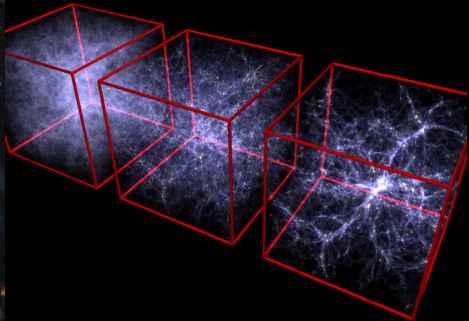
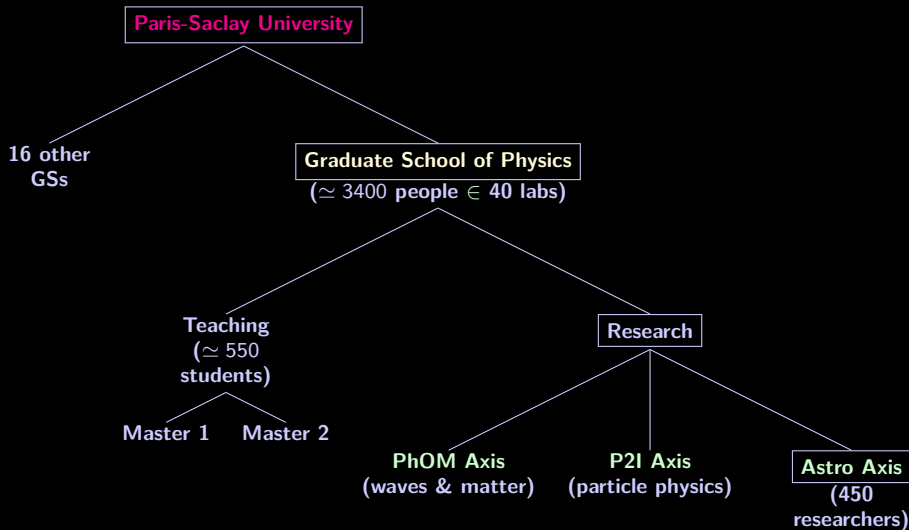


Introduction – What is the Paris-Saclay Astrophysics Axis?

Frédéric GALLIANO, on behalf of the axis committee





- Frédéric GALLIANO (DAp; director)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)
- Aline MEURIS (DAp)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)
- Aline MEURIS (DAp)
- Laurent VERSTRAETE (IAS)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)
- Aline MEURIS (DAp)
- Laurent VERSTRAETE (IAS)
- Mathieu VINCENDON (IAS)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)
- Aline MEURIS (DAp)
- Laurent VERSTRAETE (IAS)
- Mathieu VINCENDON (IAS)
- Sabrina SOCCARD (admin & €)

- Frédéric GALLIANO (DAp; director)
- Alain ABERGEL (IAS; assistant director)
- Frédéric BOURNAUD (DAp)
- Sandrine COUTURIER (IAS)
- Thomas GAUTIER (LATMOS)
- Dimitra KOUTROUMPA (LATMOS)
- Vianney LEBOUTEILLER (DAp)
- Aline MEURIS (DAp)
- Laurent VERSTRAETE (IAS)
- Mathieu VINCENDON (IAS)
- Sabrina SOCCARD (admin & €)

université
PARIS-SACLAY


GRADUATE SCHOOL
Physique

ASTRO

Astrophysique

Space Laboratories \in Astro Axis

Space Laboratories \in Astro Axis

 Département d'Astrophysique (DAp; CEA)

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$

- Federating the \neq labs

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$

- ✓ Federating the \neq labs
- ✓ Supporting summer schools & colloquium

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$

- ✓ Federating the \neq labs
- ✓ Supporting summer schools & colloquium
- ✓ Supporting local projects \Rightarrow PhD funding

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$


- ✓ Federating the \neq labs
- ✓ Supporting summer schools & colloquium
- ✓ Supporting local projects \Rightarrow PhD funding
- ✓ Organize an annual day centered around PhD students

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$


- Federating the \neq labs
- Supporting summer schools & colloquium
- Supporting local projects \Rightarrow PhD funding
- Organize an annual day centered around PhD students
- Answer  calls for funding (*e.g.* postdocs, *etc.*)

Space Laboratories \in Astro Axis

- 1 Département d'Astrophysique (DAP; CEA)
- 2 Institut d'Astrophysique Spatiale (IAS)
- 3 Laboratoire Atmosphères & Observations Spatiales (LATMOS; $\simeq 30\%$)
- 4 Laboratoire de Physique des Plasmas (LPP; $\simeq 50\%$)

Role & Future Developments

2023 – 2024	2025 – 2027
$\simeq 1.2 \times 10^5 \text{ €yr}^{-1}$	$\simeq 2.2 \times 10^5 \text{ €yr}^{-1}$

- Federating the \neq labs
- Supporting summer schools & colloquium
- Supporting local projects \Rightarrow PhD funding
- Organize an annual day centered around PhD students
- Answer  calls for funding (*e.g.* postdocs, *etc.*)
- Encourage interdisciplinary initiatives

The Main Science Theme / Open Questions

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?

