

UNIVERSITA' DEGLI STUDI DI MILANO

selezione pubblica per n. 1 posto di Ricercatore a tempo determinato in tenure track (RTT) per il settore concorsuale 02/C1 - Astronomia, Astrofisica, Fisica della Terra e dei Pianeti, settore scientifico-disciplinare FIS/05 - Astronomia e Astrofisica (ora gruppo scientifico-disciplinare 02/PHYS-05 - Astrofisica e cosmologia, fisica dello spazio, della terra e del clima; settore scientifico-disciplinare PHYS-05/A - Astrofisica, cosmologia e scienza dello spazio) presso il Dipartimento di Fisica "Aldo Pontremoli", (avviso bando pubblicato sulla G.U. n. 49 del 18/06/24). Codice concorso 5579

CURRICULUM VITAE

PERSONAL INFORMATION

Maria Archidiacono





EMPLOYMENT

- 2019 – present

Researcher (Fixed term - RTDA), Department of Physics, University of Milan, Italy. November 1, 2019 – end of contract: April 2, 2025
- 2022

Maternity leave (5 months)
- 2019

Postdoctoral research fellow, Department of Physics and Astronomy, University of Bologna, and INFN Bologna, Italy. March 1, 2019 – October 31, 2019
- 2015 – 2018

Postdoctoral research fellow, Institute for Theoretical Particle Physics and Cosmology, RWTH Aachen University, Germany, working with Professor Julien Lesgourgues. October 1, 2015 – September 30, 2018
- 2014 – 2015

Postdoctoral research fellow, Department of Physics and Astronomy, Aarhus University, Denmark, working with Professor Steen Hannestad. November 1, 2014 – September 30, 2015
- 2012 – 2014

Marie Curie early stage researcher, Initial Training Network “Invisibles”, Department of Physics and Astronomy, Aarhus University, Denmark, working with Professor Steen Hannestad. November 1, 2012 – October 31, 2014

EDUCATION

- 2013

Ph.D. in Astronomy, Defending the thesis “Constraints on Neutrino Physics in light of recent Cosmological Data”. January 21, 2013
- 2009 – 2012

Ph.D. student, Department of Physics, University of Rome La Sapienza, Italy. November 1, 2009 – October 30, 2012
- 2009

M.Sc. in Astronomy and Astrophysics, Defending the thesis “Cosmological constraints on neutrino mass”, 110/110 cum Laude, Department of Physics, University of Rome La Sapienza, Italy. October 30, 2009
- 2007

B.Sc. in Physics and Astrophysics, 110/110 cum Laude, Department of Physics, University of Rome La Sapienza, Italy. October 29, 2007

VISITING POSITIONS

- 2013

CERN Theory Division, Geneva, Switzerland (1 month)
- 2011

Department of Physics, Torino, Italy (6 months)
- 2010

Department of Physics and Astronomy, University of California Irvine, US (3 months)

INTERNATIONAL COLLABORATIONS

- 2012 – present Member of Euclid Consortium: Theory Science Working Group (SWG), CMB Cross-Correlation SWG, Galaxy Clustering SWG
- 2017 – present Member of Square Kilometre Array: Cosmology SWG

PROJECT LEADERSHIP

- 2020 – present Co-lead of Work Package 3 “Dark Matter and Particle Cosmology” of Euclid Theory Science Working Group
- 2020 – present Co-lead of Euclid pre-launch key paper: Euclid Collaboration: M. Archidiacono *et al.*, “Euclid preparation. Sensitivity to neutrino parameters,” [arXiv:2405.06047 [astro-ph.CO]]

GRANTS AND FELLOWSHIPS

- 2020 Marie Curie Individual Fellowship, ~ 183 k€. Declined due to incompatibility with RTDA position.
- 2020 “FELLINI” - Fellowship for Innovation at INFN, INFN Marie Skłodowska-Curie COFUND Fellowship Programme. Declined due to incompatibility with RTDA position.
- 2019 GCCL (German Centre of Cosmological Lensing) fellowship (declined)
- 2014 and 2018 Postdoctoral fellowship at Institute for Theoretical Physics, Universidad Autonoma de Madrid, Spain (declined)

PUBLICATIONS

Summary: 61 papers (29 first-author or first-co-author): 8 recent preprints, 45 peer-reviewed published articles (including 2 invited review articles), and 8 conference proceedings
 > 2826 citations (excluding self-citations)
 h-index (excluding self-citations): 28 (Inspire), 29 (Scopus)
 The full publication list is attached at the end of the document

TALKS

Summary: 30 invited talks at international conferences (excluding declined invitations, and conferences cancelled due to Covid-19), 17 invited departmental seminars and colloquia, 8 contributed talks.

