

Date of Birth: 8 May 1989, Nationality: Italian

Address: Observatoire astronomique de Strasbourg, 11 rue de l'Université, Strasbourg 67000, France

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Professional Experience

Postdoctoral researcher Mar. 2021 -

OBSERVATOIRE ASTRONOMIQUE DE STRASBOURG

Strasbourg, France

Scientific support to the H2020 ESCAPE project and CDS services. Research on galaxy clusters and the large-scale structure using multi-wavelength data. Advisors: Mark Allen, Ada Nebot.

Research Associate

Nov. 2018 - Feb. 2021

CORNELL UNIVERSITY Ithaca, NY, USA

Research on galaxy evolution and galaxy clusters using CMB experiments and large-scale structure surveys. Advisor: Nicholas Battaglia.

Academic Record

Qualification Maître de conférences

2020

MINISTERE DE L'ENSEIGNEMENT SUPERIEUR, DE LA RECHERCHE ET DE L'INNOVATION Qualification for the functions of lecturer, Section 34: astronomy, astrophysics

France

Doctor of Philosophy (Ph.D.)

2015 - 2018

OBSERVATOIRE DE PARIS Paris, France

Title of the PhD thesis: "Scaling relations and stellar populations of galaxy clusters from their first epochs of assembly to the present", supervised by Prof. Simona Mei and discussed the 20/09/2018.

Master of Science in Astrophysics and Cosmology

2011 - 2014

University of Bologna

Bologna, Italia

Final mark: 106/110. Title of the Master thesis: "The relation between mass and concentration in X-ray galaxy clusters at high redshift", supervised by Prof. Lauro Moscardini and Dr. Stefano Ettori.

Bachelor's degree (Laurea Triennale)

2007 - 2011

University of Bologna

Bologna, Italia

Final mark: 104/110, Dissertation title: "The physics of the Cosmic Microwave Background and the Planck mission", supervised by Prof. Lauro Moscardini.

Involvement in Scientific Collaborations

ESCAPE + CDS

SCIENCE SUPPORT RESEARCHER

2021 -

Scientific contribution to ESCAPE - CEVO (connecting the European Strategy Forum on Research Infrastructures to the European Open Science Cloud through the Virtual Observatory Framework) and to the CDS services, preparation of training materials and events.

Atacama Cosmology Telescope

EXTERNAL COLLABORATOR

Developed pipeline to interpret observations of the Sunyaev-Zeldovich effects in galaxy samples and study the gas thermodynamics and feedback processes that regulate galaxy formation.

SEPTEMBER 12, 2022 STEFANIA AMODEO · RÉSUMÉ

Simons Observatory

EXTERNAL COLLABORATOR

Working on pipeline to exploit future Sunyaev-Zeldovich observations from the Simons Observatory.

Euclid Consortium

JUNIOR MEMBER AS PHD STUDENT

2015 - 2018

Contribution to the Galaxy Cluster Working Group. I analysed scaling relations in clusters to understand systematic effects in mass estimation and the impact on Euclid cosmology from cluster counts.

Skills____

Aladin, Astropy, DS9, source detection and photometric analysis (SExtractor,

Data Analysis Swarp, PSFex, T-PHOT, GALFIT, IRAF), spectral analysis (XSPEC), Chandra X-ray

data analysis software (CIAO), TOPCAT

Programming Languages Python, knowledge of IDL, Fortran, C

Work presentation LaTeX, GitHub, Jupyter Notebook, Keynote, Google Slides, PowerPoint

Languages Italian (native), English (fluent), French (fluent), Spanish (basic)

Certified training (selection)

École Thematique AstroInformatique 2021

LINK TO SCHOOL WEBSITE Dec 2021

Data processing in Machine Learning and Deep Learning

ESCAPE Summer School on Data Science for Astronomy

LINK TO SCHOOL WEBSITE June 2021

Training on Data Science and Python development

Data-driven Astronomy

COURSERA - UNIV. OF SYDNEY

Nov 2021

Working with large datasets: computational thinking, time complexity of algorithms, SQL data querying, databases, data investigation with machine learning.

