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CURRENT POSITION

Since Jan. 2020 PSL Fellow at the LUTH laboratory of Observatoire de Paris-Meudon in France collaborating with Pier-Stefano Corasaniti and Yann Rasera:
Simulating the most massive galaxy clusters since redshift 1 in both standard and alternative cosmologies

PREVIOUS POSITION

Oct. 2014-Aug. 2019 Postdoctoral researcher at the Département d'Astrophysique of CEA Saclay in France under the supervision of Dr Monique Arnaud and Prof. Romain Teyssier:
Simulating the most massive galaxy clusters since redshift 1

EDUCATION

PhD in Astrophysics (2011-2014)

University of Birmingham (until January 2013) and Liverpool John Moores University (as from January 2013)

Thesis Topic: *Galaxy Clusters as Astrophysical Laboratories and Probes of Cosmology* under the supervision of Dr Ian McCarthy

Final acceptance date: August 26th 2014

Ecole Normale Supérieure in Paris: Interuniversity training in Physics (2007-2011)

Sep. 2008 Bachelors Degree in Science (Physics)

2008-2009 First year of Masters Degree (Physics)

2010-2011 Second year of Masters Degree (Physics and Astrophysics) at Cambridge

University through the ERASMUS Exchange Programme

Jun. 2011 Masters Degree in Science (Physics and Astronomy) with honours (Upper Second class)

Mar. 2012 Ecole Normale Supérieure's degree specialised in Physics

Louis le Grand High School (2004-2007)

2004-2007 'Preparatory Classes' (PCSI then PC*)

PREVIOUS RESEARCH EXPERIENCE

- Oct. 2010-Aug. 2011** Master's project (during the second year of the Masters Degree) at the Institute of Astronomy in Cambridge with Dr Andreea Font and Dr Ian McCarthy: *Properties of Disc Galaxies in Cosmological Simulations: survival of the disc after merger events*
- Sep. 2009-Sep. 2010** Internship at CNES (French Space Agency) in Toulouse with Pierre Omaly: *Atmospheric entries in the case of the Martian atmosphere with an application to the ESA ExoMars mission (Aerothermodynamics and radiative transfer)*
- Feb. 2009-Jul. 2009** Master's project (during the first year of the Masters Degree) at the Max Planck Institute for Astrophysics in Munich (Garching) with Dr Michael Boylan-Kolchin and Prof. Simon White: *Numerical cosmology: growth of dark matter haloes in the Millennium II simulation*
- Jun. 2008-Aug. 2008** Internship at the Astrophysics Laboratory in Marseille (LAM) with Dr Maud Langlois: *Conception of an adaptive optics bench with very high orders, aiming to enable the detection of exoplanets by direct imaging*

COLLABORATIONS

Member of the *XXL*, *Athena* and *Euclid* consortiums and of the Working Group proposing the next European Cosmic Microwave Background and Sunyaev-Zel'dovich experiment

ALLOCATIONS

PI of a large GENCI project since 2015 (more than 15 million CPU hours already allocated since then)

Co-Investigator of successful telescope time allocations in X-rays (XMM, Chandra), Optical/Infrared (ESO, CFHT, UKIRT, ENO) and (sub)millimetre (ALMA) since 2012

STUDENT SUPERVISION

- Since 2015** Co-supervising research projects of four Master and Engineering School Students (The names in bold correspond to the students of whom I was the main supervisor):
 Andréa Fredet (Final year of Master, Mar.-Jul. 2015)
Antoine Marchal (Final year of Master, Mar.-Jul. 2016)
 Michelle Tsirou (Final year of Master, Mar.-Jul. 2016)
Katia Fali (Penultimate year of Engineering School, May-Jul. 2017)

TEACHING

- Sep. 2017-Jan. 2018** Exercise classes of Mechanics for 1st year Mathematics and Computer Science undergraduates
- Jan. 2013-Sep. 2013** Tutoring Distance Learning Astrophysics Undergraduate Courses at Liverpool John Moores University
- Sep. 2011-Dec. 2012** Laboratory demonstrating and supervision of experimental projects for 2nd year undergraduates at the University of Birmingham

AWARDS AND FELLOWSHIPS

- Spring 2019** PSL Research Fellowship
- Summer 2013** ESA Education Bureau Sponsorship to attend The Origin of the Hubble Sequence Conference, IAP, Paris
- Summer 2012** Moreton Travel Prize, University of Birmingham
- Summer 2011** PhD Studentship from the University of Birmingham (until January 2013) and from Liverpool John Moores University (as from January 2013)
- September 2009** CNES Student Research Assistant Fellowship
- February 2009** Max Planck Society Student Research Assistant Fellowship at the Max Planck Institute for Astrophysics in Garching
- Summer 2008** ESO/CNRS Summer Project Fellowship at the Astrophysics Laboratory in Marseille