Invited conference talks

- 2024 Neutrino Frontiers, Galileo Galilei Institute, Arcetri, Firenze, Italy, July 2024
- 2024 XXXI International Conference on Neutrino Physics and Astrophysics, Milano, Italy, June 2024
- 2024 15th International Neutrino Summer School 2024, Bologna, Italy, June 2024
- 2024 Neutrinos from Home (online), April 2024
- 2023 New Frontiers in Theoretical Physics - XXXVII Convegno Nazionale di Fisica Teorica, Cortona, Italy, September 2023
- 2022 International Conference PUMA 2022: Probing the Universe with Multimessenger Astrophysics, Sestri Levante, Italy, September 2022
- 2022 NuMass 2022 - Determination of the absolute electron (anti)-neutrino mass, University of Milano-Bicocca, Milano, Italy, June 2022
- 2021 Six week summer webinar series on the growth of structure over cosmic time, Theory session, July 2021
- 2021 Kick-off meeting of the “Initiative for Dark Matter in Europe and beyond” (iDMEu), CERN, Geneva, Switzerland (online due to Covid-19), May 2021
- 2020 Snowmass Sterile Neutrino Mini-Workshop, Chicago, US (online due to Covid-19), September 2020
- 2019 The Hubble constant day at UniFE, Ferrara, Italy, June 2019

- 2019 Concordances and challenges in cosmology after Planck, Sexten Center for Astrophysics, Italy, February 2019
- 2019 Euclid and beyond: the many faces of modern cosmology, Rome, Italy, February 2019
- 2018 The quest for new physics, IFIC, Valencia, Spain, December 2018
- 2018 CASTLE – Cosmological and Astrophysical Synergies: Tactics for the Latest Era, Tagliolo Monferrato, Italy, September 2018
- 2017 DESY Theory Workshop 2017, DESY, Hamburg, Germany, September 2017
- 2017 International School of Nuclear Physics, Erice, Italy, September 2017
- 2017 Self-interacting dark matter workshop, Niels Bohr Institute, Copenhagen, Denmark, August 2017
- 2017 European Physical Society Conference on High Energy Physics, Venice, Italy, July 2017
- 2017 CrossTalk Workshop: The Fate of Sterile Neutrinos, VUB, Brussel, Belgium, January 2017
- 2016 NuPhys 2016, London, UK, December 2016
- 2016 DESY Theory Workshop 2016, DESY, Hamburg, Germany, September 2016
- 2016 TeV Particle Astrophysics 2016, CERN, Geneva, Switzerland, September 2016
- 2015 Invisibles workshop 2015, Madrid, Spain, July 2015
- 2014 Invisibles workshop 2014, Paris, France, July 2014
- 2014 Astroparticle physics 2014, a joint TeVPA/IDM conference, Amsterdam, Netherlands, June 2014
- 2013 Nufact 2013, Beijing, China, August 2013
- 2013 Invisibles 2013 school, Durham, UK, July 2013
- 2012 “What is ν ?” Invisibles 2012 school, Galileo Galilei Institute, Arcetri, Firenze, Italy, June 2012
- 2012 Invisibles ITN premeeting, Madrid, Spain, March 2012

Invited departmental seminars

- 2024 Theory Seminar, University of Genova, Italy, April 2024
- 2023 SISSA Colloquium, Trieste, Italy, October 2023
- 2020 Cosmology Lunch Seminar, DAMTP, Cambridge, UK (online due to Covid-19), May 2020
- 2020 Departmental Seminar, University of Milan, Italy, January 2020
- 2019 INFN Seminar, Bologna, Italy, November 2019
- 2019 Particle and Astroparticle Theory Seminar, MPIK, Heidelberg, Germany, April 2019
- 2019 CERN Theory Colloquium, Geneva, Switzerland, January 2019
- 2019 PRISMA seminar, Johannes Gutenberg University, Mainz, Germany, January 2019
- 2018 TU Dortmund seminar, Recent Topics of Particle Theory, Germany, July 2018
- 2018 SISSA Astroparticle seminar, Trieste, Italy, May 2018
- 2016 Cosmology seminar, Helsinki University, Finland, April 2016
- 2015 HEP Theory seminar, Bielefeld University, Germany, November 2015
- 2015 HEP Theory seminar, RWTH Aachen, Germany, June 2015
- 2014 SISSA Astroparticle seminar, Trieste, Italy, April 2014
- 2013 Cosmology seminar, Institute for Theoretical Physics, Heidelberg, Germany, May 2013
- 2013 Theory seminar, DESY, Hamburg, Germany, April 2013
- 2013 Web-seminar, Invisibles Journal Club, April 2013

Contributed talks

- 2021 XIX International Workshop on Neutrino Telescope, Padova, Italy (online due to Covid-19), February 2021
- 2016 “Cosmology after Planck: what is next?”, Les Houches, France, April 2016
- 2015 Texas symposium on relativistic astrophysics, Geneva, Switzerland, December 2015

- 2015 TAUP 2015, Topics in Astroparticle and Underground Physics, Torino, Italy, September 2015
- 2013 Invisible 2013 workshop, Durham, UK (Poster presentation), July 2013
- 2013 “New Horizons for Modern Cosmology” school, Varenna, Italy, July 2013
- 2012 “Essential Cosmology for the Next Generation”, Cancun, Mexico (Poster presentation), January 2012
- 2010 Conference on elementary particles, astrophysics, and cosmology, Miami, USA, December 2010. Awarded with the Scientific Workplace and MuPAD as the best graduate student’s talk

CONFERENCE ACTIVITY

- 2024 Panelist for the discussion on “Evading cosmological constraints on neutrino properties”, Neutrinos from Home (online)
- 2022 Panelist for the round-table discussion on the future of direct neutrino-mass measurements, NuMass 2022, University of Milano-Bicocca, Milano, Italy
- 2021 Convener and Chair of the Cosmology and Particle Physics session of the 17th International Conference on Topics on Astroparticle and Underground Physics (TAUP), Valencia, Spain (online due to Covid-19)
- 2020 and 2022 Member of the Scientific Organising Committee of Advanced Euclid School: The science of future cosmological surveys, Les Houches, France, 2020 edition (online due to Covid-19) and 2022 edition
- 2017 Convener of the session “Small-scale structure beyond SIDM” of the Self-interacting dark matter workshop, Niels Bohr Institute, Copenhagen, Denmark

