

Ecole Doctorale 560
**Sciences de la Terre et de
l'Environnement
et Physique de l'Univers de Paris**



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<https://ed560.ed.univ-paris-diderot.fr>

ED STEP'UP

- **Université Paris Cité**



- **1 Labex (Laboratoires d'excellence)** **LabEx UnivEarthS**

- **4 affiliated research laboratories**



- **2 specialties : Physics of the Universe & Earth and Environment**

~ 230 researchers (including CNRS and faculty)

~ 150 PhD candidates (~45 PhD /year)



Scientific landscape : Themes

Experimental, observational and theoretical studies.

Earth, environment, geophysics, geo-chemistry, geology, cosmo-chemistry

Studying all kinds of astrophysical systems from Earth to the most remote astrophysical structures (from Planetology to Cosmology).

Multi-messenger astrophysics:

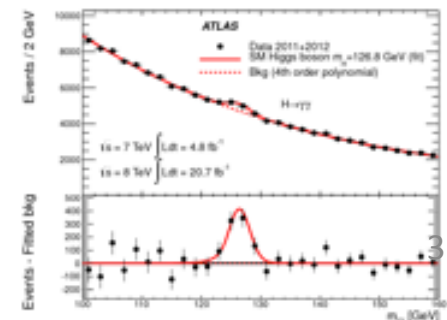
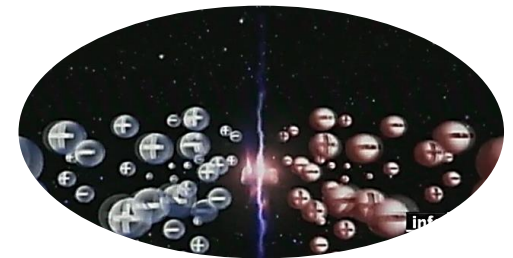
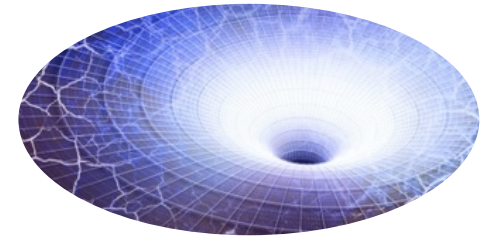
- High-energy photons (X and gamma)
- Gravitational waves
- Dark Matter searches.
- Particle and neutrino physics : mass and fundamental interactions, matter/antimatter asymmetry.

Instrumentation :

- PMTs, SiPM, Bolometers, CCD, KIDs, Silicium, Radio-detection, Interferometry, Spectrometry IR ...

Theory :

- String theories, modified gravity, Quantum Field theory, Standard model, etc ...

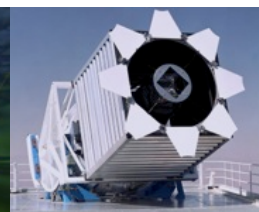
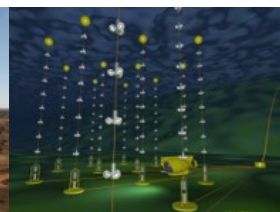
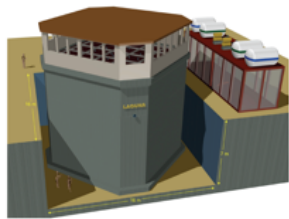
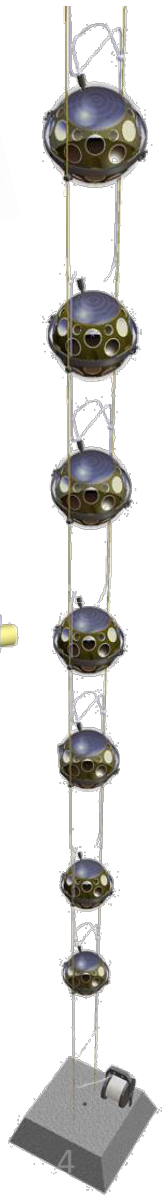
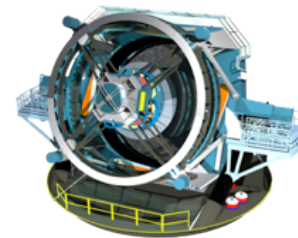
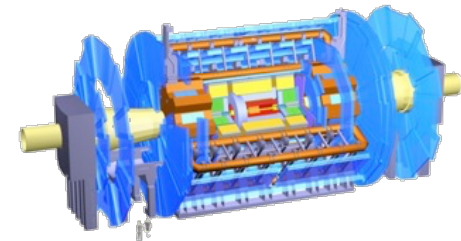




