

## Job offer

# Post-Doctoral position: time resolved X-ray diffraction in polycrystalline materials (M/F)

### Work context:

The PIMM laboratory (process and engineering in mechanics and materials, <https://pimm.artsetmetiers.fr/en>) is a research unit which depends on CNRS and which is based at Ecole Nationale Supérieure d'Arts et Métiers in the heart Paris. This laboratory brings together about 120 scientists with a wide range of expertise, from the mechanics of materials and structures to the polymer chemistry and from forming and assembling processes to advanced methods for numerical simulation. The laboratory is carrying out significant research activities on the fatigue behavior of metallic alloys in the very high cycle fatigue domain (number of cycles higher than one billion). Cutting-edge testing devices like ultrasonic fatigue machine have been developed and combined with innovative measurement techniques like thermography or time resolved X ray diffraction. This research activity is supported by the ERC (European Research Council) in the framework of the European project ERC-FastMat (Fast determination of fatigue properties of materials beyond one billion cycles, <https://pimm.artsetmetiers.fr/projet-fastmat>). This project enabled us to constitute a research team composed by 4 researchers, two PhD students and a research engineer. The recruited researcher will complete this research team and will bring his or her skills to the field of X-ray diffraction of polycrystalline materials.

### Tasks:

In the framework of the ERC FastMat European project on the study of the fatigue properties of the metallic alloys beyond on billion cycles, the recruited researcher will hold a central position. His or her first mission will be to implement time resolved X-ray diffraction measurement techniques in polycrystalline materials submitted by a cyclic mechanical loading. A second mission will be to develop new methods to analyze the diffraction patterns obtain during low stress amplitude (case of the gigacycle fatigue) and high frequency (20kHz) cyclic loading.

### Activity:

The researcher will have to implement and develop time resolved X-ray diffraction techniques using pump-probe methods. To do this, he or she will have to collaborate effectively with the teams of the Synchrotron SOLEIL (beamline scientists, detector group...) where the experiments will be carried out (<https://www.synchrotron-soleil.fr/>, DiffAbs beamline). He/she will also participate in the selection of the tested materials and the characterization of their metallurgical property (grain size, texture...) in the laboratory before tests. Another important part of his or her activity will be the analysis of diffraction data to estimate quantities such as displacement or broadening of diffraction peaks, which are significant data to understand the level of internal stresses, hardening and fatigue damage of the material.

### Skills:

The qualification required is a PhD degree in the field of X-ray diffraction in polycrystalline materials. The researcher shall have in-depth knowledge in the field of mechanics and metallurgy of materials and have interest in experimentations especially on synchrotrons. Programming skills in Python or possibly Matlab language are required for data analysis.

### General informations:

Workplace: Paris, France  
Type of contract: temporary (CDD)  
Contract length: 12 months extendable to 24 months  
Gross salary: between 2650 et 3770€ per month  
Expected date of contract start: 1 October 2019

### How to apply:

On the CNRS website:  
<http://bit.ly/2HB77vz>

Or with the following QR code:



### Contact :

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