TEACHING EXPERIENCE

- Summary: Over 270 hours of teaching at bachelor and master level in Italy, Germany, and Denmark.
- a.y. 2022/2023, a.y. 2023/2024, Summer semester Teaching assistant, “Astronomy Lab”, B.Sc. in Physics, ~18 hours per a.y., Department of Physics, University of Milan, Italy
 - a.y. 2022/2023, a.y. 2023/2024, Winter semester Teaching assistant, “Quantum physics II”, B.Sc. in Physics, ~26 hours per a.y., Department of Physics, University of Milan, Italy
 - a.y. 2019/2020, a.y. 2020/2021 Teaching assistant, “Physics Lab with Statistical Data Analysis”, B.Sc. in Physics, ~42 hours per a.y., Department of Physics, University of Milan, Italy
 - a.y. 2020/2021 Guest lecturer, “Advanced topics in astrophysics and plasma physics-observations and theory of large-scale structure formation”, PhD in Physics, ~3 hours, Department of Physics, University of Milan, Italy
 - a.y. 2015/2016, a.y. 2016/2017, a.y. 2017/2018, Summer semester Teaching assistant, “Advanced Cosmology: The Perturbed Universe”, M.Sc. in Physics, ~20 hours per a.y., Department of Physics, RWTH Aachen University, Germany
 - a.y. 2015/2016, a.y. 2016/2017, Winter Semester Teaching assistant, “Introduction to Theoretical Physics”, B.Sc. in Physics, ~20 hours per a.y., Department of Physics, RWTH Aachen University, Germany
 - a.y. 2014/2015 Guest lecturer, “Observational Cosmology”, M.Sc. in Physics, ~4 hours, Department of Physics and Astronomy, Aarhus University, Denmark

STUDENT SUPERVISION AND MENTORING

- 2020 – present Supervisor of 7 bachelor theses, and co-supervisor of 1 master thesis, Department of Physics, University of Milan, Italy
- 2019 – 2020 Co-supervisor of 1 master thesis, Department of Physics and Astronomy, University of Bologna, Italy
- 2016 – 2018 Co-supervisor of 3 master theses and 1 bachelor thesis, Department of Physics, RWTH Aachen University, Germany

CERTIFICATIONS

- Italian accreditation as associate professor in Astrophysics and in Theoretical Physics
 Abilitazione Scientifica Nazionale (seconda fascia)
 – Settore concorsuale 02/C1: Astronomia, Astrofisica, Fisica della Terra e dei Pianeti (11/07/2018)
 – Settore concorsuale 02/A2: Fisica Teorica delle Interazioni Fondamentali (13/07/2018)

ACADEMIC SERVICE

- Referee** Journal referee for Astronomy and Astrophysics, Journal of Cosmology and Astroparticle Physics, Physical Review D, Physical Review Letters, New Astronomy, European Physical Journal C, Physics of the Dark Universe
- Editor** Member of the Editorial Board of High-Energy and Astroparticle Physics as Review Editor for Frontiers in Physics and Frontiers in Astronomy and Space Sciences
- VQR** I have contributed to the Research Quality Assessment (VQR) of the Physics Department, University of Milan, for the period 2015 – 2019 with 4 papers: 3 papers were evaluated as “excellent” (score: 27/30, 27.5/30, and 28.5/30), 1 was evaluated as “excellent and high impact” (score 29/30).

OUTREACH

- 2023 Participation to the Euclid launch event, University of Milan
- 2023 Science outreach video about the Euclid mission, released on INAF social media platforms
- 2017 Talk on Neutrinos for the science channel of periscope tv
- 2014 Collaboration with the JCAP editorial office as part of the EU ITN Invisibles secondment at SISSA MediaLab, Trieste, Italy
- 2012 – 2014 Participation in the outreach activities of the EU ITN Invisibles, including two reviews of the “Paper of the month” for the Invisibles website

MEDIA COVERAGE

- 2020 Video interview about recent work (M. Archidiacono, S. Hannestad and J. Lesgourgues, “What will it take to measure individual neutrino mass states using cosmology?,” JCAP **09** (2020), 021), appeared on Cosmology Talks (YouTube) <https://www.youtube.com/watch?v=V68GvzBrAWU>. (The interview was given by one of the co-authors.)

COMPUTER SKILLS

- Software development** Contributor to Monte Python (https://github.com/brinckmann/montepython_public/tree/3.5) and to CLASS (the Cosmic Linear Anisotropy Solving System, https://lesgourg.github.io/class_public/class.html)

- Software** Experienced user of CAMB, CosmoMC, GetDist

- Programming Languages** Python, C, Fortran, Matlab

PROFESSIONAL MEMBERSHIPS

- 2012 – present Marie Curie Alumni

LANGUAGES

- Italian** Mother tongue

- English** Proficient

RESEARCH EXPERIENCE

My research activity lies at the intersection of cosmology and particle physics. The precision of forthcoming surveys will pave the way for probing particle physics through cosmological observations. However, the increasing accuracy of data will necessitate advancements in the methodology of cosmological analysis. My main research lines are:

Impact of Massive Neutrinos on Cosmological Observables: I investigate how massive neutrinos affect various cosmological observables. This includes examining their influence on the cosmic microwave background (CMB) and large-scale structure (LSS) [1].