Scientific landscape : Projects

Projects :

- Cosmology (QUBIC, Simons obs., Euclid, LSST, DESI, DarkSide, Xenon, DAMIC)
- Neutrinos (DUNE, KM3NeT/ORCA, T2K)
- High-energy photons (HESS, CTA, Fermi, SVOM)
- Gravitational waves (Virgo/LIGO, LISA)
- Particle physics (LHC: ATLAS, LHCb)





Some thesis of former NPAC students

Julien MARCHIORO (2020): Search for progenitor of gravitational waves (APC)

Timothée HESSEL (2021): Direct Dark matter search with DarkSide 20k (APC)

Shruti RAVIKULARAMAN (2021): Searching for the excess of cosmic ray in the galactic center (APC)

Arianna RIZZIERI (2021): New techniques for the next generation of CMB observatories (APC)

Camille SIRONNEAU (2022) : Algorithms for LArTPC data exploitation optimisation in the DUNE experiment (APC)

Simon BIQUARD (2022) : Randomized algorithms for data analysis of the next CMB polarization observations (APC)

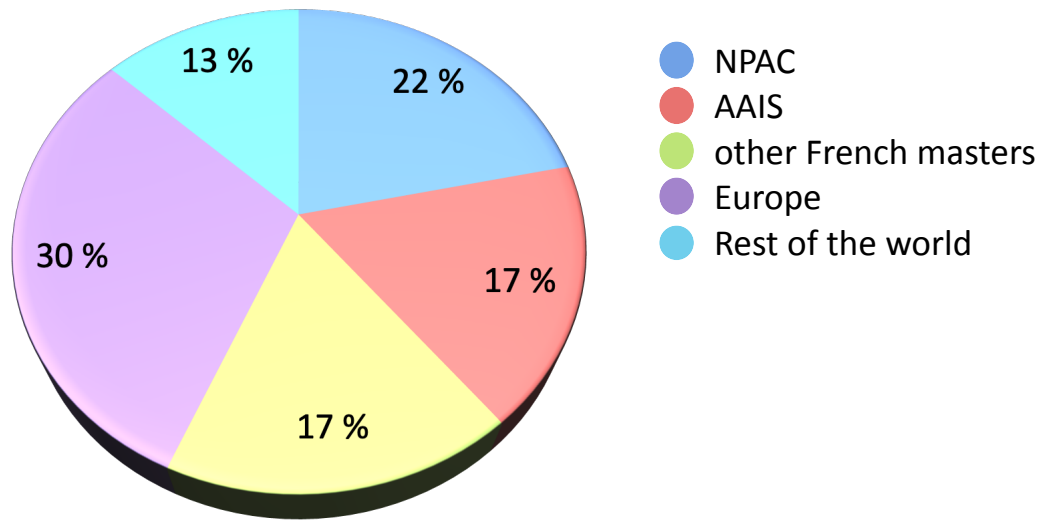
Philippe FOURQUET (2022): Study of the quantum to classical transition (APC)

Tom LACLAVERE (2023): QUBIC Data Analysis : realistic astrophysical components reconstruction and atmospheric mitigation using spectral-imaging (APC)

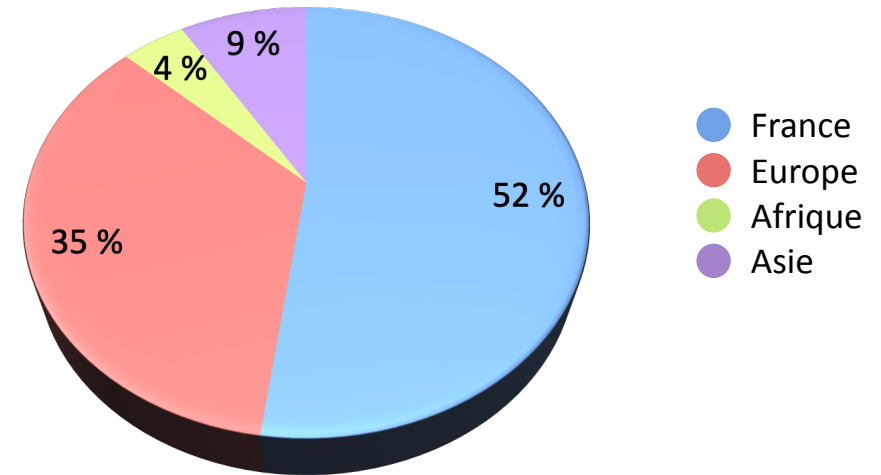
Ema TSANG KING SANG (2023): Modélisation instrumentale, calibration et exploitation des données⁵ d'observation de la polarisation du CMB avec le Simons Observatory, dans le cadre du projet européen SciPol (APC)



