

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



Deputy-Director of the doctoral school for « Physics of the Universe » specialty in STEP'UP:

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ED STEP'UP

- **Université Paris Cité**  **Université Paris Cité**
- **STEP'UP is the main doctoral school of the Graduate School “Earth, Planet and Universe” @ UPC**

- **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:

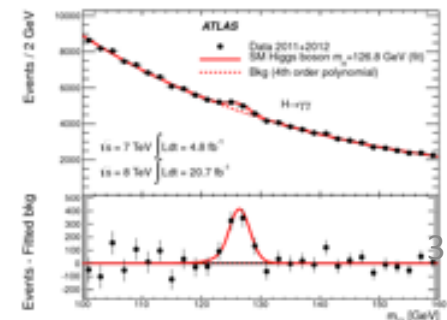
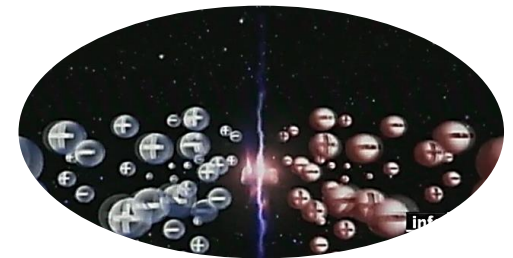
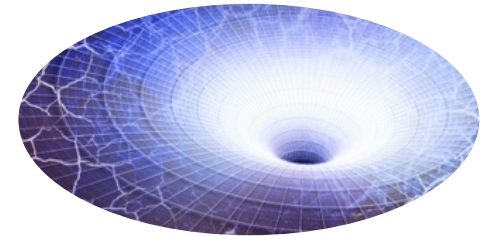
- High-energy photons (X and gamma)
- Gravitational waves
- Dark Matter searches.
- Particle and neutrino physics : mass and fundamental interactions, matter/antimatter asymmetry.

Instrumentation :

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

Theory :

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

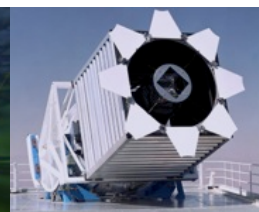
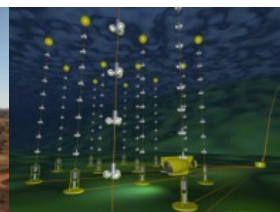
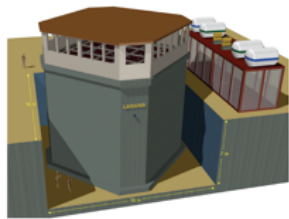
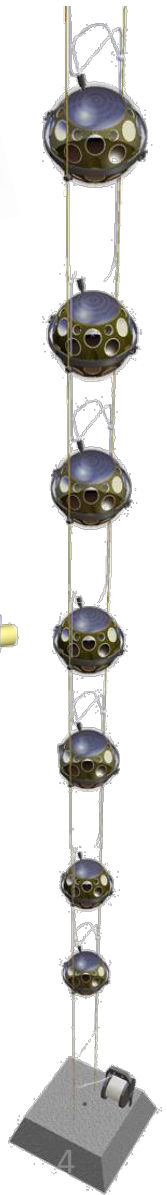
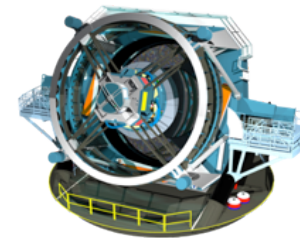
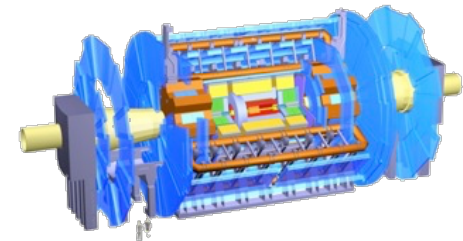




Scientific landscape : Projects

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)





Ongoing thesis of former NPAC students

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)

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

Isander-Louis AHREND (2024) : Boosting the Sensitivity of the Next-Generation Gravitational- Wave Detectors through Quantum Correlations (APC)