The possibility to detect the neutrino mass with cosmology raised the question whether future cosmological data might also be sensitive to the neutrino mass hierarchy. In [2] we demonstrated that applying the normal/inverted hierarchy rather than equally distributing the total mass among the neutrino mass eigenstates has a negligible ($< 1\%$) impact on cosmological observables, indicating that the hierarchy question will likely be answered by ground-based experiments such as JUNO.

Theoretical Scenarios Beyond the Standard Models: I develop and explore theoretical frameworks that extend beyond the Standard Model of particle physics and the Lambda Cold Dark Matter (Λ CDM) model of cosmology. These scenarios aim to address unresolved questions in both fields, and can be tested using cosmological data.

One example involves eV sterile neutrinos, which are suggested by neutrino oscillation anomalies, but are incompatible with current cosmological data [3]. In [4], we proposed a model reconciling laboratory results with cosmological observations through neutrino non-standard interactions. This model, tested against the most recent CMB data and neutrino oscillation experiments, also addresses the Hubble constant discrepancy [5, 6, 7, 8].

Another focus of my research is on alternative dark matter candidates beyond the cold and collisionless paradigm. While cold dark matter has been successful in explaining gravitational effects on cosmological observables, its fundamental nature remains elusive despite extensive experimental searches. This situation motivates the study of theoretical scenarios involving a more complex dark matter sector. Dark matter interacting with dark radiation can alleviate the existing cosmological tensions while providing a good fit of CMB, Baryonic Acoustic Oscillations (BAO), and Lyman-alpha data [9, 10]. Current constraints can be further improved with future LSS data from Euclid [11]. In models featuring a dark sector where dark matter self-interacts via a light scalar mediator, constraints derived from CMB and BAO data indicate that the induced dark fifth force is less than 1% of Newtonian gravity [12]. In this framework, the scalar mediator can also account for the dark energy of the Universe.

Pipeline Development for Testing Theoretical Models: I am involved in building an accurate and robust pipeline to test the impact of neutrinos and alternative theoretical scenarios with future cosmological data. This includes refining statistical methods and computational tools to enhance the precision and reliability of cosmological analyses. Since 2016, I have been contributing to the development of the Markov Chain Monte Carlo (MCMC) code `Monte Python` (https://github.com/brinckmann/montepython_public/tree/3.5) and the Boltzmann solver `CLASS` (the Cosmic Linear Anisotropy Solving System, https://lesgourg.github.io/class_public/class.html), in collaboration with Julien Lesgourgues.

Euclid: Within the Euclid Consortium, I led the project forecasting the sensitivity to neutrino parameters [13]. Euclid aims to deliver the first detection of a non-zero neutrino mass. My expertise in neutrino cosmology positions me as a key contributor to this endeavour, where I will play a crucial role in exploiting Euclid data to achieve this groundbreaking result.

