

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

- **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}Kr and light yield determination
 – Supervisors: Sara Diglio and Julien Masbou

EDUCATION

- **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

• Refereed

1. *Turbulence from cosmic filaments to galaxy clusters*
Lebeau, Zaroubi, Aghanim, Sorce & Langer, to be submitted to A&A
2. *Can the splashback radius be an observable boundary of galaxy clusters?*
Lebeau, Ettori, Aghanim & Sorce, A&A 689, A19 (2024)
3. *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)
4. *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

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

POSTERS

1. **Turbulence in galaxy clusters and cosmic filaments**
IAS young researchers and ingeeners day
Orsay, France
Jun 2024
2. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**
Colloque Alain Bouyssy
Orsay, France
Dec 2023
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
Orsay, France
Oct 2023
4. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**
IAS young researchers and ingeeners day
Orsay, France
Jun 2023
5. **Towards bias-free mass calibration of galaxy clusters using constrained cosmological simulations**
"Future Cosmology" summer school
Cargèse, France
Apr 2023

SUPERVISION AND TEACHING

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

MAIN SKILLS

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

- Member of the SOC for the Ultimate Cluster Cosmology workshop @ IAS 2024
- 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

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

GRANTS

- 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

- 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

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

PERSONAL INTERESTS

- Basketball in competition
- Guitar in amateur band

REFERENCES

Nabila Aghanim: nabila.aghanim@universite-paris-saclay.fr

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Saleem Zaroubi: saleem@astro.rug.nl