



TOSCA Postdoctoral position on cosmology: optimising the synergy between Euclid and SKA

2 + 1 years postdoctoral research position

Keywords: Cosmology – Astrophysics – *Optical and radio missions – Euclid & SKA*

The CEA Saclay astrophysics department (DAp) invites applications for a postdoctoral position in cosmology. The successful candidate will work with Dr. Valeria Pettorino (CEA), Dr. Martin Kilbinger (CEA) and Dr. Martin Kunz (Geneva) within the ANR funded project TOSCA on weak lensing statistics for cosmology, which investigates synergies between optical and radio surveys, in collaboration with partners in Nice, Caen and Geneva. The successful candidate will be based at CEA, within the CosmoStat Laboratory, and will collaborate with all TOSCA members, in CEA, Nice, Caen and Geneva.

Context Weak gravitational lensing is a powerful probe to study the Universe and will be used in the coming years by both the Euclid and SKA surveys. Forecasts have shown that Euclid-SKA synergy will allow us to control systematics with an accuracy impossible to achieve using only one single survey. The objective of **TOSCA** is threefold: i) develop new radio weak lensing tools for deep learning image reconstruction and galaxy shape measurements; ii) develop efficient deep learning mass mapping methods for both Euclid and SKA including an estimation of the uncertainties, and iii) develop statistical tools to jointly estimate cosmological parameters from both surveys.

The postdoc This postdoctoral position will contribute to point iii) and will focus on: estimate cosmological parameters in view of synergies between Euclid and SKA, using products from TOSCA; compare different statistical tools, with second-and higher-order statistics, including the impact of systematics on their performance; test a new tomographic estimator for the gravitational lensing potential, based on a combination of intensity mapping (IM) and galaxy number counts.

The postdoc will join the Euclid and SKA consortia.

The candidate should hold a PhD in either physics/astrophysics/cosmology.

Preferred Experience

- experience in radio astronomy
- previous expertise on weak lensing
- experience in statistics, MCMC, or map based statistics
- experience in Euclid or SKAO is a plus

The position includes an internationally competitive salary and generous travel budget. French language skills are not required. Applicants should send a CV, a research statement and a cover letter to Valeria Pettorino (valeria.pettorino@cea.fr), and arrange for three reference letters to be sent to the same e-mail address before the application deadline.

CEA Saclay is located 20 km south of Paris, France, in the vicinity of various universities and other research centres. The Paris region contains numerous research institutes. The CosmoStat group is a diverse and multi-disciplinary team of researchers working on various topics in cosmology. The successful candidate will join the CosmoStat team that gathers experts in astrophysics, signal processing and data science to work on challenging problems in cosmology such as weak gravitational lensing, modified gravity, radio interferometry, blind source separation, and machine learning.

Our group is committed to diversity and equality, and encourages applications from women and underrepresented minorities. We support a flexible and family-friendly work environment. Benefits for this position include retirement, health care, parental leave, vacation and sick days, subsidized meals, discount for public transport, sport and culture, French language classes.

- **Contacts:** Valeria Pettorino (valeria.pettorino@cea.fr), Martin Kunz (martin.kunz@unige.ch), Martin Kilbinger (martin.kilbinger@cea.fr)
- Deadline for applications: 15th December 2023
- Start date: October 2024 or earlier
- Contract duration: 2 years with the possibility for renewal of 1 year.