References

- [1] Maria Archidiacono, Thejs Brinckmann, Julien Lesgourgues, and Vivian Poulin. “Physical effects involved in the measurements of neutrino masses with future cosmological data”. In: *JCAP* 1702.02 (2017), p. 052. DOI: 10.1088/1475-7516/2017/02/052. arXiv: 1610.09852 [astro-ph.CO].
- [2] Maria Archidiacono, Steen Hannestad, and Julien Lesgourgues. “What will it take to measure individual neutrino mass states using cosmology?” In: *JCAP* 09 (2020), p. 021. DOI: 10.1088/1475-7516/2020/09/021. arXiv: 2003.03354 [astro-ph.CO].
- [3] Maria Archidiacono and Stefano Gariazzo. “Two Sides of the Same Coin: Sterile Neutrinos and Dark Radiation, Status and Perspectives”. In: *Universe* 8.3 (2022), p. 175. DOI: 10.3390/universe8030175. arXiv: 2201.10319 [hep-ph].
- [4] Maria Archidiacono, Steen Hannestad, Rasmus Sloth Hansen, and Thomas Tram. “Cosmology with self-interacting sterile neutrinos and dark matter - A pseudoscalar model”. In: *Phys. Rev. D* 91.6 (2015), p. 065021. DOI: 10.1103/PhysRevD.91.065021. arXiv: 1404.5915 [astro-ph.CO].
- [5] Mattia Atzori Corona, Riccardo Murgia, Matteo Cadeddu, Maria Archidiacono, Stefano Gariazzo, Carlo Giunti, and Steen Hannestad. “Pseudoscalar sterile neutrino self-interactions in light of Planck, SPT and ACT data”. In: *JCAP* 06.06 (2022), p. 010. DOI: 10.1088/1475-7516/2022/06/010. arXiv: 2112.00037 [astro-ph.CO].
- [6] Maria Archidiacono, Stefano Gariazzo, Carlo Giunti, Steen Hannestad, and Thomas Tram. “Sterile neutrino self-interactions: H_0 tension and short-baseline anomalies”. In: *JCAP* 12 (2020), p. 029. DOI: 10.1088/1475-7516/2020/12/029. arXiv: 2006.12885 [astro-ph.CO].
- [7] Maria Archidiacono, Stefano Gariazzo, Carlo Giunti, Steen Hannestad, Rasmus Hansen, Marco Laveder, and Thomas Tram. “Pseudoscalar-sterile neutrino interactions: reconciling the cosmos with neutrino oscillations”. In: *JCAP* 1608.08 (2016), p. 067. DOI: 10.1088/1475-7516/2016/08/067. arXiv: 1606.07673 [astro-ph.CO].
- [8] Maria Archidiacono, Steen Hannestad, Rasmus Sloth Hansen, and Thomas Tram. “Sterile neutrinos with pseudoscalar self-interactions and cosmology”. In: *Phys. Rev. D* 93.4 (2016), p. 045004. DOI: 10.1103/PhysRevD.93.045004. arXiv: 1508.02504 [astro-ph.CO].
- [9] Maria Archidiacono, Deanna C. Hooper, Riccardo Murgia, Sebastian Bohr, Julien Lesgourgues, and Matteo Viel. “Constraining Dark Matter-Dark Radiation interactions with CMB, BAO, and Lyman- α ”. In: *JCAP* 10 (2019), p. 055. DOI: 10.1088/1475-7516/2019/10/055. arXiv: 1907.01496 [astro-ph.CO].
- [10] Deanna C. Hooper, Nils Schöneberg, Riccardo Murgia, Maria Archidiacono, Julien Lesgourgues, and Matteo Viel. “One likelihood to bind them all: Lyman- α constraints on non-standard dark matter”. In: *JCAP* 10 (2022), p. 032. DOI: 10.1088/1475-7516/2022/10/032. arXiv: 2206.08188 [astro-ph.CO].
- [11] J. Lesgourgues et al. “Euclid preparation. Sensitivity to non-standard particle dark matter model”. In: (June 2024). arXiv: 2406.18274 [astro-ph.CO].
- [12] Maria Archidiacono, Emanuele Castorina, Diego Redigolo, and Ennio Salvioni. “Unveiling dark fifth forces with linear cosmology”. In: *JCAP* 10 (2022), p. 074. DOI: 10.1088/1475-7516/2022/10/074. arXiv: 2204.08484 [astro-ph.CO].
- [13] M. Archidiacono et al. “Euclid preparation. Sensitivity to neutrino parameters”. In: (May 2024). arXiv: 2405.06047 [astro-ph.CO].

Publication list

Recent preprints

1. Euclid Collaboration: J. Lesgourgues *et al.*, “Euclid preparation. Sensitivity to non-standard particle dark matter model,” [arXiv:2406.18274 [astro-ph.CO]].
2. Euclid Collaboration: F. Hormuth *et al.*, “Euclid. IV. The NISP Calibration Unit,” [arXiv:2405.13494 [astro-ph.IM]].
3. Euclid Collaboration: K. Jahnke *et al.*, “Euclid. III. The NISP Instrument,” [arXiv:2405.13493 [astro-ph.IM]].
4. Euclid Collaboration: M. Cropper *et al.*, “Euclid. II. The VIS Instrument,” [arXiv:2405.13492 [astro-ph.IM]].
5. Euclid Collaboration: F. J. Castander *et al.*, “Euclid. V. The Flagship galaxy mock catalogue: a comprehensive simulation for the Euclid mission,” [arXiv:2405.13495 [astro-ph.CO]].
6. Euclid Collaboration: Y. Mellier *et al.*, “Euclid. I. Overview of the Euclid mission,” [arXiv:2405.13491 [astro-ph.CO]].
7. Euclid Collaboration: M. Archidiacono *et al.*, “Euclid preparation. Sensitivity to neutrino parameters,” [arXiv:2405.06047 [astro-ph.CO]].
8. Euclid Collaboration: S. Casas *et al.*, “Euclid: Constraints on $f(R)$ cosmologies from the spectroscopic and photometric primary probes,” [arXiv:2306.11053 [astro-ph.CO]].

