

POSITION TITLE : RESEARCH ENGINEER IN OPTICAL INSTRUMENTATION

METROLOGY OF LIGHT SCATTERED BY OPTICAL COMPONENTS FOR LISA

● General information

Duration : 2 years with possible reconduction of 2 years

Expected starting date : before summer 2019

Working time : Full time

Diploma : PhD in instrumental optics

● Scientific context

LISA, Laser Interferometer Space Antenna, is a space-borne Gravitational Wave Observatory with an arm-length of 2.5 million km, compared to the few km's of the ground-based observatories. LISA is the largest project ever led by ESA, with the support of NASA and all the European national Space Agencies. LISA will be a Space interferometer with 3 arms of 2.5 million km length. The 3 satellites with optical payloads will be launched in 2034 to fly in formation on the same orbit than the Earth. Due to the distances and the configuration of the interferometer, the performances of the instrument will be mainly limited by the straylight, which is a critical point in this project and an ambitious technical and scientific challenge.

In this context, as the international leader of this straylight field, the Institut Fresnel has been asked to join the LISA Consortium to take the charge of the modeling and metrology of straylight at the component level.

The Institut Fresnel is now active part of the LIG (LISA Instrument Group) and SLWG (Straylight Working Group). New numerical and experimental developments will be brought by the laboratory on the basis on the expertise of the CONCEPT Group and DIFFUSIF Platform.

● Mission

The research engineer will work on the DIFFUSIF platform of the Institut Fresnel. He / She will be in charge of the activities of the DIFFUSIF platform as part of the LISA project.

● Activities

- He / she will be in charge of the development of a test bench for the accurate coherent and incoherent measurement of light backscattered by optical components (mirrors, beamsplitters, lenses, etc ...) designed for the optical systems that will be embedded on the LISA satellites.
- He / she will be in charge of the different series of measurements to be carried out by the platform as part of the LISA project.

● Expertise / skills

Technical skills

- Optical metrology
- Optical instrumentation

- Parasitic light, straylight and scattering
- Interferometry
- Contamination / Clean room
- Metrology of low noise optical systems specific to gravitational wave detection
- Constraints specific to instrumental developments for space projects
- Quality procedures in the space domain

Operational know-how

- Constraints specific to instrumental developments for space projects
- Quality procedures in the space domain.

Other skills

The practice of English (read, spoken, written) is required:

- The drafting of documents, reports and articles, in English will be recurrent
- He/She will have to present the results to the international consortium and in international conferences

Administrative procedures (purchase of equipment, security ...)

● **Working environment**

The engineer will be attached to the technological platform of Aix-Marseille University DIFFUSIF located at the Institut Fresnel on the campus of Saint Jérôme. He/She will join the LISA community through the Institut Fresnel participation. More details are available here:

<https://www.fresnel.fr/spip/spip.php?article2228>

The position is funded by the Aix-Marseille Initiative of Excellence, A*Midex. Aix-Marseille University has been awarded the Initiative of Excellence national label as part of the Investments for the Future Programme (PIA). A*Midex is led by Aix-Marseille University, with seven partners: CNRS, Inserm, CEA, IRD, AP-HM, Sciences Po Aix, and Centrale Marseille. The objective of A*Midex is to enhance and develop the exceptional potential of Aix-Marseille University and its area by providing them with world-class research and higher education. The Institut Fresnel and DIFFUSIF were selected in the frame of the A*Midex programme "Talents Management" dedicated to attract high-level research engineers in Aix-Marseille. More information on the A*MIDEX foundation can be found at:

<https://amidex.univ-amu.fr/en>

- **Specific conditions** : Candidates must have had no contractual relationship with Aix-Marseille University over the last 5 years.
- **To apply** : Please send CV, motivation letter and recommendations letters from previous advisors to myriam.zerrad@fresnel.fr