

Stefania Amodeo

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

France

Qualification for the functions of lecturer, Section 34: astronomy, astrophysics

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 Sunjaev-Zeldovich effects in galaxy samples and study the gas thermodynamics and feedback processes that regulate galaxy formation.

Simons Observatory

EXTERNAL COLLABORATOR

Working on pipeline to exploit future Sunjaev-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

Data Analysis	Aladin, Astropy, DS9, source detection and photometric analysis (SExtractor, 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](#)

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-Zeldovich-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
10. 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-González, 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

3. 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*
2. 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*”, submitted to *ApJ*, arXiv:2201.02708
1. 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*”, submitted to *MNRAS*, arXiv:2110.02228

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: *Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics*

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

Co-supervision of a PhD student and a student intern

CORNELL UNIVERSITY

2019 - 2021

Lecture

CORNELL UNIVERSITY

2019

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

Teaching assistant

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

ICM THERMODYNAMICS FROM THE SZ EFFECTS: AN ACT VIEW

August 2022

2. SO/Euclid cross-correlation workshop

CALIBRATING FEEDBACK PROCESSES WITH SIMONS OBSERVATORY

Trieste, IT

Postponed

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 CLUSTERS

October 2019

Talks

20. Galaxy Clusters 2022: Challenging Our Cosmological Perspectives CONSTRAINING ICM THERMODYNAMICS AND FEEDBACK WITH THERMAL AND KINEMATIC SZ EFFECTS	<i>Virtual</i> April 2022
19. CCAT-Prime/FYST Collaboration Meeting SZ CLUSTER SCIENCE: PRECURSOR MEASUREMENTS FROM ACT	<i>Virtual</i> April 2022
18. Webinar demos at EAS 2021 Meeting ACCESSING CDS SERVICES FROM JUPYTER NOTEBOOKS	<i>Virtual</i> June 2021
17. SF2A 2021 - S17: Des galaxies à la toile cosmique: baryons et matière noire CONSTRAINING BARYONIC PROCESSES IN GALAXY GROUPS WITH OBSERVATIONS OF THE THERMAL AND KINEMATIC SUNYAEV-ZELDOVICH EFFECTS	<i>Virtual</i> June 2021
16. AAS 237 Meeting THE ATACAMA COSMOLOGY TELESCOPE : GAS THERMODYNAMICS IN BOSS CMASS GALAXIES FROM THERMAL AND KINEMATIC SUNYAEV-ZEL'DOVICH MEASUREMENTS	<i>Virtual</i> January 2021
15. EAS 2020 - S2 CALIBRATING BARYONIC PROCESSES WITH THERMAL AND KINETIC SZ	<i>Virtual</i> July 2020
14. CCAT-prime Collaboration Meeting DUST IN TSZ CROSS-CORRELATIONS	<i>Virtual</i> April 2020
13. KICC 10th Anniversary Symposium BARYONIC PROCESSES FROM THERMAL AND KINETIC SZ	<i>Cambridge, UK</i> September 2019
12. Matera Oscura, cosmology and dark matter within galaxies and clusters PROBING BARYONS AND DARK MATTER WITH THERMAL AND KINETIC SZ	<i>Matera, IT</i> September 2019
11. Tracing cosmic evolution with clusters of galaxies BARYONIC PROCESSES FROM THERMAL AND KINETIC SZ	<i>Sesto, IT</i> July 2019
10. ACT f2f meeting BARYONIC PROCESSES AND THE KINETIC SZ EFFECT	<i>Princeton, NJ</i> March 2019
9. IAU XXX General Assembly, Division J: Galaxies and Cosmology STELLAR POPULATIONS OF HIGH-Z PROTOCLUSTERS FROM THE CARLA SURVEY	<i>Vienna, AT</i> August 2018
8. EWASS 2018 STELLAR POPULATIONS OF HIGH-Z PROTOCLUSTERS FROM THE CARLA SURVEY	<i>Liverpool, UK</i> April 2018
7. Elbereth: Conference of the PhD students in Astronomy & Astrophysics in Île-de-France COLORS AND MORPHOLOGIES OF GALAXIES IN CLUSTERS AND PROTO-CLUSTERS AT $z > 1.5$	<i>Paris, FR</i> November 2017
6. Joint SWG-OULE3 Euclid meeting on Galaxy Clusters CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH VELOCITY DISPERSIONS	<i>Toulouse, FR</i> October 2017
5. Atelier de l'action fédératrice "Cosmologie et structuration de l'Univers" CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH VELOCITY DISPERSIONS	<i>Paris, FR</i> October 2017
4. geco-lam2017: Galaxy Clusters Across Cosmic Time CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH CLUSTER VELOCITY DISPERSIONS	<i>Aix en Provence, FR</i> July 2017
3. CLUSTER1: A view from Italy on galaxy clusters in the 21st century PROBING CLUSTER MASS PROXIES FOR COSMOLOGY	<i>Torino, IT</i> February 2017
2. Euclid Cluster SWG Meeting CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH CLUSTER VELOCITY DISPERSIONS	<i>Trieste, IT</i> November 2016
1. Hot spots in the XMM sky: Cosmology from X-ray to Radio CALIBRATING THE GALAXY CLUSTER MASS SCALE FOR COSMOLOGY	<i>Mykonos, GR</i> June 2016

Seminars

11. Invited talk at UC Berkeley Cosmology Seminars

CONSTRAINING BARYONIC PROCESSES IN GALAXY HALOS WITH THE SZ EFFECTS

Virtual
April 2022

10. Invited talk at the Arizona State University Extragalactic Summer Talk Series

HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5

Virtual
July 2021

9. Invited talk at the Observatoire astronomique de Strasbourg

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

Virtual
April 2021

8. Invited talk at the University of KwaZulu-Natal

HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5

Virtual
February 2021

7. Invited talk at the Cosmology Lunch Seminar, University of Cambridge

HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5

Virtual
February 2021

6. Invited talk at the Yale Nuclear Particle Astrophysics (NPA) Seminar

HALO GAS THERMODYNAMICS FROM THE CMB: RESULTS FROM THE ATACAMA COSMOLOGY TELESCOPE DR5

Virtual
October 2020

5. Webinar hosted by the Simons Foundation

ASTROPHYSICAL EVOLUTION WITH tSZ AND kSZ DATA FROM ACT DR5

Virtual
September 2020

4. Cornell Galaxy Lunch Seminar

STELLAR POPULATIONS OF HIGH-Z PROTOCLUSTERS FROM THE CARLA SURVEY

Ithaca, NY
February 2018

3. IAP PhD Seminar

CALIBRATING THE GALAXY CLUSTER MASS SCALE WITH CLUSTER VELOCITY DISPERSIONS

Paris, FR
May 2017

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

THE RELATION BETWEEN MASS AND CONCENTRATION IN X-RAY GALAXY CLUSTERS AT HIGH REDSHIFT

Paris, FR
April 2016

Posters

3. Poster at EAS 2021, S3 - Galaxy clusters and AGNs

CONSTRAINING BARYONIC PROCESSES WITH OBSERVATIONS OF THE THERMAL AND KINEMATIC SUNYAEV-ZELDOVICH EFFECTS

Virtual
June 2021

2. Poster at EWASS 2018, SS13 - Galaxy clusters and groups across cosmic time

THE CLUSTER MASS AND VELOCITY BIAS FROM GALAXY DYNAMICS

Liverpool, UK
April 2018

1. Poster presentation at SF2A: Galaxies decadence: theory and observation

THE CLUSTER MASS AND VELOCITY BIAS FROM GALAXY DYNAMICS

Paris, FR
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, Nature Communications
- 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)