Peer-reviewed published articles

1. Euclid Collaboration: S. Casas *et al.*, “Euclid: Validation of the MontePython forecasting tools,” *Astron. Astrophys.* **682** (2024), A90 doi:10.1051/0004-6361/202346772 [arXiv:2303.09451 [astro-ph.CO]].
2. D. C. Hooper, N. Schöneberg, R. Murgia, M. Archidiacono, J. Lesgourgues and M. Viel, “One likelihood to bind them all: Lyman- α constraints on non-standard dark matter,” *JCAP* **10** (2022), 032 doi:10.1088/1475-7516/2022/10/032 [arXiv:2206.08188 [astro-ph.CO]].
3. M. Archidiacono, E. Castorina, D. Redigolo and E. Salvioni, “Unveiling dark fifth forces with linear cosmology,” *JCAP* **10** (2022), 074 doi:10.1088/1475-7516/2022/10/074 [arXiv:2204.08484 [astro-ph.CO]].
4. M. A. Corona, R. Murgia, M. Cadeddu, M. Archidiacono, S. Gariazzo, C. Giunti and S. Hannestad, “Pseudoscalar sterile neutrino self-interactions in light of Planck, SPT and ACT data,” *JCAP* **06** (2022) no.06, 010 doi:10.1088/1475-7516/2022/06/010 [arXiv:2112.00037 [astro-ph.CO]].
5. Euclid Collaboration: S. Ilić *et al.*, “Euclid preparation. XV. Forecasting cosmological constraints for the Euclid and CMB joint analysis,” *Astron. Astrophys.* **657** (2022), A91 doi:10.1051/0004-6361/202141556 [arXiv:2106.08346 [astro-ph.CO]].
6. G. Parimbelli, G. Scelfo, S. K. Giri, A. Schneider, M. Archidiacono, S. Camera and M. Viel, “Mixed dark matter: matter power spectrum and halo mass function,” *JCAP* **12** (2021) no.12, 044 doi:10.1088/1475-7516/2021/12/044 [arXiv:2106.04588 [astro-ph.CO]].
7. Euclid Collaboration: M. Martinelli *et al.*, “Euclid: Impact of non-linear and baryonic feedback prescriptions on cosmological parameter estimation from weak lensing cosmic shear,” *Astron. Astrophys.* **649** (2021), A100 doi:10.1051/0004-6361/202039835 [arXiv:2010.12382 [astro-ph.CO]].
8. M. Archidiacono, S. Gariazzo, C. Giunti, S. Hannestad and T. Tram, “Sterile neutrino self-interactions: H_0 tension and short-baseline anomalies,” *JCAP* **12** (2020), 029 doi:10.1088/1475-7516/2020/12/029 [arXiv:2006.12885 [astro-ph.CO]].
9. M. Archidiacono, S. Hannestad and J. Lesgourgues, “What will it take to measure individual neutrino mass states using cosmology?,” *JCAP* **09** (2020), 021 doi:10.1088/1475-7516/2020/09/021 [arXiv:2003.03354 [astro-ph.CO]].
10. H. Khoramanezhad, M. Viel, C. Baccigalupi and M. Archidiacono, “Constraints on the Spacetime Dynamics of an Early Dark Energy Component,” *JCAP* **07** (2020), 039 doi:10.1088/1475-7516/2020/07/039 [arXiv:2001.10252 [astro-ph.CO]].
11. M. Archidiacono, D. C. Hooper, R. Murgia, S. Bohr, J. Lesgourgues and M. Viel, “Constraining Dark Matter-Dark Radiation interactions with CMB, BAO, and Lyman- α ,” *JCAP* **10** (2019), 055 doi:10.1088/1475-7516/2019/10/055 [arXiv:1907.01496 [astro-ph.CO]].
12. A. Spurio Mancini, F. Köhlinger, B. Joachimi, V. Pettorino, B. M. Schäfer, R. Reischke, E. van Uitert, S. Brieden, M. Archidiacono and J. Lesgourgues, “KiDS + GAMA: constraints on horndeski gravity from combined large-scale structure probes,” *Mon. Not. Roy. Astron. Soc.* **490** (2019) no.2, 2155-2177 doi:10.1093/mnras/stz2581 [arXiv:1901.03686 [astro-ph.CO]].

