Post Doctoral Fellow (m/f)

Inter-Carnot project based on the Materials Science Beamline ID11 at ESRF

Type of contract: time limited contract (24 months)

Title of the research project: Unified framework for analysis of time lapse observation of structural materials under synchrotron light

Reference: MUC4D_PD-CARNOT-ID11

JOB DESCRIPTION

3D synchrotron X-ray diffraction imaging techniques enable unprecedented insight on the multi-scale mechanical behavior of polycrystalline structural materials. The progress made in recent years makes it possible to follow the temporal evolution of the crystalline microstructure in terms of grain shape and orientation (Diffraction Contrast Tomography - DCT), total deformation (Digital Volume Correlation - DVC) and more recently also in terms of spatially resolved elastic strain tensors (scanning-3DXRD) within materials. The analysis of this type of multidimensional diffraction data is very complex: at present, there is no standardized and user-friendly methodology as in the case of EBSD, which is well established and widely used in academic and industrial research. The current project aims to establish such a framework, automating the analysis of four complementary 3D X-ray diffraction imaging techniques, namely DCT, Topotomography, 3DXRD and scanning-3DXRD in order to facilitate the deployment of these techniques in industrial use cases.

The goal of this postdoc is to standardize the multi-scale and multi-modal acquisitions and analysis protocols that have been developed at ID11 over the years. It includes writing code to link several functions already developed, improving calibration strategies to facilitate registration steps and processing of existing datasets available in the six partner teams. Each of these datasets is the basis for a potential publication (Materials studied: Nickel, CuAlBe, 316L, …).

PROFILE, SKILLS AND EXPERIENCE

PhD in Materials Science, Chemistry, Physics, or a related discipline

- Previous research experience with high-energy X-ray diffraction and/or polycrystalline material characterization, including programming and data processing (Python, MATLAB)
- Ability to interact with multiple coworkers and teams located in different laboratories
- Proficiency in English (working language at the ESRF)

WORK CONDITIONS

The post-doc will be recruited by ENSCM (Montpellier), but the mission will be based mainly on the ID11 line at ESRF in Grenoble (France). During the 24-month contract, several visits to partner laboratories will be necessary to better understand needs, and to train users in new data processing methods.

- For further details and send a CV and ML please contact before October 14, 2023:

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- Salary to be negotiated according to profile / Project to start in January 2024
- The selected candidate must have ZRR approval to be able to work on the project (2 to 3 months lead time) (http://www.legifrance.gouv.fr/eli/arrete/2012/7/3/PRMX1227979A/jo/texte)

Carnot Institutes are public-sector research organizations, accredited by the French Ministry of Research, that make a strong commitment to conducting and developing partnership-based research activities to benefit innovation in companies - from SMEs to large companies - and socio-economic players.

The ESRF, the European Synchrotron, is an international research facility based in Grenoble, France. Thanks to innovative engineering and high-level scientific vision, it is recognised as one of the top research institutions worldwide. The ESRF employs 650 staff and, each year, welcomes more than 6 500 scientists to carry out experiments in fields such as biology, medicine, chemistry, earth and environmental sciences, cultural heritage, materials and surface science, and physics.