for the large-scale production of Fusion Energy, are currently reaching the production stage. The production assessment of these materials, structures and material connections passes through dedicated campaigns of tests, within the Mechanical & Materials Engineering (MME) group at CERN, which for specific components comprise both non-destructive and destructive tests. Tests include, amongst others, mechanical tests both at ambient as well as at cryogenic temperatures, as well as metallurgical examination with use of a diverse range of optical imaging techniques. Most of the described measurement set-ups are being developed in-house due to their generally exotic nature. During the internship at CERN, the student will be involved in protocol definition, preparation of, and support with experiment execution, data analysis, and the follow-up and interpretation of destructive and non-destructive tests and results regarding structural components for superconducting magnet systems.

Specific projects will be concluded on, in agreement with the student, depending on particular interests and available activities. Generally, numerous topics can be proposed, ranging from focussing mainly on mechanical activities to topics targeting more in-depth micro-structural material characteristics. Topics can also include, more specifically, the development of new test facilities or characterisation instruments, generally employed at cryogenic temperatures.

Objectives

- Acquire knowledge about the technical aspects of general High Energy Physics applications, with emphasis on its superconducting magnets and materials involved.
- Define new testing protocols including measurement preparation for the novel magnet systems as presented.
- Develop familiarity in selection and testing of materials for cryogenic structural applications as well as in materials production processes and testing techniques.

Knowledge / Skills required

- General knowledge of Materials Science and Engineering: Mechanics of Materials, materials structure - properties relationship.
- Good knowledge of the English or French language required.

Internships at CERN generally comprise 5 months, which can be prolonged to 6 months. Master thesis projects extend between 4 and 12 months, which can be prolonged to 14 months.

Compensation is awarded in terms of a monthly allowance.

Contact

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