OTHER ACTIVITIES

Referee for MNRAS

Outreach activities during my PhD (such as Outreach Talk, Astronomy-themed garden at a Flower Show in England, (Astro)Physics demonstrations for girl scouts and young kids as part of the BBC Stargazing events) and my postdoctoral contract (presenting my research to high-school students, contribution to the preparation of a new 3D movie about the Universe)

Member of the LOC of the The physics of groups and galaxy properties therein conference in 2016

Member of the ‘Women in Physics’ group of the Institute of Physics and of the University of Birmingham during my PhD

Member of the International Astronomical Union and of the French Astronomical Society, Fellow of the Royal Astronomical Society as well as Member of the Institute of Physics

PUBLICATIONS

1. R. Gobat, E. Daddi, R. T. Coogan, **A. M. C. Le Brun**, F. Bournaud, J.-B. Melin, D. A. Riechers, M. Sargent, F. Valentino, H. S. Hwang, A. Finoguenov, V. Strazzullo, *Sunyaev-Zel'dovich detection of the galaxy cluster Cl J1449+0856 at $z = 1.99$: The pressure profile in uv space*. *A&A*, 629, A104, September 2019.
2. Aurel Schneider, Romain Teyssier, Joachim Stadel, Nora Elisa Chisari, **Amandine M. C. Le Brun**, Adam Amara, Alexandre Refregier, *Quantifying baryon effects on the matter power spectrum and the weak lensing shear correlation*. *JCAP*, 03, 020, March 2019.
3. Lorenzo Faccioli, Florian Pacaud, Jean-Luc Sauvageot, Marguerite Pierre, Lucio Chiappetti, Nicolas Clerc, René Gastaud, Elias Koulouridis, **Amandine M. C. Le Brun**, Andrea Valotti, *The XXL Survey XXIV. The final detection pipeline*. *A&A*, 620, A9, December 2018.
4. Elias Koulouridis, Lorenzo Faccioli, **Amandine M. C. Le Brun**, Manolis Plionis, Ian G. McCarthy, Marguerite Pierre, A. Akylas, I. Georgantopoulos, Stéphane Paltani, Chris Lidman, Sotiria Fotopoulou, Cristian Vignali, Florian Pacaud, P. Ranalli, *The XXL Survey XIX. A realistic population of simulated X-ray AGN: Comparison of models with observations*. *A&A*, 620, A4, December 2018.
5. N. E. Chisari, M. L. A. Richardson, J. Devriendt, Y. Dubois, A. Schneider, **A. M. C. Le Brun**, R. S. Beckmann, S. Peirani, A. Slyz, C. Pichon, *The impact of baryons on the matter power spectrum from the Horizon-AGN hydrodynamical cosmological simulation*. *MNRAS*, 480, 3962, November 2018.
6. Brandyn E. Lee, **Amandine M. C. Le Brun**, M. E. Haq, N. J. Deering, Lindsay J. King, Douglas Applegate, Ian G. McCarthy, *The impact of baryons on weak lensing mass estimates of galaxy clusters*. *MNRAS*, 479, 890, September 2018.
7. Iacopo Bartalucci, Monique Arnaud, Gabriel W. Pratt, **Amandine M. C. Le Brun**, *Resolving the hydrostatic mass profiles of galaxy clusters at $z \sim 1$ with XMM-Newton and Chandra*. *A&A*, 617, A64, September 2018.
8. Jacques Delabrouille et al., *Exploring Cosmic Origins with CORE: Survey requirements and mission design*. *JCAP*, 04, 014, April 2018.
9. Jean-Baptiste Melin et al., *Exploring Cosmic Origins with CORE: Cluster Science*. *JCAP*, 04, 019, April 2018.
10. Gianfranco De Zotti et al., *Exploring Cosmic Origins with CORE: Extragalactic sources in Cosmic Microwave Background maps*. *JCAP*, 04, 020, April 2018.
11. **Amandine M. C. Le Brun**, Monique Arnaud, Gabriel W. Pratt, Romain Teyssier, *Internal dark matter structure of the most massive galaxy clusters*. *MNRAS Letters*, 473, L69, January 2018.
12. Andreea S. Font, Ian G. McCarthy, **Amandine M. C. Le Brun**, Robert A. Crain, Lee S. Kelvin, *The diversity of assembly histories leading to disc galaxy formation in a Λ CDM model*. *PASA*, 34, 50, November 2017.
13. **Amandine M. C. Le Brun**, Ian G. McCarthy, Joop Schaye, Trevor J. Ponman, *Scatter and evolution of the hot gas properties of a realistic population of simulated galaxy clusters*. *MNRAS*, 466, 4442, April 2017.