The Main Science Theme / Open Questions

- ① What are the processes of formation, functioning and evolution of the Solar system?
- ② What is the origin of stars and planets, and how do they evolve?

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

Methodological Approaches

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

Methodological Approaches

- Theory & Simulations;

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

Methodological Approaches

- Theory & Simulations;
- Observations & data science;

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

Methodological Approaches

- Theory & Simulations;
- Observations & data science;
- Instrumental developments & laboratory astrophysics;

The Main Science Theme / Open Questions

- 1 What are the processes of formation, functioning and evolution of the Solar system?
- 2 What is the origin of stars and planets, and how do they evolve?
- 3 How are galaxies formed, and how does the Universe evolve?
- 4 Do we understand the extreme conditions in the Universe?

Methodological Approaches

- Theory & Simulations;
 - Observations & data science;
 - Instrumental developments & laboratory astrophysics;
- ⇒ everything astrophysics.

Potential Synergies

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Pool of students: Master of physics & the 4 Doctoral Schools.

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Pool of students: Master of physics & the 4 Doctoral Schools.

Local Assets

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Pool of students: Master of physics & the 4 Doctoral Schools.

Local Assets

International positioning: strong involvement in large space & ground-based projects (Solar Orbiter, JWST, JUICE, Euclid, *etc.*).

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Pool of students: Master of physics & the 4 Doctoral Schools.

Local Assets

International positioning: strong involvement in large space & ground-based projects (Solar Orbiter, JWST, JUICE, Euclid, *etc.*).

Community interests: development of instruments, tools, data, *etc.*

Potential Synergies

Close coupling between the approaches: instrumentation, observations, data science, modeling, numerical simulations, laboratory astrophysics & large research facilities.

Connections with physics laboratories: PhOM & P2I axes.

Pool of students: Master of physics & the 4 Doctoral Schools.

Local Assets

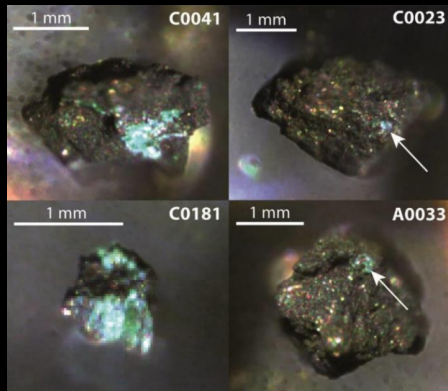
International positioning: strong involvement in large space & ground-based projects (Solar Orbiter, JWST, JUICE, Euclid, *etc.*).

Community interests: development of instruments, tools, data, *etc.*

Large platforms: integrations, tests, calibration, data.

Project 1

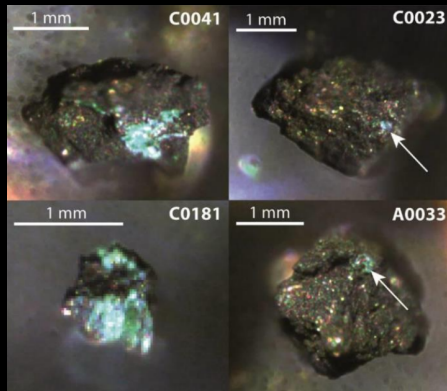
Characterization and comparison of the composition of samples from the primitive asteroids Ryugu and Bennu by hyperspectral near-IR microscopy



Project 1

Characterization and comparison of the composition of samples from the primitive asteroids Ryugu and Bennu by hyperspectral near-IR microscopy

Advisors: Cédric PILORGET (IAS) &
Rosario BRUNETTO (IAS)

