

Deanna Charlotte Hooper

CURRICULUM VITAE

Academic Positions

- Oct 2021 – Ongoing** **Postdoctoral Researcher**, Helsinki Institute of Physics, University of Helsinki, Finland
- Oct 2019 – Sep 2021** **Postdoctoral Researcher**, Service de Physique Théorique, Université Libre de Bruxelles, Belgium

Education and Qualifications

- 2016 – 2019** **Ph.D.** in Physics, specialising in Cosmology, at RWTH Aachen, Germany
Supervised by Julien Lesgourgues, Defended September 2019, *magna cum laude*
Topic: *Extended Cosmological Probes of Massive Dark Relics*
- 2014 – 2016** Master of Science (**M.Sc.**): Astroparticle Physics and Cosmology,
RWTH Aachen, Germany. *Final Grade 1.3 (With Honours)*
- 2009 – 2014** Bachelor in Physics (**B.Sc.**), specialisation in Fundamental Physics
Universitat Autònoma Barcelona, Spain, and Universität Wien, Austria (Exchange)

Non-academic Working Experience

- June 2015 – Oct 2015** Cosmology Internship, TTK Institute, RWTH Aachen University
Task: *creating the manual for the Boltzmann code CLASS with doxygen*
- Sep 2011 – July 2013** English Teacher for young children, Kids & Us, Sabadell, Spain

Scientific Contributions

- Co-developer of** CLASS, MONTEPYTHON
- Collaborations** CORE, Planck, LISA
- Referee for** JCAP, Nature Astronomy, PRD

Relevant Skills

- Languages** English (Native), Catalan (Native), Spanish (Proficiency),
German (B2)
- Programming** C/C++, Python, Mathematica, git, LaTeX, doxygen, Unix

Organisational Experience

- 2019** • **Conference:** “COSMO’19”, Aachen, September 2nd - 6th
Local Organising Committee
- 2018** • **School:** “CosmoTools 2018”, Aachen, April 23rd - 28th
Scientific Committee and Local Organising Committee
- 2016 – 2019** • Weekly TTK Cosmology Journal Club

Lecturing and Tutoring

- 2020
 - **Tutor:** CLASS tutorial at “TOOLS 2020”, Lyon, November 2nd - 6th ([online](#))
- 2018 – 2019
 - **Tutor:** General Relativity and Cosmology, 15-week Master’s Course
- 2018
 - **Lecturer:** CLASS lectures and tutorials at “MONTEPYTHON + CLASS Workshop 2018”, Kavli Institute for Cosmology, Cambridge, September 11th - 13th
 - **Tutor:** Perturbed Universe (Advanced Cosmology), 15-week Master’s Course
- 2017 – 2018
 - **Tutor:** General Relativity and Cosmology, 15-week Master’s Course
- 2017
 - **Tutor:** Intro to Theoretical Physics 1 (Classical Mechanics), Undergrad Course

Supervision

- 2018 – 2019
 - **Co-supervisor Master Thesis:** S. Heimersheim, *Cosmological constraints on Cannibal Dark Matter*
 - **Co-supervisor Master Thesis:** M. Lucca, *Spectral distortions of the CMB*
 - **Co-supervisor Master Thesis:** D. Meinert, *Treating Reionisation with the Boltzmann solver CLASS*
 - **Co-supervisor Master Thesis:** A. Struocken, *Developing a smartphone application for cosmology outreach*
- 2018
 - **Co-supervisor Bachelor Thesis:** G. Samaras, *Designing a graphical interface for CMB physics*
 - **Co-supervisor Bachelor Thesis:** M. Syed, *21cm observations and dark matter*

Science Outreach

- 2015 – Ongoing
 - **Livestreams:** Host and founder of [Cup of Cosmology](#), a weekly livestreamed cosmology show, with over 150 talks
- 2021
 - **Livestream:** Organiser and host of Dark Matter Day panel discussion and Q&A
- 2020
 - **Smartphone Game:** Advisor for DarkMaster, available on iOS and Android
- 2016 – 2019
 - **Livestreams:** Host and organiser of weekly institute-wide theoretical physics Q&As on Periscope for the TTK Institute, RWTH Aachen University
- 2017
 - **Outreach Talk:** Presenter at the NEMO Science Museum, Amsterdam, for the MuseumNight 2017
 - **Science Slam:** FameLab Germany contestant ([video available](#))
- 2011 – 2013
 - **Popular Astronomy:** co-founder of University Astronomy Group “*Societat Astronòmica UAB*”, and organiser of public observations, lectures, and seminars

Seminars and Talks

- 2021
 - **YouTube Dark Chatter Series**, December 3rd ([video available](#))
Hints of dark matter - neutrino interactions in Lyman- α data
 - **ICG Cosmology Seminar**, Portsmouth, UK, December 1st ([online](#))
Lyman- α data as a probe of dark matter interactions