Observing Experience _____

• Du Pont 2.5m Telescope, Direct CCD Camera, 4 nights (2016), Las Campanas Observatory, Chile

Publications in peer-reviewed journals _____ Link to my ads library

- 22. Moser, E., Battaglia, N., Nagai, D., Lau, E., Valle, L., Villaescusa-Navarro, F., **Amodeo, S**., Angles-Alcazar, D., Bryan, G.L., Dave, R., Hernquist, L., Vogelsberger, M. (2022), "The Circumgalactic Medium from the CAMELS Simulations: Forecasting Constraints on Feedback Processes from Future Sunyaev-Zeldovich Observations", ApJ in press, arXiv:2201.02708
 - C: Software, Validation, Writing Review & Editing
- 21. Schneider, A., Giri, S. K., **Amodeo, S.**, Refregier, A. (2021), "Constraining baryonic feedback and cosmology with weak-lensing, X-ray, and kinematic Sunyaev-Zeldovich observations", MNRAS in press,

- arXiv:2110.02228
- C: Data curation, Resources, Writing Review & Editing
- 20. Kim, J., Golwala, S., Bartlett, J.G., et al. (including **Amodeo, S**.) (2021), "Probing hot gas components of circumgalactic medium in cosmological simulations with the thermal Sunyaev-Zel'dovich effect", accepted for publication, ApJ, 926, 179
- 19. Li, Y., Adam D. Hincks, A., et al. (including **Amodeo, S**.) (2021), "Constraining CMB temperature evolution with Sunyaev-Zel'dovich galaxy clusters from the Atacama Cosmology Telescope", ApJ, 922, 136
- 18. Moser E., **Amodeo, S.**, Battaglia N., Alvarez M., Ferraro S., Schaan E. (2021), "The Impacts of Modeling Choices on the Inference of the Circumgalactic Medium Properties from Sunyaev-Zeldovich Observations", ApJ, 919, 2
- 17. Orlowski-Scherer, J., Di Mascolo, L., Bhandarkar, T., Manduca, A., Mroczkowski, T. et al. (including **Amodeo, S.**) (2021), "Atacama Cosmology Telescope measurements of a large sample of candidates from the Massive and Distant Clusters of WISE Survey: Sunyaev-Zeldovich effect confirmation of MaD-CoWS candidates using ACT", A&A, 653, A135
- 16. Calafut, V., Gallardo, P., Vavagiakis, E., **Amodeo, S.**, et al. (2021), "The Atacama Cosmology Telescope: Detection of the Pairwise Kinematic Sunyaev-Zel'dovich Effect with SDSS DR15 Galaxies", Phys. Rev. D, 104, 043502
- 15. Vavagiakis, E., Gallardo, P., Calafut, V., **Amodeo, S.**, et al. (2021), "The Atacama Cosmology Telescope: Probing the Baryon Content of SDSS DR15 Galaxies with the Thermal and Kinematic Sunyaev-Zel'dovich Effects", Phys. Rev. D, 104, 043503
- 14. Mallaby-Kay M., Atkins Z. et al. (including **Amodeo, S**.) (2021), "The Atacama Cosmology Telescope: Summary of DR4 and DR5 Data Products and Data Access", ApJS, 255, 11
- 13. Knowles, K., Pillay, D. S. et al. (including **Amodeo, S**.) (2021), "MERGHERS Pilot: MeerKAT discovery of diffuse emission in nine massive Sunyaev-Zeláovich-selected galaxy clusters from ACT", MNRAS, 504, 1749
- 12. Hilton, M., Sifón, C., Naess, S., Madhavacheril, M., Oguri, M., Rozo, E., Rykoff, E., et al. (including **Amodeo, S**.), "The Atacama Cosmology Telescope: A Catalog of > 4000 Sunyaev-Zel'dovich Galaxy Clusters", ApJS, 253, 3
- 11. **Amodeo, S.**, Battaglia, N., Schaan, E., Ferraro, S., Moser, E., et al. (2021) "Atacama Cosmology Telescope: Modeling the Gas Thermodynamics in BOSS CMASS galaxies from Kinematic and Thermal Sunyaev-Zel'dovich Measurements", Phys. Rev. D, 103, 063514
- Schaan, E., Ferraro, S., Amodeo, S., Battaglia, N., et al. (2021), "Atacama Cosmology Telescope: Combined kinematic and thermal Sunyaev-Zel'dovich measurements from BOSS CMASS and LOWZ halos", Phys. Rev. D, 103, 063513
- 9. Aiola, S., Calabrese, E., Maurin, L., Naess, S., Schmitt, B.L., et al. (including **Amodeo, S**.) (2020), "The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters", JCAP12, 2020, 047
- 8. Choi, S., Hasselfield, M., Ho, S. P., Koopman, B., Lungu, M., et al. (including **Amodeo, S**.) (2020), "The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz", JCAP12, 2020, 045
- 7. Madhavacheril, M., Sifón, C., Battaglia, N., et al. (including **Amodeo, S**.) (2020), "The Atacama Cosmology Telescope: Weighing distant clusters with the most ancient light", ApJL, 903, L13
- 6. Markov, V., Mei, S., Salomé, P., Combes, F., Stern, D., Galametz, ., De Breuck, C., Wylezalek, D., **Amodeo, S.**, Cooke, E., Gonzalez, A., Hatch, N., Noirot, G., Rettura, A., Seymour, N., Stanford, S., Vernet, J.,

