

## Call for Expression of Interest - Junior Professor Chair

**Lead institution/organization** : CNRS

**Partner institutions/organizations** : University of Grenoble Alpes (UGA)

**Host laboratory** : Institut Néel (UPR 2940)

**Project name** : Revealing the ultimate properties of innovative materials through innovative techniques of electron and X-ray microscopy and crystallography.

**Acronym** : MatInnov

**Keywords** : Materials science, crystallography, large instruments, advanced characterizations

**Planned duration** : 4 years

**Scientific topic** : Materials science

**Corresponding CNU/CoNRS/CNAP sections** : 28th section/sections 05 or 03

**IR/TGIR/SNO involved** : F-CRG (Grenoble), EquipEx+ MAGNIFIX

**Institution strategy** : Materials are at the heart of several thematic priorities of the CNRS “Objectives and Performance Contract” (2.1.5 Multi-scale characterization of matter; 2.1.3 Materials by design; 2.1.8 Matter, information and quantum technologies). Materials largely condition the competitiveness of the industry through innovation and their advanced synthesis and characterization require developments that are part of major national and local projects for the CNRS such as the “DIADEM” PEPR and the EquipeX+ “MAGNIFIX”. As far as the Institut de Physique of the CNRS is concerned, the development of a large variety of topics, and the potential transfer to applications, cannot be done without state-of-the-art materials with a well-controlled dimensionality, relying on an expertise in materials science and engineering. The **Néel Institute** (UPR2940), the largest laboratory of the CNRS National Institute of Physics, plays a major role in material science and advanced characterization, notably thanks to its involvement in French Cooperative Research Groups at the ESRF and ILL, and the development of laboratory instruments unique at the national level. The mastery, for certain families of materials, from synthesis to extensive property characterization, and to applications, together with the development of experimental methods are specific to the laboratory.

**Strategies of the host laboratories** : The synthesis of new materials and the property-structure relationships are two of the main and historical lines of research of the Institut Néel. The diversity of physico-chemical synthesis routes and the range of associated fine characterization techniques, on large instruments and in the laboratory, bring together the expertise of the Institute's specialists around common subjects, giving rise to regional, national and international collaborations. The Institut Néel is at the center of major developments with the recent development project EquipEx+ “MAGNIFIX” (the rejuvenation of French CRGs at the ESRF) and the

PEPR “DIADEM”, as well as the current installation of state-of-the-art equipments : a new electron microscope (3.6 M€) and an X-ray single crystal diffractometer (0.5 M€). Now, the Institut Néel is seeking to preserve its expertise in crystallography, through the combinations of themes and methods, thanks to the recruitment of a high-level researcher.

**Summary of the scientific project :** The candidate must propose a research project on materials within the Néel Institute. This research activity will be carried out in close collaboration with the laboratory teams, in particular "Materials, Radiation, Structure (MRS)", "Magnetism and Superconductivity (MagSup)", and "Surface Interface and Nanostructures (SIN)", whose activities are centered on understanding the physico-chemical properties of a very wide range of materials (multiferroics, oxides with magnetic frustration, intermetallics and hydrides, semiconductor nanowires, heritage materials, molecular materials, etc.). The project will in particular identify a class of materials whose properties understanding requires the development of in situ and operando structural studies in electron microscopy and X-ray diffraction. The chair will also benefit from a unique environment in connection with the beamlines at the ESRF and at the ILL managed by the Néel Institute, and the new laboratory instruments mentioned above.

**Summary of the teaching/observation project :** The teaching project will be built with the University of Grenoble Alpes.

**Financial summary :**

Founded :	4x55 k€ (salary) 200 K€ (ANR environment)
Potential additional founding	120 k€ (CNRS PhD)
Total	540 k€

**Scientific dissemination :** Dissemination of the results will be through publications in recognized international journals. In addition, the project will implement communication towards various targets such as scientific communities, media, decision-makers, general public, schools, with an appropriate timetable. Specific tools could be developed such as websites, newsletters or meetings, international symposiums, summer schools and conferences.

**Open science :** The CNRS is developing a strong policy in favor of open science. Open science consists of making the results of research “accessible as much as possible and closed as much as necessary”. As such, the CNRS aims to ensure that 100% of the texts of publications resulting from the work of its units are made accessible, in particular by depositing them in HAL. The data produced must also be made available and reusable, unless otherwise restricted. In addition, the guiding principles of individual assessment have been reviewed in accordance with the DORA declaration, more qualitative and taking into account all facets of the researcher's profession.

**Science and society:** The science-society relationship is now recognized as an integral dimension of scientific activity. The project will develop this dimension in synergy with all the partners. The resulting research work will help inform public

decision-making. Participatory science initiatives may be initiated with actors from the socio-economic and cultural ecosystem of the project. The Néel Institute is particularly strongly committed to scientific mediation actions, with for example the creation of the "Physiquarium", an experimental platform dedicated to the dissemination of knowledge to schoolchildren, high school students and the general public, on the occasion of national or international events.

**Indicators:** A joint committee between the CNRS Institute of Physics and the University of Grenoble Alpes will monitor the deployment of the project, whose indicators will be identical to those on which the evaluation of the researchers is based (scientific productions; scientific influence, collective responsibilities, supervision and teaching) with a greater weight on the research activities given the nature (tenure on a DR2 position) and the desired duration of the chair (4 years).