



## Postdoc position

# Fringe tracking for multi chromatic imaging – advanced performance for the Interferometric Survey of Stellar Parameters

**Job offer:** FT-ISSP for H2020\_AdG 2020: Project 101019953 ISSP

**Level:** PostDoc, PhD required + experience

**Salary:** Depending on experience (42k€ to 48k€, gross salary)

**Type of position:** postdoc position with research activities in stellar physics, fundamental parameters of stars, interferometric observations, fringe tracking and signal analysis – Required experience in optical interferometry

**Situation :** Université Côte d'Azur – Observatoire de la Côte d'Azur - Laboratoire LAGRANGE – Bâtiment Fizeau du Campus Valrose (Nice) & Calern Observatory for remote observations

### Description of Observatoire de la Côte d'Azur :

Observatoire de la Côte d'Azur is a French public Center for research in earth sciences and astronomy. With more than 450 persons working at four different locations (Nice Observatory, Université de Nice, Sophia Antipolis, Plateau de Calern), its role is to explore, understand and transfer knowledge about Earth sciences and astronomy, whether in astrophysics, geosciences, or related sciences such as mechanics, signal processing, or optics. OCA is composed of 3 research units (ARTEMIS, GEOAZUR, and LAGRANGE) and 1 support structure (GALILEE). This program will be developed in the Lagrange Laboratory.

The Interferometric Survey of Stellar Parameters (ISSP) ERC-Adv grant, started on 1 Sep 2021 for 5 years, aims at realizing and exploiting an ambitious and homogenous survey of the angular diameters of a thousand stars as faint as magnitude 8 in the visible and as small as 0.2 milliseconds of arc. It takes benefit of the recently commissioned CHARA/SPICA instrument installed on the CHARA Array, Mount Wilson Observatory (USA, CA). The survey is built to address key questions about the relation between planets and stars and to offer to the broader community a unique and primary source of direct information on a representative and large sample of stars all over the HR diagram. The ISSP team is opening this postdoc position to support the scientific programs of the survey through a dedicated effort on the fringe tracking facility and image reconstruction.

### Description of the position:

This position is focused on the imaging part of the survey, mainly related to the subprograms S05 (limb darkening), S06 (binary), S07 (fast rotators) and S08 (disks and winds). The goal is to open the possibility of image reconstruction combining R-band data (SPICA-VIS), H-band data (MIRCx) and K-band data (MYSTIC), using the three instruments simultaneously with the 15 baselines of CHARA. To reach the required performance for the different programs, we need to have a fully operational fringe tracker, called SPICA-FT, and that can be operate routinely every night.

Part of the activity will be dedicated to the optimization of the fringe tracking capabilities and to its consolidation as a routine service tool for the interferometric observations. This supposes some works to correctly parametrize the system for the different kinds of objects (bright/faint, unresolved/resolved) and to characterize the stability of the fringe phase over the large domain of wavelengths, from 0.7 $\mu\text{m}$  to 2.4 $\mu\text{m}$ . This also includes a potential amelioration of the operation of the longitudinal dispersion compensators.

The characterization of the progresses will be guided by the imaging program of the survey, mainly for complex objects for which the measurement of the angular diameter is not enough for the science objectives. As already said, the preferred targets will be binaries, fast rotators, and stars with environments.

This team welcomes applicants with diverse backgrounds and experiences. We regard gender equality and diversity as a strength and an asset.

## Main activities

- Observations with the CHARA/SPICA instrument and the CHARA Array. Data reduction. Exploitation of the interferometric data for the optimal extraction of stellar fundamental parameters through multichromatic imaging.
- Multichromatic characterization of the fringe tracking performance. Optimization of its behavior for the different cases of science objects.
- Reporting, publications
- Collaboration on tools with other persons in the team

## Skills

A background in interferometric instrumentation is necessary as well as an experience in interferometric observations. The position supposes also some skills in data analysis. Some knowledge in image reconstruction would be ideal but collaborations within the existing group are also considered for this objective.

## Conditions

This position assumes that the candidate will undertake observations, and they will be required to travel to (1) the United States at Mount Wilson in California for some onsite observations, and (2) the remote observatory at the Plateau de Calern site of the Côte d'Azur Observatory for most of the observations.

## Applications

The deadline for application is fixed to December 1, 2024. Interviews will be organized in December 2024, with a starting date for the contract to be discussed during the interview, but the sooner the better. The end of contract is on 31 Aug 2026 at the latest.

Application must be sent by email to [denis.mourard@oca.eu](mailto:denis.mourard@oca.eu). The application should contain a detailed CV, a letter of motivation describing the interest for the position and the skills for the activities that are described. Please provide also the name of two external referees that we can contact for discussion.

## Contact :

- Denis Mourard, (+33) 625 665 130  
<https://lagrange.oca.eu/fr/welcome-erc-issp>