- (2020), "Massive molecular gas reservoir around the central AGN in the CARLA J1103+3449 cluster at z=1.44", A&A, 641, 22
- 5. **Amodeo, S.**, Mei, S., Stanford, S. A., Lawrence, C. R., Bartlett, J. G., Stern, D., Chary, R. R., Shim, H., Marleau, F. R., Melin, J. B., Rodríguez-Gonzálvez, C. (2018), "Spectroscopic confirmation and velocity dispersions for twenty Planck galaxy clusters at 0.16 < z < 0.78", ApJ, 853, 36
- 4. Corasaniti, P. S., Ettori, S., Rasera, Y., Sereno, M., **Amodeo, S**., Breton, M.-A., Ghirardini, V., Eckert, D. (2018), "Probing cosmology with dark matter halo sparsity using X-ray cluster mass measurements", ApJ, 862, 40
- 3. **Amodeo, S.**, Mei, S., Stanford, S. A., Bartlett, J. G., Melin, J. B., Lawrence, C. R., Chary, R. R., Shim, H., Marleau, F. R., Stern, D. (2017), "Calibrating the Planck Cluster Mass Scale with Cluster Velocity Dispersions", ApJ, 844, 101
- 2. Ghirardini, V., Ettori, S., **Amodeo, S**., Capasso, R., Sereno, M. (2017), "On the evolution of the entropy and pressure profiles in X-ray luminous galaxy clusters at z > 0.4", A&A, 604, A100
- 1. **Amodeo, S.**, Ettori, S., Capasso, R., Sereno, M. (2016), "The relation between mass and concentration in X-ray galaxy clusters at high redshift", A&A, 590, A126

Submitted

- 2. Mei, S., Hatch, N., **Amodeo, S**., Afanasiev, A., De Breuck, C., Stern, D., Cooke, E., Gonzalez, A., Noirot, G., Rettura, A., Seymour, N., Stanford, S.A., Vernet, J., Wylezalek, D. (2022), "*Morphology-density Relation, Quenching, and Mergers in CARLA Clusters and Proto-Clusters at 1.4* < *z* < 2.8", submitted to A&A, arXiv:2209.02078
- 1. Afanasiev, A., Mei, S., Fu, H., Shankar, F., **Amodeo, S**., Stern, D., Cooke, E., Gonzalez, A., Noirot, G., Rettura, A., Wylezalek, D., De Breuck, C., Hatch, N., Stanford, S., Vernet, J. (2022), "The Galaxy Mass-Size Relation in CARLA Clusters and Proto-Clusters at 1.4 < z < 2.8: Larger Cluster Galaxy Sizes", submitted to A&A

