

The Centre de Recherche Astrophysique de Lyon (<http://www-obs.univ-lyon1.fr/?lang=en>) is offering a 2-years research post-doctoral position on **new wavefront sensing methods for extreme adaptive optics toward very high contrast Imaging of extrasolar planets**. This position is supported by the Lyon Institute of Origins (LabEx LIO).

In order to allow the discovery of other Earths, near perfect wavefront adaptive optics correction is required so that speckles of starlight created by subtle aberrations caused by atmospheric turbulence and by the telescope and instrument optics, will not create a glare that would obscure the presence of very faint planets. This research project addresses new wavefront control strategies in extreme adaptive optics (ExAO) with the aim of proposing new concepts to push towards ultra-high-contrast astronomical observations. In particular the successful applicant will be involved in demonstrating the feasibility of the required high-order, high-speed wavefront control despite the increase of the number of actuators for the E-ELT. Faster algorithms based on fractal iterative method such as FrIM will be studied and tested experimentally to cope with the insufficient computer power that is currently anticipated. In this context, the successful applicant will study a new wavefront sensor (WFS) concept, based on the Mach-Zehnder wavefront sensor (MZWFS), as a single stage sensor in order to achieve better performances and to decrease hardware complexity. Thanks to a better sensitivity, such WFS favours a clean correction of the starlight halo at small angular separations where the most demanding contrast is required. The successful applicant will use inverse approach to attempt a direct wavefront control with a MZWFS and validate this architecture by using the ExAO bench available at CRAL. He/She will participate to the evaluation of the impact of these developments on high contrast performances for imaging extra-solar planets.

This work will be done in collaboration with Maud Langlois, Michel Tallon, Eric Thiébaud.

Minimum qualifications include a PhD degree or higher in astronomy, physics or related field. Preference will be given to applicants with experience in adaptive optics. The position is open from September 2013, initially for duration of 12 months, renewable for 12 months. The starting date is flexible. Applicants should send a resume, list of publications, statement of research interests and experience, and arrange for three letters of reference to be sent directly via e-mail to maud.langlois@obs.univ-lyon1.fr. The review of applications will begin on May 15, 2013 and will continue until the position is filled.

Full benefits are included.