Postdoctoral Position in Adaptive Optics – EKARUS On-Sky Demonstrator

Position Details

Location: Laboratoire d'Astrophysique de Marseille (LAM), France
Start date: Between February and April 2026
Duration: 12 months (renewable)

Project Overview

The EKARUS project aims to build a next-generation Adaptive Optics (AO) R&D and training platform installed at the Copernico Telescope (182 cm) at Cima Ekar - Italy. EKARUS will inherit from the PAPYRUS platform, scheduled to be decommissioned early 2026 due to the renovation of the OHP Telescope 152. EKARUS is designed as a modular, remotely operable AO bench enabling on-sky testing of innovative wavefront sensing concepts for Extreme AO (XAO), supporting developments for instruments such as RISTRETTO, ANDES, and future ELT-class systems.

The postdoctoral researcher will play a central role in the integration, alignment, validation and first-light operations of EKARUS. He/She will work closely with teams from LAM, ONERA, INAF Padova/Arcetri, Durham University, ensuring that the system is fully operational for the planned first light in late summer 2026

Key Responsibilities

1. System Integration & AIT (Assembly, Integration, Testing)

- Lead and coordinate the integration of the PAPYRUS AO components into EKARUS at LAM and later at the Copernico telescope.
- Integrate and test the common path optics (OAPs, pupil relay, TT mirrors, DM468, dichroic, beam splitters).
- Oversee installation and validation of the visible pyramid wavefront sensor (PWFS), its modulator, and the Guiding & Sensing Camera (GSC).
- Participate in procurement, verification and acceptance of opto-mechanical components.

2. Calibration & Laboratory Validation

- Implement and calibrate the dual-wavelength calibration and telescope simulator module, including VIS/IR sources
- Prepare test plans and execute functional, performance, and stability tests, including:
    - pupil stability and TT correction validation
    - DM characterisation and WFE budget measurements
    - pyramid WFS response, linearity and sensitivity tests

3. On-Sky Commissioning

- Lead the **on-sky commissioning campaign** planned for August/September 2026.
- Develop and execute procedures for:
    - NCPA compensation
    - DM slaving control strategies
    - loop optimisation and gain scheduling
    - PWFS modulation strategies
    - Performance monitoring (Strehl, residual WFE, telemetry)
- Contribute to preparing the platform for remote operations and external users.

4. Collaboration, Documentation & Training

- Work in close collaboration with INAF, LAM, Durham and ONERA.
- Document alignment procedures, test results, and operational guidelines.
- Contribute to the EKARUS training program, assisting in student supervision and AO operational training.

5. Optional R&D Contributions

Depending on interest and time availability, the postdoc may contribute to:

- development of advanced WFS concepts (Bi-O edge, unmodulated pyramid, segmentation sensing)
- control algorithm optimisation (predictive control, woofer–tweeter strategies)
- preparation of Stage-2 upgrades (service WFS, IR arm, pupil fragmentation unit, coronagraph arm)

Required Qualifications

- PhD in Adaptive Optics, Optical Engineering, Astronomical Instrumentation, or related field.
- Proven experience with optical alignment and laboratory AO systems.
- Experience with deformable mirrors, wavefront sensors, or real-time control.
- Strong programming skills (Python, MATLAB, C/C++).
- Ability to work in a multi-partner international team.

Application Instructions

Please send a single PDF including:

- CV with publication list
- Cover letter describing relevant AO experience
- Contact information for two referees

To Benoit Neichel (benoit.neichel@lam.fr) & Taissir Héritier (cedric-taissir.heritier@lam.fr)

Applications will be reviewed continuously until the position is filled.

AO 2nd Stage
- [1000-1700] nm
- 2 kHz
- DM TBD
- Vector-Zernike WFS
- 1 WFS visitor port
- 1 Coronagraph arm
- 1 Spectro/Imager arm

Q3 2027

AO 1st Stage
- [500-1000] nm
- 1kHz
- 30" FoV
- Achromatic Pyramid WFS
- 2 WFS Visitor ports
- Focal Plane Assisted WFS
- 1 Spectro/Imager arm

Q3 2026

Visitor WFS

V-Zernike WFS (Service)

Visitor Spectro

Imager

TT Modulator

Pyramid WFS (Service)

Test FFWFS

Visitor WFS

DM2

IR VISIBLE

GSC

Coronagraph

Pointing Mirror

Visitor Spectro

Tracking/Science

DM1 (24x24)

Pupil Fragmentation Unit

Copernico Telescope

1.82 m

Coudé Relay F/20

Telescope Focus

Pupil Stabilization

Fast Tip/Tilt

Coudé & Common Path
- Focus optimized on [600-1600] nm
- Coudé Transmission >30% in VIS & IR
- 24x24 ALPAO DM
- Fast Tip/Tilt Mirror
- Pupil Stabilizer
- 1' FoV

Q1 2026

Calibration & Telescope Simulator
- Visible Source (640 nm)
- IR Source (1550 nm)
- Rotating Phase-Screens

Q2 2026

RTC and UI
- Durham Adaptive Optics RTC (DAO) [2]
- Telescope + EKARUS (almost) fully remotely accessible

DAO