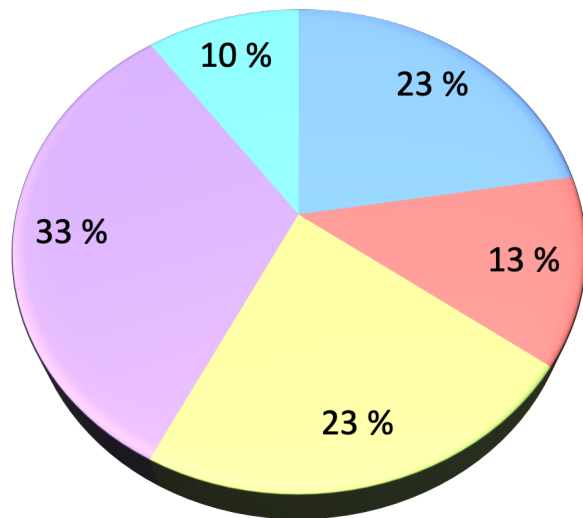
Enzo M'SIHID (2024) : Photodetection and Instrumentation for UHECR & SQM detection from space (APC)

Pierre MASSON (2024) : CMB Foreground studies (APC)

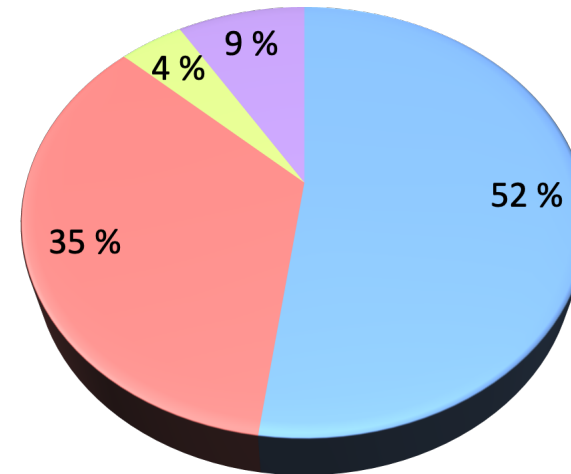
Hoang Viet TRAN (2024) : Measurement of CMB B-mode polarisation with the LiteBIRD satellite mission: development of innovative data analysis techniques (APC)



STEP'UP PhD students 2023 & 2024: 'Physics of the Universe' statistics



- NPAC
- AAIS
- other French masters
- Europe
- Rest of the world



- France
- Europe
- Afrique
- Asie

**20 doctoral contracts in Physics of the Universe in 2024
(7 from University + 13 from CNRS, ANR, CNES, Académie Spatiale IDF,
CEA, ENS, etc ...)**



Thesis offers

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

> 40 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 for STEP UP ÉCOLE DOCTORALE. The header includes the logo and navigation links: "L'École Doctorale", "Rejoindre l'ED" (circled in red), "Pendant la thèse", and "Après la thèse". A sidebar on the left contains language options (Français, English), a search bar, and a list of "Actualités" (news) items. The main content area is titled "Offres de thèse" and contains the following text:

Vous trouverez ci-dessous la liste des sujets de thèse proposés en 2022 au sein de l'ED STEP'UP.

Si un de ces sujets vous intéresse, vous êtes invités à prendre contact avec la personne qui le propose et à consulter les modalités de [candidature](#).

- Liste des sujets en Terre et Environnement (Pour déposer un sujet [cliquer ici](#))
[Montrer la liste](#)
- Liste des sujets en Physique de l'Univers
[Masquer](#)

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 the STEP'UP competition (“concours” in june 2025) ➔ *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*

20 doctoral contracts in Physics of the Universe @ STEP'UP in 2024 :

(7 from University + 13 from CNRS, ANR, CNES, Académie Spatiale IDF, CEA, ENS, etc ...)



Dates and procedures

Selection process for 2025 <https://ed560.ed.univ-paris-diderot.fr/candidature/>

- ➔ “Physics of the Universe” competition : deadline for application : **May 2025**
[student+advisor) with interviews in june 2025
- ➔ 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 !



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 —> PhD (partially) funded by UPC**
- ☐ For fully funded subject, no contest but interview for admission**

All student admissions @ STEP'UP have to be validated by the council of the doctoral school in July 2025



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
- Professional outcome can be found for STEP'UP PhDs

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

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

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