**PhD Position**

**Toward Improved X-ray imaging: Use of a new generation detector based on photon counting**

**SECTOR:** Higher Education Institution

**LOCATION:** France, Grenoble

**RESEARCHER PROFILE:**

- First stage researcher,

**INSTITUTION:** Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL*). The dynamic ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alps is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century ("sustainable planet and society", "health, well-being and technology", "understanding and supporting innovation: culture, technology, organizations" "Digital technology").

* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

**Key figures:**

- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS
SUBJECT DESCRIPTION:

X-ray microtomography has been extensively used to characterize the 3D microstructure of materials, with or without a stimuli. The obtained data is important in a variety of materials such as metals, fiber reinforced composites, or geo-materials. This technique, based on the acquisition of 2D images (radiographs), provides a 3D map of the local absorption of the considered sample. First initiated in synchrotron, the development of laboratory X-ray tomographs has enlarged opportunities and utility of this technique.

Recent advances in so-called ‘color-detectors’ offers several advantages over conventional detectors. These advantages range from fast read out time, high efficiency for all the energy of the polychromatic beam provided by laboratory X-ray source, and a capacity to select the energy of the beam in each pixel of the detector. Such a detector has the potential to reveal otherwise inaccessible phase data by selective irradiation at different beam energy.

During this PhD project, two possibilities of the detector will be investigated to increase the contrast in the image provided by a laboratory X-ray microtomography:

- **Selection of the energy** (fig1 top): The PhD fellow will develop strategies to acquire data and reconstruct X-ray tomography data sets using this mode of the detector with the following constraints: i) the acquisition time must be reasonable, and ii) the obtained 3D data set must have a high signal to noise ratio. The development will first be based on model materials such as green materials (panels constituted of wood fibers glued together with cellulose based glue) and then on synthetic functional materials such fiber reinforced composite or materials obtained by additive manufacturing (Al-Mg-Si for example)

- **Toward X-ray diffraction contrast tomography** (fig. 1 bottom): The PhD fellow will develop strategies to acquire data and reconstruct X-ray tomography data sets to reveal information on the crystallographic orientation of grains that constitute the sample. The method will be developed on model materials such ice or pure Al and then on functional materials such Al-Mg-Si.

**Location**: The PhD will take place in Grenoble France (fig 2a) in two laboratories SIMAP and 3SR which are both recognized for their expertise in X-ray microtomography and are equipped with a nanotomograph (fig2b).
ELIGIBILITY CRITERIA
Applicants:
- must hold a Master’s degree (or be about to earn one) or have a university degree equivalent to a European Master’s (5-year duration),
- hold a master of science or an engineering degree in material science, physics or applied mathematics. The candidate must be able to propose procedures for both acquisitions and reconstruction and must be able to work within a team.

Applicants will have to send an application letter in English and attach:
- Their last diploma
- Their CV
- A short presentation of their scientific project (2 to 3 pages max)
- Letters of recommendation are welcome.

Address to send their application: Sabine Rolland du Roscoat: sabine.rolland@3sr-grenoble.fr
Salvo Luc Luc.Salvo@simap.grenoble-inp.fr
Pierre Lhuissier: Pierre.Lhuissier@simap.grenoble-inp.fr

SELECTION PROCESS
Application deadline: 25 June 2018 at 17:00 (CET)
Applications will be evaluated through a three-step process:

1. Eligibility check of applications in June 2018
2. 1st round of selection: the applications will be evaluated by a Review Board in June 2018. Results will be given in July 2018.
3. 2nd round of selection: shortlisted candidates will be invited for an interview session in Grenoble on July 2018. (if necessary)

TYPE of CONTRACT: temporary-3 years of doctoral contract
JOB STATUS: Full time
HOURS PER WEEK: 35
OFFER STARTING DATE: 1st octobre 2018
APPLICATION DEADLINE: 25 June 2018
Salary: between 1768.55 € and 2100 € brut per month (depending on complementary activity or not)