Recruits a

Research Engineer (F/H)

Référence n° FOCUS-XXXX-LAM

	Contract Type	Location
2 years fixed-term contract *Working Time : 100%* *Starting date: as soon as possible*	*Research engineer contract*	*LAM – Laboratoire d'Astrophysique de Marseille* *Pôle de l'Etoile Site de Château-Gombert* *38, rue Frédéric Joliot-Curie* *13388 Marseille cedex 13 France*

Work Environment

The LabEx FOCUS who funds this contract is hosted by Univ. Grenoble Alpes (UGA). UGA is one of the major research-intensive French universities, that 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 vibring 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 Alpes is an internationally engaged university.

The person will be hired at the Laboratoire d'Astrophysique de Marseille (LAM) in the optical service, under the authority of the service responsible. The project will be done at LAM at the interface between the instrumentation R&D group (GRD) and the Space and Ground Instrumental Department (DISS). The successful participant will benefit from the local expertise in adaptive optics, in particular on wavefront sensing for ELT instrumentation, and from the mechanical, optical and qualification and test expertise of the DISS. This work will be done in parallel with the development of the ELT instrument HARMONI with strong links and discussions with the project as it corresponds to the prototype of the HARMONI LGS detector module. Close collaboration with the Institut de Planétologie et d'Astrophysique de Grenoble (IPAG) is foreseen, with possibilities for short term visits during the contract.

Missions

A research engineer position is offered at Laboratoire d'Astrophysique de Marseille (France) to work with Dr. Anne Costille and Dr. Benoit Neichel on the development and the validation of a prototype of a Laser Guide Star (LGS) Wave-Front Sensor (WFS) for Extremely Large Telescope (ELT). The prototype will be used to explore alternative wavefront sensor schemes to prepare the future generation of Laser assisted AO system on the ELTs. In addition to these developments, the candidate will participate to the definition of the test plan of the Laser Guide Star System of HARMONI, first-light instrument for the ELT. This work is supported by the labex FOCUS (FOCal plane array for Universe Sensing) and is part of the technology development for the ELT, as the French laboratories are responsible for the delivery of the LGS WFS for two ELT instruments (HARMONI and MAORY). The key elements of the prototype (microlens array, optical relay, detector) have already been purchased and a preliminary assembly of the system is done at LAM.

Main activities:

The successful applicant will be the heart of the development of the LGS WFS prototype and will strongly collaborate to the HARMONI Laser Guide Star System test plan. The work is expected to last 24 months with the following foreseen steps:

- Get a handle on the scientific and technical context for LGS WFS in HARMONI
- Take responsibility of the alignment and test of the complete WFS prototype (microlens array, optical relay and detector)
- Definition of the prototype verification and test plan
- Definition and follow-up of the development of the test tools for the prototype
- Responsibility of the test of the prototype:
    - Optical quality
    - Wavefront sensing
    - Test of adapted and innovating algorithms for wavefront sensing
    - Calibration and operation schemes
    - Study of the impact of spot elongation on wavefront sensing
    - Analysis of the results obtained
- Report on results obtained with the prototype
- Contribute to HARMONI Laser Guide Star System test plan: definition of the test lists for AO WF sensing and definition and design of the needed test tools
- Participate to conferences to present the results obtained and publish scientific articles

Based on the expertise acquired during the prototype development, the candidate will propose new concepts to further improve the ultimate performance (in terms of sensitivity and linearity of LGS wavefront sensors).

First results on the prototype are expected in early 2021 and a final and complete demonstration of its performance and characteristics is expected by the end of the position.

Requested profile

Expected /recommanded skills are:

- Optics and optical design
- Adaptive optics with knowledge on wavefront sensing
- Signal processing and Data analysis (data analysis software skill like for example Python, IDL, Matlab...)
- Basics in mechanics, and assembly, integration and tests
- Project organisation / management
- English

Background / Diploma :

Recruitment qualification is expected at the level of a young research engineer (BAC+5) (MSc degree), if possible with 1 year experience in the domain of optical instrumentation (or internship), or PhD degree in astronomy, physics, optics or related field. The applicants must have demonstrated their capacity for independent work.

General information

Gross monthly income: from 2764 euros (before tax) and depending on candidate's profile
Paid annual leave: 45 days

Recruitment process

Please send your application to Anne Costille (anne.costille@lam.fr) and provide:

- *A one page letter of motivation*
- *A curriculum vitae and list of publications*
- *Contact of two persons with whom the candidate has worked with and / or a short statement (1 page) of research and experience*

Applications send before 15/12/2020 will receive full consideration.
Pass this date, applications will be considered upon availability of the position.