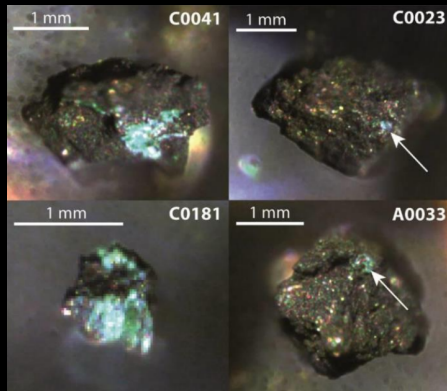


Project 1

Characterization and comparison of the composition of samples from the primitive asteroids Ryugu and Bennu by hyperspectral near-IR microscopy

Advisors: Cédric PILORGET (IAS) & Rosario BRUNETTO (IAS)

Objective: analyzing returned asteroid samples \Rightarrow understanding the formation of the Solar system



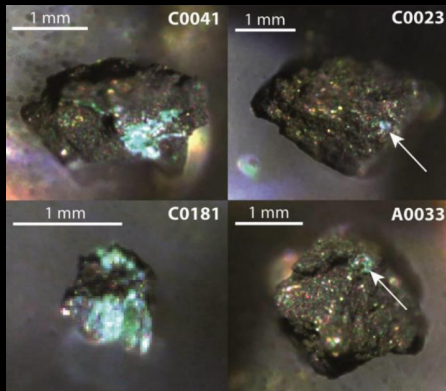
Project 1

Characterization and comparison of the composition of samples from the primitive asteroids Ryugu and Bennu by hyperspectral near-IR microscopy

Advisors: Cédric PILORGET (IAS) & Rosario BRUNETTO (IAS)

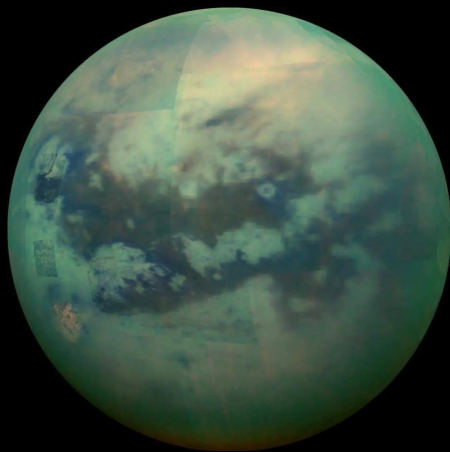
Objective: analyzing returned asteroid samples \Rightarrow understanding the formation of the Solar system

Co-funding: CNES



Project 2

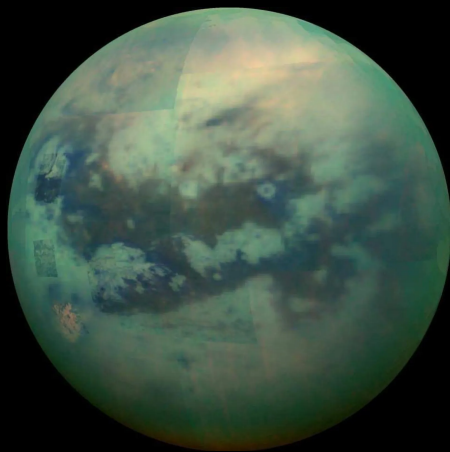
The habitability of ocean-worlds in the Solar system: surface composition analysis



Project 2

The habitability of ocean-worlds in the Solar system: surface composition analysis

Advisor: Caroline FREISSINET
(LATMOS)

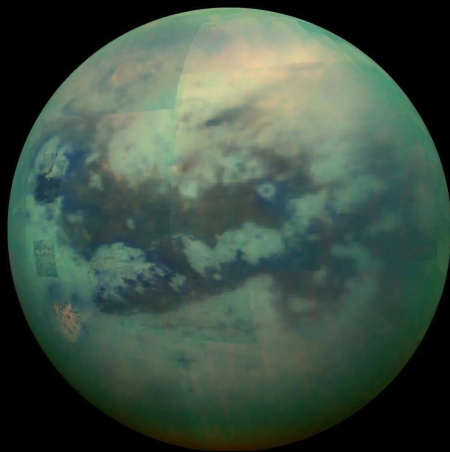


Project 2

The habitability of ocean-worlds in the Solar system: surface composition analysis

Advisor: Caroline FREISSINET
(LATMOS)

Objective: conceive and prepare an instrument \Rightarrow characterizing organic molecules on the surface of Titan, Europe and Enceladus.



