

**Keywords:** analysis of cosmological simulations, study of gas dynamics in galaxy clusters and filaments, quantification of the physics processes contributing to the hydrostatic mass bias

## RESEARCH EXPERIENCES

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- **PhD** Oct 2022 - present  
*Institut d'Astrophysique Spatiale (IAS)* Orsay, France  
 – Title: "Mass calibration from constrained simulations: towards bias-free scaling relations for galaxy clusters."  
 – Supervisors: Nabila Aghanim & Jenny Sorce  
 – Expected defence date : September 2025
- **2nd year Master Degree research internship** Mar 2022 - Jun 2022  
*Institut d'Astrophysique Spatiale (IAS)* Orsay, France  
 – Project: Study of a constrained zoom-in simulation of the Virgo cluster  
 – Supervisors: Nabila Aghanim & Jenny Sorce
- **1st year Master Degree research internship** May 2021 - Jul 2021  
*Institut d'Astrophysique Spatiale (IAS)* Orsay, France  
 – Project: Study of galaxy clusters pressure profiles in the IllustrisTNG simulation  
 – Supervisors: Nabila Aghanim & Hideki Tanimura
- **Bachelor research internship** Jan 2020  
*Laboratoire de Physique SUBAtomique et TECHnologies associées (SUBATECH)* Nantes, France  
 – Project: Calibration of the XENON1T detector using  $^{83m}\text{Kr}$  and light yield determination  
 – Supervisors: Sara Diglio and Julien Masbou

## EDUCATION

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- **Magister degree in Fundamental Physics, specialisation in Astrophysics (M2)** 2022  
*Université Paris-Saclay* Orsay, France
- **Bachelor degree in Physics** 2020  
*Université de Nantes* Nantes, France
- **Bachelor degree in Mathematics** 2020  
*Université de Nantes* Nantes, France

## PUBLICATIONS

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### • Refereed

1. *Can the splashback radius be an observable boundary of galaxy clusters?*  
**Lebeau**, Ettori, Aghanim & Sorce, A&A 689, A19 (2024)
2. *Simulating the LOcal Web (SLOW) – II: Properties of local galaxy clusters*  
 Hernández-Martínez, Dolag, Seidel, Sorce, Aghanim, Pilipenko, Gottlöber,  
**Lebeau** & Valentini, A&A 687, A253 (2024)
3. *Mass bias in clusters of galaxies: Projection effects on the case study of Virgo replica*  
**Lebeau**, Sorce, Aghanim, Hernández-Martínez & Dolag, A&A 682, A157 (2024)

### • Proceedings

1. *Projection effects on pressure profiles: a case study of the Virgo replica*  
**Lebeau**, Sorce & Aghanim, mm Universe Proceedings, EPJ Web of conferences, 2024

## TALKS

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1. **Turbulence in the ICM of the Virgo cluster simulated replica**  
*EAS annual meeting* *Jul 2024*  
Padova, Italy
2. **Can the splashback radius be an observable boundary of galaxy clusters ?**  
*GdR Cophy Episode 2* *May 2024*  
Lyon, France
3. **Can the splashback radius be an observable boundary of galaxy clusters ?**  
*Tuorla-Tartu meeting* *May 2024*  
Turku, Finland
4. **Gas dynamics in the ICM of galaxy clusters: case study of a Virgo replica**  
*Elbereth Conference* *Mar 2024*  
Paris, France
5. **Mass bias in clusters of galaxies: case study of Virgo CLONE replica**  
*RAMSES SNO kick-off meeting* *Dec 2023*  
Lyon, France
6. **Biases in the estimation of the hydrostatic mass of the Virgo simulated CLONE**  
*mm Universe conference* *Jun 2023*  
Grenoble, France
7. **Biases in the estimation of the hydrostatic mass of the Virgo simulated CLONE**  
*CLUES meeting* *Jun 2023*  
Munich, Germany
8. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**  
*Elbereth Conference* *Mar 2023*  
Paris, France

## POSTERS

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1. **Turbulence in galaxy clusters and cosmic filaments**  
*IAS young researchers and ingeeners day* *Jun 2024*  
Orsay, France
2. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**  
*Colloque Alain Bouyssy* *Dec 2023*  
Orsay, France
3. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**  
*Journée de l'axe Astro de la Graduate School de Physique de l'Université Paris-Saclay* *Oct 2023*  
Orsay, France
4. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**  
*IAS young researchers and ingeeners day* *Jun 2023*  
Orsay, France
5. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**  
*"Future Cosmology" summer school* *Apr 2023*  
Cargèse, France

## SUPERVISION AND TEACHING

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- **Co-Supervision of Jade Paste (1st year Master Degree trainee)** *May-Jun 2024*  
*2 months research internship*
- **Astronomy pratical works (15h/year)** *2022-present*  
*1st year Master Degree*
- **Electromagnetism courses (21h/year)** *2023-2024*  
*2nd year Bachelor Degree*
- **Co-supervision of astronomy projects (one week)** *2023*  
*1 week project with four students of 3rd year Bachelor Degree*

## MAIN SKILLS

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**Programming Languages:** Analysis of cosmological simulations with Fortran (own RAMSES-related data preparation and map creation codes) and Python (use of scientific (numpy,scipy,astropy,...), visualisation (matplotlib,pyvista,...) and optimisation (numba,jax,...) libraries)

**Languages:** English (fluent), French (mother tongue)

## CONTRIBUTIONS TO THE COMMUNITY

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- Referee for "The Open Journal of Astrophysics" 2024
- Co-organisation of bimonthly Cosmology team seminars 2024 - present
- Organisation of the IAS young researchers and ingeneers day 2024
- Elected as doctoral student representative on the laboratory board 2024 - present
- Elected as doctoral student representative on the Paris-Saclay University Physics Graduate School board 2023 - present
- Management of the Cosmology team's conference webpage 2022 - 2024

## COLLABORATIONS

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- Member of the LOCALIZATION project 2022-2025  
*P.I.s: Nabila Aghanim (IAS, Paris-Saclay University) & Klaus Dolag (LMU, Munich)*

## GRANTS

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- Financial support from doctoral school to participate to "Future Cosmology" summer school (~500€) Apr 2023
- 3-years PhD half-grant from doctoral school 2022 - 2025  
"Astronomie & Astrophysique d'Ile-de-France" (~50k€)

## PROPOSALS

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- Co.I of project Proposal for Tier 0/Tier 1 HPC Access at the Gauss Center for supercomputing 2023  
*45Mcpu hours obtained on the LRZ supercomputer to run the LOCALIZATION simulation*

## OUTREACH

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- Conference "Introduction to cosmology" for secondary school students Dec 2023
- Participation to the "Science Festival 2022" at IAS 2022

## PERSONAL INTERESTS

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- Basketball in competition
- Guitar in amateur band

## REFERENCES

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Nabila Aghanim: [nabila.aghanim@universite-paris-saclay.fr](mailto:nabila.aghanim@universite-paris-saclay.fr)  
Jenny Sorce: [jenny.sorce@univ-lille.fr](mailto:jenny.sorce@univ-lille.fr)  
Stefano Ettori: [stefano.ettori@inaf.it](mailto:stefano.ettori@inaf.it)