



Recruitment Associate/full professors School year 2015-2016

Short profile : Rheology of complex fluids

Category : Professor

Job number : 573

Field of expertise: Section 1 : 60

Section 2 :

School to which the position is attached : Grenoble INP Ense3

Associate Research lab : Laboratoire Rhéologie et Procédés

Location : Saint Martin d'Hères

Date de recrutement : 01/09/15

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Grenoble INP, Grenoble Institute of Technology has been training engineers, and PhDs, and developing outstanding international research for the past hundred years. As a public Higher Education Institution and a leader in innovation, it is one of the preferred partners of the industrial world. As a cofounder of MINATEC, and an active member of Grenoble Innovation University, it is involved in international projects. Grenoble INP, Grenoble Institute of Technology is made up of approximately 1100 staff (administrative and academic), 6 engineering schools, 5400 students and 32 Research labs.

Site internet : <http://www.grenoble-inp.fr/>

School to which the position is attached

Ense3 - National School of Energy, Water and Environment - is an engineering school of the Grenoble INP group. It trains engineers in industries to meet the challenges of tomorrow and respond to the major societal challenges of the 21st century. Over 1000 students (engineers and masters) for a total of 100 faculty members - 350 temporary teachers - 50 administrative staff.

The school offers a comprehensive and multidisciplinary training based on a strong interaction with industry and research, particularly through the technological platforms PREDIS and IEE. The number of partnerships with large groups provide a good fit with the training needs of industry. The strong link with the research laboratories of Grenoble internationally recognized allows teaching to be brought in line with the latest technological developments. Ense3 also works towards opening itself to the world and its issues, including the promotion of international mobility of students and by diversifying the public (foreign students, learning).

Teaching experience :

Offering a wide range of programs, ENSE3 trains engineers able, on the one hand, to design and optimize hydromechanical and energetic systems and, on the other hand, to coordinate and manage product development projects in the fields of energy, transportation and processes. The recruited Professor shall possess a broad general knowledge of fluid mechanics that will allow him (her) to intervene in the teachings of the discipline (in core subjects of the first year, elective module in 2nd and 3rd year of the ME (Mechanics and Energetics) specialization program but also in other programs where the discipline is present). His (her) expertise in rheology of complex fluids will also allow him (her) to manage and develop, within the ME program, courses in connection with processes involving industrial fluids. The Professor will mobilize his (her) experimental skills to offer innovative teaching practices consistent with the educational reform which will be put in place at ENSE3 in September 2015. He (she) will contribute to the tutoring the students in their 2nd year engineering projects and industrial projects in the field of processes within the ME specialization program and in interaction with other programs offered by the School (Engineering of Electrical Energy, Engineering of Nuclear Energy).

It will also be necessary that the candidate may have an active role in the teachings of numerical methods applied to fluid mechanics. The recruited Professor will actively participate in the educational management of ENSE3, whether in the ME program, in another specialization program or in the international master programs FME or ENTECH.

It will be highly appreciated that the candidate has an industrial experience and connections with the downstream sector as well as experience abroad. The candidate must master the spoken and written English to teach a large part of his (her) courses in English.

Associate Research lab :

The Laboratoire Rhéologie et Procédés, established in 1992, is a joint research unit between CNRS, Grenoble Institute of Technology (G-INP) and the University Joseph Fourier (UJF).

The laboratory is also involved in the research federation 'Galileo Galilei Grenoble' (Fed3G), in the Laboratory of excellence 21 TEC on mechanics and its interfaces, and we are one of the five founding teams of the Carnot Institute "PolyNat" whose objective is the development and enhancement of bio-based functional materials.

17 scientists, 4 engineers, 1 technician and 3 administrative currently host 24 PhD students and 5 post-docs.

Research experience :

The activity of the Laboratoire Rhéologie et Procédés is the study of complex fluids flow field, with a multidisciplinary approach at the interface between materials, fluid mechanics, process engineering, physical/chemistry and coupled physical measurements.

The research topic concerns the rheology and the engineering of complex fluids for processes. This issue, firmly focused on industrial problems, suffers from a critical shortage of detailed understanding of the observed behaviors, especially during flow and under industrial conditions.

In practical terms the aim is to establish the basic knowledge in the context of non-Newtonian fluids. Viscoelastic fluids, yield stress fluids, possibly thixotropic, they may be the seat of defects and specific instabilities, that it is necessary to identify, characterize and model at different scales.

Using experimental approaches, we will seek to address scientific and technological issues, associated to the detailed characterization of these fluids and their flow at a given scale as well as the complexity of the characterization and the modelling of the transition from one scale to the other.

Thus, it will be necessary to characterize the intrinsic behavior of the material for solicitation range representative of the processing and the formulation of the fluid, through rheometry and coupled physical measurements. It will also be important to identify the behavior at the macroscopic scale, and develop appropriate strategies for accessing to the stress fields, the deformation fields and the local flow modes. Finally, we must ensure the determination of the induced effects at the fluid / structure interfaces and of the interactions between the complex geometries, the structure of the processed objects and the flows to which they are subject.

Through this multiscale and multiphysic approach, the goal is to understand the physics of the phenomena with a methodology of fundamental science, to integrate it in relevant models, in view of predicting the flow behavior, this predictive aspect being particularly crucial at the engineering scale.

In this context, you will design, animate and coordinate the activities of research and transfer in the field of rheology and engineering of complex fluids. You will take an active part in the scientific activities in this subject area. You will develop your work within the framework of current projects and you will be especially leader in developing scientific new projects (ANR, H2020, International Programs ...), making sure to develop the scientific partnership within the laboratory as well as at the international level.

A strong skill in fluid mechanics, especially in terms of experimentation and analysis, is necessary. A recognized expertise in the fields of rheology and processes is needed. Complementary approaches, such as physical techniques, simulation, etc ... would be a plus.

Details of the position, specific requirements and responsibilities

None

Languages

Ability to teach in French and English
Fluent French and English required.

Skills

General knowledge	Competencies in fluid mechanics and rheology
Technical knowledge	Approaches at frontiers between scientific fields Open-minded to scientific and technological innovation
Behaviour abilities	Integration and human interaction abilities Supervising ability Team worker open-minded to multi physics

Keywords :

Fluid mechanics - Viscoplasticity - Solid-liquid transitions - Dispersed systems - Structured fluids