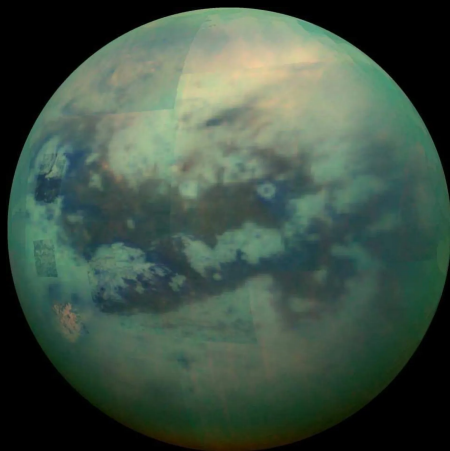
Project 2

The habitability of ocean-worlds in the Solar system: surface composition analysis

Advisor: Caroline FREISSINET
(LATMOS)

Objective: conceive and prepare an instrument \Rightarrow characterizing organic molecules on the surface of Titan, Europe and Enceladus.

Co-funding: ED AAIF



Supporting Summer & Winter Schools

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

2024 – Will support *M2 OHP winter school*

- \simeq 20 students
- A long tradition

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

2024 – Will support *M2 OHP winter school*

- \simeq 20 students
- A long tradition

Annual Axis Day

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

2024 – Will support *M2 OHP winter school*

- \simeq 20 students
- A long tradition

Annual Axis Day

Dates: November 16, 2021 – December 2, 2022 – October 19, 2023

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

2024 – Will support *M2 OHP winter school*

- \simeq 20 students
- A long tradition

Annual Axis Day

Dates: November 16, 2021 – December 2, 2022 – October 19, 2023

Format: 1 day – no fees – time to discuss

Supporting Summer & Winter Schools

2023 – supporting the summer school *Paris-Saclay @ OHP*

- 20 L3/M1
- learning observing techniques

2024 – Will support *Rencontres de physique l'infiniment grand à l'infiniment petit*

- 20 students
- Classes + visits of labs @ UPS

2024 – Will support *M2 OHP winter school*

- \simeq 20 students
- A long tradition

Annual Axis Day

Dates: November 16, 2021 – December 2, 2022 – October 19, 2023

Format: 1 day – no fees – time to discuss

Characteristics:

- only meeting of all astrophysics @ Paris-Saclay;
- follow-up LabEx P2IO projects.

TODAY | What are the Goals of The Present Event?

TODAY | What are the Goals of The Present Event?

- 1 Listen to science talks

TODAY | What are the Goals of The Present Event?

- 1 Listen to science talks
- 2 Learn what science is done @ Paris-Saclay

TODAY | What are the Goals of The Present Event?

- 1 Listen to science talks
- 2 Learn what science is done @ Paris-Saclay
- 3 Have informal discussions

TODAY | What are the Goals of The Present Event?

- 1 Listen to science talks
- 2 Learn what science is done @ Paris-Saclay
- 3 Have informal discussions
- 4 Networking & kick-starting collaborations

TODAY | What are the Goals of The Present Event?

- 1 Listen to science talks
- 2 Learn what science is done @ Paris-Saclay
- 3 Have informal discussions
- 4 Networking & kick-starting collaborations

9h30 - ACCUEIL		
9h45	Introduction	Frédéric GALLIANO
10h00	Effects of the Airless Bodies Regoliths Structures and of the Solar Wind Properties on the Backscattered Energetic Neutral Atoms Flux	Sébastien VERKERCKE
10h20	HTRES-X High Resistivity TES micro-calorimeter : a path toward breaking the power dissipation technological lock for future X-ray space telescopes	Benjamin CRITON
10h40 - PAUSE CAFÉ / SESSION POSTER		
11h10	Characterization of heterogeneous subsurface with broad-band GPR : application to WISDOM, the GPR of the ExoMars mission	Emile BRIGHI
11h30	AI-Based Advancements in Gamma Spectroscopy in Complex Environments	Felipe Matheus FERNANDES DE OLIVEIRA
11h50	A landscape of stellar activity	Lucie DEGOTT
12h10 – DÉJEUNER / SESSION POSTER		
14h00	Dust millimetre emission in nearby galaxies with NIKA2 (IRAM-30m): major challenges and late st results of the IMEGIN Large Program	Lara PANTONI
14h20	Towards Measurements of Spectral Distortions of the Cosmic Microwave Background	Xavier COULON
14h40	Plateforme d'Irradiation Gamma pour les Sciences, l'Industrie et l'Enseignement	François DALY
15h00 – PAUSE CAFÉ / SESSION POSTER		
15h30	Table ronde – Astrophysique et visualisation	Leïla GODINAUD (chair), Adnan Ali AHMAD, Eric BUCHLIN, Ronan MODOLO, Antoine STRUGAREK
16h30	Conclusion	
16h40 - FIN		