Origin of the STEP'UP PhD students 2023: Some statistics



**Masters of origin of the
2023 STEP'UP class**



**Geographical origin of
2023 STEP'UP class**



Thesis offers

<https://ed560.ed.univ-paris-diderot.fr/offres-de-these/>

> 80 subjects
proposed/year for
Physics of the Univers

→ Get in touch with
the proponent !!

see also the websites
of the labs

AIM, APC and LPTHE

The screenshot shows the website interface for STEP UP ÉCOLE DOCTORALE. The top navigation bar includes 'L'École Doctorale', 'Rejoindre l'ED' (highlighted with a red circle), 'Pendant la thèse', and 'Après la thèse'. The left sidebar contains language options (Français, English), 'Soutenances à venir', 'd'écran', and 'Actualités' with a list of events. The main content area is titled 'Offres de thèse' and contains a list of thesis subjects. Two subjects are visible in a table:

| Sujet n. | Labo (équipe) | Directeur (co-encadrant) | Titre | Financement |
|----------|---------------|--------------------------|---|-------------|
| U34 | AIM (LDE3) | Rafael García | Characterization of magnetic activity cycles of the Sun and solar-like stars with observations from SoHO, Kepler, and TESS satellites | CD UP |
| U33 | AIM (LDE3) | Antonio Muñoz García | New insights into radiative transfer modelling of exoplanet atmospheres | CD UP |



Funding for a PhD thesis @ STEP'UP

- All PhD candidates @ STEP'UP have to be funded for at least 3 years
- **Three possible PhD funding scenario :**
 - ➔ you are applying for one of the University PhD contract ➔ you have to enter one of the STEP'UP competition (“concours” in march 2024 or june 2024) or you can try both (in march and june 2024 if the first one is not successful) ➔ *see slide 9*
 - ➔ your PhD thesis is already partially funded but you are applying for a partial funding from University PhD contract ➔ *same procedure than the first item !*
 - ➔ your PhD thesis is already fully funded and you do not need any funding from the University ➔ *you do not have to enter the competition but you will have an interview with the doctoral board to validate your admission @ STEP'UP*

25 doctoral contracts in Physics of the Universe @ STEP'UP in 2023 :

2 CD SU + 5 CD UPC + 4,5 CNRS + 2 CNES + 2 CEA + 1 IPI SU + 1 ERC + 2 DIM Origines
+ 1 FSI + 1 CIFRE + 1 prog Vinci + 0,5 LPNHE + 0.5 SOUND.AI + 0.5 ANR



Dates and procedures

Selection process for 2024 <https://ed560.ed.univ-paris-diderot.fr/candidature/>

Two competitions (“concour”) :

- Anticipated competition (international + “excellence” M2 students)
deadline for application : **February 2024 [student+advisor]**
 - Main competition
deadline for application : **May 2024 [student+advisor]** (interviews: june 2024)
- ➔ In order to enter the competition your application has to be submitted by the thesis proponent (aka future PhD supervisor): you can only apply for one PhD subject per competition !
- ➔ If your application at the anticipated competition is not succesful you can reapply for the main competition (on the same PhD subject or not).



Selection process

- **Application file (Research experience, academic records, recommendation letters)**
- **Interviews: 20 mn**

Selection criteria will include :

- Quality of the candidate (motivation, experience and academic records)
- Adequacy between the candidate and the subject
- Relevance of the subject

☐ Main list + complementary list

For fully funded subject, no contest but interview for admission



Training & thesis follow-up

FORMATION À LA RECHERCHE + FORMATION PAR LA RECHERCHE

- Many formation proposed by ED, CFDip UP, DFC SU, CD PSL....
<https://ed560.ed.univ-paris-diderot.fr/formation/>
- Start-of-year meeting
- Comité de suivi individuel (at least 1 meeting per year)
- Individual interviews (1 or 2 per year)
- Plan Individuel de Formation

Yearly "Congrès des Doctorants" organized by D1 PhDs from both components (Earth Sciences + PU)

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