13. C. Fidler, N. Sujata and M. Archidiacono, “Relativistic bias in neutrino cosmologies,” JCAP **06** (2019), 035 doi:10.1088/1475-7516/2019/06/035 [arXiv:1812.09266 [astro-ph.CO]].
14. H. Hildebrandt, F. Köhlinger, J. L. van den Busch, B. Joachimi, C. Heymans, A. Kannawadi, A. H. Wright, M. Asgari, C. Blake and H. Hoekstra, *et al.* “KiDS+VIKING-450: Cosmic shear tomography with optical and infrared data,” Astron. Astrophys. **633** (2020), A69 doi:10.1051/0004-6361/201834878 [arXiv:1812.06076 [astro-ph.CO]].
15. S. Vagnozzi, T. Brinckmann, M. Archidiacono, K. Freese, M. Gerbino, J. Lesgourgues and T. Sprenger, “Bias due to neutrinos must not uncorrect’d go,” JCAP **09** (2018), 001 doi:10.1088/1475-7516/2018/09/001 [arXiv:1807.04672 [astro-ph.CO]].
16. T. Brinckmann, D. C. Hooper, M. Archidiacono, J. Lesgourgues and T. Sprenger, “The promising future of a robust cosmological neutrino mass measurement,” JCAP **01** (2019), 059 doi:10.1088/1475-7516/2019/01/059 [arXiv:1808.05955 [astro-ph.CO]].
17. T. Sprenger, M. Archidiacono, T. Brinckmann, S. Clesse and J. Lesgourgues, “Cosmology in the era of Euclid and the Square Kilometre Array,” JCAP **02** (2019), 047 doi:10.1088/1475-7516/2019/02/047 [arXiv:1801.08331 [astro-ph.CO]].
18. S. Gariazzo, M. Archidiacono, P. F. de Salas, O. Mena, C. A. Ternes and M. Tórtola, “Neutrino masses and their ordering: Global Data, Priors and Models,” JCAP **03** (2018), 011 doi:10.1088/1475-7516/2018/03/011 [arXiv:1801.04946 [hep-ph]].
19. M. Archidiacono, S. Bohr, S. Hannestad, J. H. Jørgensen and J. Lesgourgues, “Linear scale bounds on dark matter–dark radiation interactions and connection with the small scale crisis of cold dark matter,” JCAP **11** (2017), 010 doi:10.1088/1475-7516/2017/11/010 [arXiv:1706.06870 [astro-ph.CO]].
20. M. Archidiacono, T. Brinckmann, J. Lesgourgues and V. Poulin, “Physical effects involved in the measurements of neutrino masses with future cosmological data,” JCAP **02** (2017), 052 doi:10.1088/1475-7516/2017/02/052 [arXiv:1610.09852 [astro-ph.CO]].
21. M. Archidiacono, S. Gariazzo, C. Giunti, S. Hannestad, R. Hansen, M. Laveder and T. Tram, “Pseudoscalar—sterile neutrino interactions: reconciling the cosmos with neutrino oscillations,” JCAP **08** (2016), 067 doi:10.1088/1475-7516/2016/08/067 [arXiv:1606.07673 [astro-ph.CO]].
22. M. Drewes, T. Lasserre, A. Merle, S. Mertens, R. Adhikari, M. Agostini, N. A. Ky, T. Araki, M. Archidiacono and M. Bahr, *et al.* “A White Paper on keV Sterile Neutrino Dark Matter,” JCAP **01** (2017), 025 doi:10.1088/1475-7516/2017/01/025 [arXiv:1602.04816 [hep-ph]].
23. M. Archidiacono and S. Hannestad, “Efficient calculation of cosmological neutrino clustering in the non-linear regime,” JCAP **06** (2016), 018 doi:10.1088/1475-7516/2016/06/018 [arXiv:1510.02907 [astro-ph.CO]].
24. M. Archidiacono, S. Hannestad, R. S. Hansen and T. Tram, “Sterile neutrinos with pseudoscalar self-interactions and cosmology,” Phys. Rev. D **93** (2016) no.4, 045004 doi:10.1103/PhysRevD.93.045004 [arXiv:1508.02504 [astro-ph.CO]].
25. M. Archidiacono, T. Basse, J. Hamann, S. Hannestad, G. Raffelt and Y. Y. Y. Wong, “Future cosmological sensitivity for hot dark matter axions,” JCAP **05** (2015), 050 doi:10.1088/1475-7516/2015/05/050 [arXiv:1502.03325 [astro-ph.CO]].
26. M. Archidiacono, L. Lopez-Honorez and O. Mena, “Current constraints on early and stressed dark energy models and future 21 cm perspectives,” Phys. Rev. D **90** (2014) no.12, 123016 doi:10.1103/PhysRevD.90.123016 [arXiv:1409.1802 [astro-ph.CO]].
27. M. Archidiacono, S. Hannestad, R. S. Hansen and T. Tram, “Cosmology with self-interacting sterile neutrinos and dark matter - A pseudoscalar model,” Phys. Rev. D **91** (2015) no.6, 065021 doi:10.1103/PhysRevD.91.065021 [arXiv:1404.5915 [astro-ph.CO]].
28. M. Archidiacono, N. Fornengo, S. Gariazzo, C. Giunti, S. Hannestad and M. Laveder, “Light sterile neutrinos after BICEP-2,” JCAP **06** (2014), 031 doi:10.1088/1475-7516/2014/06/031 [arXiv:1404.1794 [astro-ph.CO]].
29. M. Archidiacono and S. Hannestad, “Updated constraints on non-standard neutrino interactions from Planck,” JCAP **07** (2014), 046 doi:10.1088/1475-7516/2014/07/046 [arXiv:1311.3873 [astro-ph.CO]].
30. M. Archidiacono, S. Hannestad, A. Mirizzi, G. Raffelt and Y. Y. Y. Wong, “Axion hot dark matter bounds after Planck,” JCAP **10** (2013), 020 doi:10.1088/1475-7516/2013/10/020 [arXiv:1307.0615 [astro-ph.CO]].
31. M. Archidiacono, E. Giusarma, A. Melchiorri and O. Mena, “Neutrino and dark radiation properties in light of recent CMB observations,” Phys. Rev. D **87** (2013) no.10, 103519 doi:10.1103/PhysRevD.87.103519 [arXiv:1303.0143 [astro-ph.CO]].
32. M. Archidiacono, N. Fornengo, C. Giunti, S. Hannestad and A. Melchiorri, “Sterile neutrinos: Cosmology versus short-baseline experiments,” Phys. Rev. D **87** (2013) no.12, 125034 doi:10.1103/PhysRevD.87.125034 [arXiv:1302.6720 [astro-ph.CO]].
33. R. Diamanti, E. Giusarma, O. Mena, M. Archidiacono and A. Melchiorri, “Dark Radiation and interacting scenarios,” Phys. Rev. D **87** (2013) no.6, 063509 doi:10.1103/PhysRevD.87.063509 [arXiv:1212.6007 [astro-ph.CO]].