Non-refereed Publications

- 5. Jiménez-Esteban, F., Allen, M. G., **Amodeo, S**., Cortés-Contreras, M., Derriere, S., Heinl, H., Nebot, A., Solano, E. (2021), "European Virtual Observatory Schools", Proceeding to Astronomy, Software, Systems. ADASS XXXI Conference, arXiv:2112.07370
- 4. Allen, M. G., **Amodeo, S**., Bonnarel, F., Molinaro, M., Genova, F., Romaniello, M., Heinl, H., Schaaff, A., Lesteven, S. (2021), "Data stewardship of next-generation data products and services related to ESFRI and other astrophysics infrastructures", Proceedings of the LISA IX meeting, hal-03372190
- 3. **Amodeo, S.**, Battaglia, N., Schaan, E., Ferraro, S., Moser, E., and the ACT collaboration (2021), "The Atacama Cosmology Telescope: gas thermodynamics in BOSS CMASS galaxies from thermal and kinematic Sunyaev-Zel'dovich measurements", Proceedings of the American Astronomical Society meeting #237
- 2. Battaglia, N., Hill, J. C., **Amodeo, S**., Bartlett, J. G., Basu, K., Erler, J., Ferraro, S., Hernquist, L., Madhavacheril, M., McQuinn, M., Mroczkowski, T., Nagai, D., Schaan, E., Somerville, R., Sunyaev, R., Vogelsberger, M., Werk, J. (2019), "*Probing Feedback in Galaxy Formation with Millimeter-wave Observations*", White Paper submitted to the Astro2020 Decadal Survey, arXiv:1903.04647
- 1. **Amodeo S.**, Mei S., Stanford S., Bartlett J., Melin J-B, Lawrence C., Chary R-R, Shim H., Marleau F., Stern D. (2017), "Calibrating the Planck cluster mass scale with cluster velocity dispersions", SF2A-2017:

Data and Code repositories

- 3. Jupyter notebook tutorials on CDS services, including: searching for data with Simbad, finding and downloading catalogues from Vizier, visualising catalogues and survey images and interacting with them in the Aladin Lite widget, cross-matching tables with XMatch, using Multi-Order Coverage maps (MOCs) to operate with arbitrary sky regions.
- 2. Mop-c GT Python code, authors: Stefania Amodeo, Nicholas Battaglia

Model-to-observable projection code for galaxy thermodynamics

The code takes in input models of thermodynamic profiles of galaxy samples, and returns the correspondent profiles of observable quantities, specifically the kinematic and thermal SZ profiles that we expect to measure from real surveys, accounting for line-of-sight projections, instrumental beam, aperture photometry filter and possible systematics.

1. VizieR Online Data Catalog:

Spectroscopy observations of 20 Planck galaxy cluster candidates (Amodeo+, 2018)

The repository contains details of the observational campaigns, catalogs of galaxies detected in each cluster, with spectroscopic redshift measured using Gemini (GMOS-N, GMOS-S) and Keck data, and our estimates of the cluster velocity dispersions and masses, with some statistical estimators.

Teaching and Mentoring _____

LecturerKrakow, PolandJagiellonian UniversityJuly 2022

5th Cosmology School "Introduction to Cosmology"

Lecturer Virtual

Strasbourg astronomical Data Center (CDS)

2nd ESCAPE-VO School, "Science with interoperable data"

Co-supervisor of a PhD student and a student intern

Ithaca, NY

CORNELL UNIVERSITY 2019 - 2021

Department of Astronomy

Lecturer Ithaca, NY

CORNELL UNIVERSITY 2019

Compact objects: neutron stars and black holes, Astro 2201 (1st year undergrad)

