

Post Title: Post-doctoral Research Fellow – The stellar-substellar limit in the large scale survey Euclid

Laboratory: Institut UTINAM

The post is funded by the University of Franche-Comté, the successful candidate will ideally be in post as soon as possible, starting from April 2024.

FTE: 1.0 (37 hours per week)

Duration of Contract: 12 months, renewable

Salary: around 2000€/month depending on previous experience.

Annual Leave: 35 days plus standard public holidays

Location: Besançon Observatory (OSU THETA), University of Franche-Comté, Besançon, France

Scientific context:

Applications are invited for a 12-month postdoctoral position, renewable, to lead and publish original scientific investigations in the area of ultra cool dwarfs and brown dwarfs observed by Euclid.

Euclid is a space mission led by the European Space Agency (ESA) to conduct a deep, single-epoch survey of 15,000 deg² of sky with visible and near-infrared photometry and spectroscopy, and 40 deg² multi-epoch very deep surveys. Its primary science goal is to investigate the geometry of the dark universe by mapping the distribution and shapes of galaxies. The unprecedented combination of sensitivity, areal coverage, spatial resolution, data homogeneity and spectral information will naturally be of tremendous benefit to other areas of astrophysics.

Ultra cool dwarfs (UCDs) are the lowest-mass, coldest, and faintest products of star formation. They are defined as objects with M7 and later spectral type objects. UCDs are of particular interest since they include both very low-mass stars that slowly fuse hydrogen, and brown dwarfs, which have insufficient mass to sustain hydrogen fusion in their cores, and cool down with time.

The Euclid wide survey will probe a very large volume and allow the detection of an unprecedented huge number of UCDs (> 1 000 000). The NIR colours are suitable to classify them, the only point-source contaminants being high redshift quasars. However, UCDs can be discriminated from QSOs thanks to the visible survey: UCDs VIS-NIR colours will be much redder or they will not be detected in the visible. Most of those with spectral type M7 to L5 have been discovered thanks to Gaia, completed by ground based or space telescopes in the NIR for the latter type brown dwarfs. With its deep and large cover in the NIR, Euclid is expected to complete the census and push the volume for L and T dwarfs.

Thanks to the depth of the NIR Euclid survey, we expect to use the UCDs as a probe of the oldest Milky Way populations and so learn more about the sub-stellar formation history at early times. In addition Euclid will offer a large sample of UCDs spanning a large metallicity range and open up a new window on the chemical evolution of the Milky Way.

Objective:

The successful applicant will work on the identification of ultra cool dwarfs in Euclid fields, and may propose new identification techniques and explore the possibility of using the precise PSF of Euclid to identify close binaries. Other challenges can be addressed, such as to determine the luminosity function, infer the most likely low-mass end of the initial mass function and explore its degree of universality in different components of the Milky Way.

The candidate will be working with the international Euclid UCD group within the consortium, as well as the Gaia UCD team.

Skill and experience required:

The candidates will have a track record of research in a relevant area of expertise in astrophysics. The candidates will also have a record of submitting/publishing scientific research in leading astronomical journals, presenting their work at scientific conferences, workshops or seminars.

The candidates will ideally have some experience of working large scale surveys, and stellar populations, in particular low mass stars and brown dwarfs.

Qualifications required:

A PhD in a relevant discipline (or equivalent qualification) must have been approved for the award.

Contact:

For more information about this position, please contact Professor Céline Reylé celine.reyle@obs-besancon.fr

Application:

Applications should be sent to Céline Reylé and should be accompanied by PDF versions of an europass CV (<https://europa.eu/europass/eportfolio/screen/cv-editor?lang=en>), a list of publications, and a personal statement/cover letter (maximum one side of A4 paper) explaining the motivation for applying, summarizing the research interests and the project. It should also include the contact details of two referees.

Closing Date: 15 March 2024