34. M. Archidiacono, N. Fornengo, C. Giunti and A. Melchiorri, "Testing 3+1 and 3+2 neutrino mass models with cosmology and short baseline experiments," *Phys. Rev. D* **86** (2012), 065028 doi:10.1103/PhysRevD.86.065028 [arXiv:1207.6515 [astro-ph.CO]].
35. M. Archidiacono, E. Giusarma, A. Melchiorri and O. Mena, "Dark Radiation in extended cosmological scenarios," *Phys. Rev. D* **86** (2012), 043509 doi:10.1103/PhysRevD.86.043509 [arXiv:1206.0109 [astro-ph.CO]].
36. E. Calabrese, M. Archidiacono, A. Melchiorri and B. Ratra, "The impact of a new median statistics H_0 prior on the evidence for dark radiation," *Phys. Rev. D* **86** (2012), 043520 doi:10.1103/PhysRevD.86.043520 [arXiv:1205.6753 [astro-ph.CO]].
37. E. Menegoni, M. Archidiacono, E. Calabrese, S. Galli, C. J. A. P. Martins and A. Melchiorri, "The Fine Structure Constant and the CMB Damping Scale," *Phys. Rev. D* **85** (2012), 107301 doi:10.1103/PhysRevD.85.107301 [arXiv:1202.1476 [astro-ph.CO]].
38. A. Smith, M. Archidiacono, A. Cooray, F. De Bernardis, A. Melchiorri and J. Smidt, "The Impact of Assuming Flatness in the Determination of Neutrino Properties from Cosmological Data," *Phys. Rev. D* **85** (2012), 123521 doi:10.1103/PhysRevD.85.123521 [arXiv:1112.3006 [astro-ph.CO]].
39. E. Giusarma, M. Archidiacono, R. de Putter, A. Melchiorri and O. Mena, "Sterile neutrino models and nonminimal cosmologies," *Phys. Rev. D* **85** (2012), 083522 doi:10.1103/PhysRevD.85.083522 [arXiv:1112.4661 [astro-ph.CO]].
40. M. Archidiacono, E. Calabrese and A. Melchiorri, "The Case for Dark Radiation," *Phys. Rev. D* **84** (2011), 123008 doi:10.1103/PhysRevD.84.123008 [arXiv:1109.2767 [astro-ph.CO]].
41. M. Archidiacono, F. De Bernardis, A. Cooray, A. Melchiorri, A. Amblard, L. Pagano and P. Serra, "Amplitudes of thermal and kinetic Sunyaev-Zel'dovich signals from small-scale CMB anisotropies," *Phys. Rev. D* **85** (2012), 043015 doi:10.1103/PhysRevD.85.043015 [arXiv:1103.3051 [astro-ph.CO]].
42. E. Giusarma, M. Corsi, M. Archidiacono, R. de Putter, A. Melchiorri, O. Mena and S. Pandolfi, "Constraints on massive sterile neutrino species from current and future cosmological data," *Phys. Rev. D* **83** (2011), 115023 doi:10.1103/PhysRevD.83.115023 [arXiv:1102.4774 [astro-ph.CO]].
43. M. Archidiacono, A. Cooray, A. Melchiorri and S. Pandolfi, "CMB Neutrino Mass Bounds and Reionization," *Phys. Rev. D* **82** (2010), 087302 doi:10.1103/PhysRevD.82.087302 [arXiv:1010.5757 [astro-ph.CO]].

Invited review articles

1. M. Archidiacono and S. Gariazzo, "Two Sides of the Same Coin: Sterile Neutrinos and Dark Radiation, Status and Perspectives," *Universe* **8** (2022) no.3, 175 doi:10.3390/universe8030175 [arXiv:2201.10319 [hep-ph]].
2. M. Archidiacono, E. Giusarma, S. Hannestad and O. Mena, "Cosmic dark radiation and neutrinos," *Adv. High Energy Phys.* **2013** (2013), 191047 doi:10.1155/2013/191047 [arXiv:1307.0637 [astro-ph.CO]].

Conference proceedings

1. M. Archidiacono, T. Brinckmann, J. Lesgourgues and V. Poulin, "Neutrino properties from cosmology," [arXiv:1705.00496 [astro-ph.CO]].
2. R. S. L. Lundkvist, M. Archidiacono, S. Hannestad and T. Tram, "How to make the short baseline sterile neutrino compatible with cosmology," *PoS ICHEP2016* (2016), 478 doi:10.22323/1.282.0478
3. M. Archidiacono, S. Hannestad, R. S. Hansen and T. Tram, "Secret neutrino interactions: a pseudoscalar model," *J. Phys. Conf. Ser.* **718** (2016) no.3, 032002 doi:10.1088/1742-6596/718/3/032002
4. A. Melchiorri, M. Archidiacono, E. Calabrese and E. Menegoni, "Constraints on neutrino physics from cosmology," *J. Phys. Conf. Ser.* **485** (2014), 012014 doi:10.1088/1742-6596/485/1/012014
5. M. Archidiacono, "Constraints on sterile neutrinos from the latest cosmological data," *Proc. Int. Sch. Phys. Fermi* **186** (2014), 237-242 doi:10.3254/978-1-61499-476-3-237
6. E. Menegoni, S. Galli, M. Archidiacono, E. Calabrese and A. Melchiorri, "Cosmological constraints on variations of the fine structure constant at the epoch of recombination," *J. Phys. Conf. Ser.* **470** (2013), 012007 doi:10.1088/1742-6596/470/1/012007
7. A. Melchiorri, M. Archidiacono and E. Calabrese, "New Constraints on Neutrino Physics from Cosmology," *Nucl. Phys. B Proc. Suppl.* **237-238** (2013), 13-18 doi:10.1016/j.nuclphysbps.2013.04.046
8. M. Archidiacono, A. Melchiorri and S. Pandolfi, "The impact of reionization modelling on CMB neutrino mass bounds," *Nucl. Phys. B Proc. Suppl.* **217** (2011), 65-67 doi:10.1016/j.nuclphysbps.2011.04.070