Teaching assistant Paris, FR

ECOLE D'INGÉNIEUR DENIS DIDEROT 2018

Course of Signal Processing, tutorials 30h, 1st year undergrad (L3), in French

Invited talks (formal invitation from the SOC) ____

3. IAUGA 2022 - FM6 Dynamics of the ICM: Radio and X-ray Observations and Theory

Busan, Korea

February 2022

ICM THERMODYNAMICS FROM THE SZ EFFECTS: AN ACT VIEW

August 2022

2. Reproducibility and Open Science in Astronomy

Virtual

THE ESCAPE PROJECT - TUTORIAL ON FAIR DATA WITH MULTI-ORDER COVERAGE MAPS

May 2022

1. Cosmology with CMB-S4

SZ MEASUREMENTS WITH EXISTING DATA SETS

Virtual August 2020

Invited colloquium _____

1. Saint Mary's University

Halifax, Nova Scotia

AT THE CROSSROADS OF GALAXY EVOLUTION AND COSMOLOGY: MULTI-WAVELENGTH STUDIES OF GALAXY

October 2019

Virtual

Virtual

November 2017

Talks_

15. EAS 2020 - S2

21. IVOA Interoperability Meeting

The 2nd ESCAPE-VO School April 2022

20. Galaxy Clusters 2022: Challenging Our Cosmological Perspectives Virtual

Constraining ICM thermodynamics and feedback with thermal and kinematic SZ effects