- 2021 (cont)**
- **Newcastle University**, Newcastle, UK, November 22nd (*online*)
Hints of dark matter - neutrino interactions in Lyman- α data
 - **Helsinki Institute of Physics**, Helsinki, Finland, April 21st (*online*)
Cracks in the CDM paradigm: NCDM as a way forward
 - **Stony Brook University**, Stony Brook, USA, April 19th (*online*)
Cracks in the CDM paradigm: NCDM as a way forward
- 2020**
- **Vrije Universiteit Brussel**, Brussels, Belgium, June 30th (*online*)
H₀ Tension: Cracks in Standard Cosmology?
 - **BCTP Theory Seminar**, Bonn, Germany, May 18th (*online*)
Cracks in the CDM Paradigm: NCDM as a Way Forward
 - **YouTube Cosmology Talks Series**, April 9th ([video available](#))
CMB spectral distortions are a prime untapped resource
- 2019**
- **Université Libre de Bruxelles**, Brussels, Belgium, February 14th
Constraining Dark Matter Interactions with Lyman-alpha Data
- 2018**
- **Princeton University**, Princeton, USA, November 29th
Constraining DM - DR Interactions with Lyman-alpha Data
 - **Johns Hopkins University**, Baltimore, USA, November 28th
Constraining Dark Matter Interactions with Lyman-alpha Data
 - **Fermilab**, Chicago, USA, November 26th
Constraining Dark Matter Interactions with Lyman-alpha Data
 - **McGill University**, Montreal, Canada, November 21st
Constraining Dark Matter Interactions with Lyman-alpha Data
 - **Boston University**, Boston, USA, November 15th
Constraining Dark Matter Interactions with Lyman-alpha Data
 - **Harvard University**, Boston, USA, November 13th
Constraining Dark Matter Interactions with Lyman-alpha Data
 - **CCP NYU & CCA**, New York, USA, November 9th
Constraining DM - DR Interactions with Lyman-alpha Data
 - **Columbia University**, New York, USA, November 8th
Constraining DM - DR Interactions with Lyman-alpha Data

Contributed Conferences, Schools, and Workshops

- 2021**
- **Conference**: “Cosmology from Home 2021”, July 5th - 16th (*online*)
Plenary Talk: *CMB probes of the early universe*
 - **Workshop**: “XIVth International Workshop on the Interconnection between Particle Physics and Cosmology, PPC2021”, Oklahoma, May 17th - 22nd (*online*)
Contributed Talk: *Cosmological constraints on multi-interacting dark matter*
- 2020**
- **Conference**: “Progress on Old and New Themes in cosmology, PONT 2020”, Avignon, December 7th - 10th (*online*)
Contributed Talk: *Cosmological constraints on multi-interacting dark matter*

- 2020 (cont)**
- **Workshop:** “Less Travelled Path of Dark Matter, LTPDM2020”, Bengaluru, November 9th - 13th (*online*)
Contributed Talk: *Non-cold dark matter from PBH evaporation*
 - **Workshop:** “TOOLS 2020”, Lyon, November 2nd - 6th (*online*)
Contributed Talk: *Multi-interacting dark matter in the Boltzmann code CLASS*
 - **Workshop:** “News from the Dark, NftD20”, Strasbourg, June 8th - 10th (*online*)
Invited Talk: *CMB constraints on Dark Matter*
- 2019**
- **Conference:** “IRN Terascale@Bruxelles”, Brussels, October 16th - 18th
Invited Talk: *Constraining DM - DR Interactions with Lyman-alpha Data*
 - **Conference:** “COSMO’19”, Aachen, September 2nd - 6th
Contributed Talk: *Constraining DM - DR Interactions with Lyman-alpha Data*
- 2018**
- **Workshop:** “XIIth International Workshop on the Interconnection between Particle Physics and Cosmology, PPC2018”, Zurich, August 20th - 24th
Poster: *Are DM - Dark Radiation Interactions Allowed by Lyman-alpha Data?*
 - **Workshop:** “14th International Workshop on the Dark Side of the Universe, DSU18”, Annecy, June 25th - 29th
Contributed Talk: *Are Dark Matter Interactions Allowed by Cosmological Data?*
- 2017**
- **School:** 11th TRR33 Winter School in Cosmology, “Theory for Observers & Observations for Theorists”, Passo del Tonale, December 10th - 16th
Poster: *Numerically Tackling Axion Monodromy Inflation*
 - **Conference:** “Fundamental physics in the cosmos: The early, the large, and the dark Universe”, Hamburg, September 26th - 29th
Contributed Talk: *Dealing with Axion Monodromy Inflation*
 - **School:** “The 2nd IFT School on Cosmology Tools”, Madrid, March 12th - 19th
Co-tutoring: *Assisted Miguel Zumalacarregui with tutoring for CLASS sessions*

Publications

Papers marked with a dagger † indicate first author or equivalent contribution.

Papers marked with an asterisk * are signed alphabetically.