April 2022

19. CCAT-Prime/FYST Collaboration Meeting

SZ Cluster Science: Precursor measurements from ACT

April 2022

18. Webinar demos at EAS 2021 Meeting Virtual

ACCESSING CDS SERVICES FROM JUPYTER NOTEBOOKS

June 2021

17. SF2A 2021 - S17: Des galaxies à la toile cosmique: baryons et matière noire Virtual

CONSTRAINING BARYONIC PROCESSES IN GALAXY GROUPS WITH OBSERVATIONS OF THE THERMAL AND KINEMATIC

SUNYAEV-ZELDOVICH EFFECTS

June 2021

16. AAS 237 Meeting Virtual

THE ATACAMA COSMOLOGY TELESCOPE: GAS THERMODYNAMICS IN BOSS CMASS GALAXIES FROM THERMAL AND

January 2021

KINEMATIC SUNYAEV-ZEL'DOVICH MEASUREMENTS

Calibrating baryonic processes with thermal and kinetic SZ

July 2020

14. CCAT-prime Collaboration Meeting Virtual

Dust in tSZ cross-correlations April 2020

13. KICC 10th Anniversary Symposium Cambridge, UK

Baryonic processes from thermal and kinetic SZ

September 2019

12. Matera Oscura, cosmology and dark matter within galaxies and clusters

Matera, IT

Probing baryons and dark matter with thermal and kinetic SZ September 2019

11. Tracing cosmic evolution with clusters of galaxies Sesto, IT

Baryonic processes from thermal and kinetic SZ

July 2019

10. ACT f2f meeting Princeton, NJ

BARYONIC PROCESSES AND THE KINETIC SZ EFFECT

March 2019

9. IAU XXX General Assembly, Division J: Galaxies and Cosmology Vienna, AT

Stellar populations of high-z protoclusters from the CARLA survey

August 2018

8. EWASS 2018 Liverpool, UK

STELLAR POPULATIONS OF HIGH-Z PROTOCLUSTERS FROM THE CARLA SURVEY

April 2018

7. Elbereth: Conference of the PhD students in Astronomy & Astrophysics in

COLORS AND MORPHOLOGIES OF GALAXIES IN CLUSTERS AND PROTO-CLUSTERS AT Z>1.5

Île-de-France

6. Joint SWG-OULE3 Euclid meeting on Galaxy Clusters	Toulouse, FR
CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH VELOCITY DISPERSIONS	October 2017
5. Atelier de l'action fédératrice "Cosmologie et structuration de l'Univers"	Paris, FR
CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH VELOCITY DISPERSIONS	October 2017
4. geco-lam2017: Galaxy Clusters Across Cosmic Time	Aix en Provence, FR
CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH CLUSTER VELOCITY DISPERSIONS	July 2017
3. CLUSTER1: A view from Italy on galaxy clusters in the 21st century PROBING CLUSTER MASS PROXIES FOR COSMOLOGY	Torino, IT February 2017
2. Euclid Cluster SWG Meeting	Trieste, IT
CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH CLUSTER VELOCITY DISPERSIONS	November 2016
1. Hot spots in the XMM sky: Cosmology from X-ray to Radio	Mykonos, GR
CALIBRATING THE GALAXY CLUSTER MASS SCALE FOR COSMOLOGY	June 2016
Seminars	
12. Panelist at ESCAPE Virtual Observatory Webinar	Virtual
Training methods in Virtual Observatory schools	June 2022
11. Invited talk at UC Berkeley Cosmology Seminars	Virtual
CONSTRAINING BARYONIC PROCESSES IN GALAXY HALOS WITH THE SZ EFFECTS	April 2022
10. Invited talk at the Arizona State University Extragalactic Summer Talk Series	Virtual
HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5	July 2021
9. Invited talk at the Observatoire astronomique de Strasbourg	Virtual
AT THE CROSSROADS OF GALAXY EVOLUTION AND COSMOLOGY: MULTI-WAVELENGTH STUDIES OF GALAXY GROUPS AND CLUSTERS	April 2021
8. Invited talk at the University of KwaZulu-Natal	Virtual
HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5	February 2021
7. Invited talk at the Cosmology Lunch Seminar, University of Cambridge	Virtual
HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5	February 2021
6. Invited talk at the Yale Nuclear Particle Astrophysics (NPA) Seminar	Virtual
HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5	October 2020
5. Webinar hosted by the Simons Foundation	Virtual
ASTROPHYSICAL EVOLUTION WITH TSZ AND KSZ DATA FROM ACT DR5	September 2020
4. Cornell Galaxy Lunch Seminar	Ithaca, NY
STELLAR POPULATIONS OF HIGH-Z PROTOCLUSTERS FROM THE CARLA SURVEY	February 2018
3. IAP PhD Seminar Calibrating the Galaxy cluster mass scale with cluster velocity dispersions	Paris, FR May 2017
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2. Kapteyn Institute Wednesday Lunch Seminar Calibrating the Galaxy cluster Mass Scale with cluster velocity dispersions	Groningen, NL May 2017
1. Talk at LERMA Extragalactic meeting	Paris, FR
THE RELATION BETWEEN MASS AND CONCENTRATION IN X-RAY GALAXY CLUSTERS AT HIGH REDSHIFT	April 2016
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Posters

3. Poster at EAS 2022, S2 - Galaxies as cosmological tracers	Valencia, ES
Probing baryons and dark matter with the SZ effects	June 2022
3. Poster at EAS 2021, S3 - Galaxy clusters and AGNs	Virtual
CONSTRAINING BARYONIC PROCESSES WITH OBSERVATIONS OF THE THERMAL AND KINEMATIC SUNYAEV-ZELDOVICH EFFECTS	June 2021
2. Poster at EWASS 2018, SS13 - Galaxy clusters and groups across cosmic time	Liverpool, UK
THE CLUSTER MASS AND VELOCITY BIAS FROM GALAXY DYNAMICS	April 2018
1. Poster presentation at SF2A: Galaxies decadence: theory and observation	Paris, FR
THE CLUSTER MASS AND VELOCITY BIAS FROM GALAXY DYNAMICS	July 2017

Press releases ___

- Cornell Chronicle, "Ancient light illuminates matter that fuels galaxy formation", link
- Berkeley Lab, "Missing Baryons Found in Far-Out Reaches of Galactic Halos", link

Other Academic Activities _____

- Organiser of the Second ESCAPE Virtual Observatory school, Strasbourg/On-line, 22–24 Feb 2022
- IVOA newsletter editor and media group member
- Mentor of The Supernova Foundation, a worldwide mentoring program for women in physics.
- Referee for A&A, MNRAS, Nature Communications
- Panelist for NASA program review
- Member of the code of conduct committee, Cornell Astronomy Department (2020-2021)
- Conference LOC member: Galaxy Evolution Across Time, Paris, 12-16 June 2017.

Outreach activities

- Aladin Desktop interface translation English to Italian
- Panelist at *Women in Science*, a live interaction organized by the Department of Physics, P. K. College, Contai, India. 28 Feb. 2021.
- ESO volunteer translator (English to Italian)