- < 10 authors**
- * Q. Decant, J. Heisig, **D. C. Hooper**, L. Lopez-Honorez, *Lyman- α constraints on freeze-in and superWIMPs*, arXiv: [2111.09321](https://arxiv.org/abs/2111.09321)
 - * **D. C. Hooper**, M. Lucca, *Hints of dark matter-neutrino interactions in Lyman- α data*, arXiv: [2110.04024](https://arxiv.org/abs/2110.04024)
 - N. Schoeneberg, M. Lucca, **D. C. Hooper**, *Constraining the inflationary potential with spectral distortions*, **JCAP 03 (2021) 036**, arXiv: [2010.07814](https://arxiv.org/abs/2010.07814)
 - * N. Becker, **D. C. Hooper**, F. Kahlhoefer, J. Lesgourgues, N. Schoeneberg, *Cosmological constraints on multi-interacting dark matter*, **JCAP 02 (2021) 019**, arXiv: [2010.04074](https://arxiv.org/abs/2010.04074)
 - S. Heimersheim, N. Schoeneberg, **D. C. Hooper**, J. Lesgourgues, *Cannibalism hinders growth: Cannibal Dark Matter and the S_8 tension*, **JCAP 12 (2020) 016**, arXiv: [2008.08486](https://arxiv.org/abs/2008.08486)

- H. Fu, M. Lucca, S. Galli, E. S. Battistelli, **D. C. Hooper**, J. Lesgourgues, N. Schoeneberg, *Unlocking the synergy between CMB spectral distortions and anisotropies*, **JCAP 12 (2021) 050**, arXiv: [2006.12886](https://arxiv.org/abs/2006.12886)
- * I. Baldes, Q. Decant, **D. C. Hooper**, L. Lopez-Honorez, *Non-cold Dark Matter from Primordial Black Hole Evaporation*, **JCAP 08 (2020) 045**, arXiv: [2004.14773](https://arxiv.org/abs/2004.14773)
- † M. Lucca, **D. C. Hooper**, *Tensions in the dark: shedding light on Dark Matter - Dark Energy interactions*, **Phys. Rev. D 102 (2020) 123502**, arXiv: [2002.06127](https://arxiv.org/abs/2002.06127)
- M. Lucca, N. Schoeneberg, **D. C. Hooper**, J. Lesgourgues, J. Chluba, *The synergy between CMB spectral distortions and anisotropies*, **JCAP 02 (2020) 026**, arXiv: [1910.04619](https://arxiv.org/abs/1910.04619)
- N. Schoeneberg, J. Lesgourgues, **D. C. Hooper**, *The BAO+BBN take on the Hubble tension*, **JCAP 10 (2019) 029**, arXiv: [1907.11594](https://arxiv.org/abs/1907.11594)
- † M. Archidiacono, **D. C. Hooper**, R. Murgia, S. Bohr, J. Lesgourgues, M. Viel, *Constraining Dark Matter - Dark Radiation interactions with CMB, BAO, and Lyman- α* , **JCAP 10 (2019) 055**, arXiv: [1907.01496](https://arxiv.org/abs/1907.01496)
- † T. Brinckmann, **D. C. Hooper**, M. Archidiacono, J. Lesgourgues, T. Sprenger, *The promising future of a robust cosmological neutrino mass measurement*, **JCAP 01 (2019) 059**, arXiv: [1808.05955](https://arxiv.org/abs/1808.05955)

Collaboration Papers

- * EuCAPT: R. Alves Batista et al., *EuCAPT White Paper: Opportunities and Challenges for Theoretical Astroparticle Physics in the Next Decade*, arXiv: [2110.10074](https://arxiv.org/abs/2110.10074)
Contribution: Spectral distortions constraints on dark matter
- * Planck Collaboration: Y. Akrami. et al., *Planck 2018 results. X. Constraints on inflation*, **A&A 641 (2020) A10**, arXiv: [1807.06211](https://arxiv.org/abs/1807.06211)
Contribution: Taylor reconstruction and Axion Monodromy sections
- * CORE Collaboration: J. Delabrouille et al., *Exploring Cosmic Origins with CORE: Survey requirements and mission design*, **JCAP 04 (2018) 014**, arXiv: [1706.04516](https://arxiv.org/abs/1706.04516)
- * CORE Collaboration: E. Di Valentino et al., *Exploring Cosmic Origins with CORE: Cosmological Parameters*, **JCAP 04 (2018) 017**, arXiv: [1612.00021](https://arxiv.org/abs/1612.00021)
Contribution: Dark matter annihilation section

Proceedings

- Q. Decant, J. Heisig, **D. C. Hooper**, L. Lopez-Honorez, *Cosmological imprints of non-thermalized dark matter*, arXiv: [2112.08853](https://arxiv.org/abs/2112.08853)
- **D. C. Hooper**, *Multi-interacting dark matter in the Boltzmann code CLASS*, **PoS TOOLS2020 (2021) 026**, available [online](https://arxiv.org/abs/2008.08853)

Dissertation

- **D. C. Hooper**, *Extended Cosmological Probes of Massive Dark Relics*, Ph.D. Thesis supervised by J. Lesgourgues, available [online](https://arxiv.org/abs/2008.08853)