14. Ian G. McCarthy, Joop Schaye, Simeon Bird, **Amandine M. C. Le Brun**, *The BAHAMAS project: Calibrated hydrodynamical simulations for large-scale structure cosmology*. MNRAS, 465, 2936, March 2017.
15. Francesco Valentino, Emanuele Daddi, Alexis Finoguenov, Veronica Strazzullo, **Amandine Le Brun**, Cristian Vignali, Frédéric Bournaud, Mark Dickinson, Alvio Renzini, Matthieu Béthermin, Anita Zanella, Raphaël Gobat, Andrea Cimatti, David Elbaz, Masato Onodera, Maurilio Pannella, Mark Sargent, Nobuo Arimoto, Marcella Carollo, Jean-Luc Starck, *A giant Lyman alpha nebula in the core of an X-ray cluster at $z=1.99$: Implications for early energy injection*. ApJ, 829, 53, September 2016.
16. Tao Wang, David Elbaz, Emanuele Daddi, Alexis Finoguenov, Daizhong Liu, Corentin Schreiber, Sergio Martín, Veronica Strazzullo, Francesco Valentino, Remco van der Burg, Anita Zanella, Laure Ciesla, Raphael Gobat, **Amandine Le Brun**, Maurilio Pannella, Mark Sargent, Xinwen Shu, Qinghua Tan, Nico Cappelluti, Yanxia Li, *Discovery of a galaxy cluster with a violently starbursting core at $z=2.505$* . ApJ, 828, 56, September 2016.
17. Dominique Eckert, Stefano Ettori, Jean Coupon, Fabio Gastaldello, Marguerite Pierre, Jean-Baptiste Melin, **Amandine M. C. Le Brun**, Ian G. McCarthy, Christophe Adami, Lucio Chiappetti, Lorenzo Faccioli, Paul Giles, Sébastien Lavoie, Jean-Paul Lefèvre, Maggie Lieu, Adam Mantz, Ben Maughan, Sean McGee, Florian Pacaud, Stéphane Paltani, Tatyana Sadibekova, Graham P. Smith, Felicia Ziparo, *The XXL Survey XIII. Baryon content of the bright cluster sample*. A&A, 592, A12, June 2016.
18. Marguerite Pierre et al., *The XXL Survey I. Scientific motivations – XMM-Newton observing plan – Follow-up observations and simulation programme*. A&A, 592, A1, June 2016. (128 citations)
19. Alireza Hojjati, Ian G. McCarthy, Joachim Harnois-Deraps, Yin-Zhe Ma, Ludovic Van Waerbeke, Gary Hinshaw, **Amandine M. C. Le Brun**, *Dissecting the thermal Sunyaev-Zel'dovich-gravitational lensing cross-correlation with hydrodynamical simulations*. JCAP, 10, 047, October 2015.
20. **Amandine M. C. Le Brun**, Ian G. McCarthy, Jean-Baptiste Melin, *Testing Sunyaev-Zel'dovich measurements of the hot gas content of dark matter haloes using synthetic skies*. MNRAS, 451, 3868, August 2015.
21. Marco Velliscig, Marcel P. van Daalen, Joop Schaye, Ian G. McCarthy, Marcello Cacciato, **Amandine M. C. Le Brun**, Claudio Dalla Vecchia, *The impact of galaxy formation on the total mass, profiles and abundance of haloes*. MNRAS, 442, 2641, August 2014.
22. **Amandine M. C. Le Brun**, Ian G. McCarthy, Joop Schaye, Trevor J. Ponman, *Towards a realistic population of simulated galaxy groups and clusters*. MNRAS, 441, 1270, June 2014.
23. Ian G. McCarthy, **Amandine M. C. Le Brun**, Joop Schaye, Gilbert P. Holder, *The thermal Sunyaev Zel'dovich effect power spectrum in light of Planck*. MNRAS, 440, 3645, June 2014.

CONFERENCE PROCEEDINGS

1. Marguerite Pierre et al., *The XXL survey: first results and future*. XMM-Newton: The Next Decade, Proceedings of the Conference held 9-11 May, 2016 at ESAC, Madrid, June 2016. Published in Astronomische Nachrichten, 338, 334, March 2017.
2. Jessica Démoclès, Trevor Ponman, **Amandine Le Brun**, Ian McCarthy, Lorenzo Faccioli, Jean-Luc Sauvageot, Marguerite Pierre, *The 100 XXL brightest clusters: morphological study*. The X-ray

Universe 2014, edited by Jan-Uwe Ness. Online at <http://www.cosmos.esa.int/web/xmm-newton/2014-symposium/>, id. 61.

3. **Amandine M. C. Le Brun**, Ian G. McCarthy, Joop Schaye, *The Evolution of the Baryon Fraction of Groups and Clusters and its Consequences*. Tracing Cosmic Evolution with Clusters of Galaxies, a conference held 1-5 July, 2013 in Sexten, Italy. Online at <http://www.sekten-cfa.eu/en/conferences/2013/details/34-SestoClusters2013.html>, id. 46.
4. **Amandine Le Brun** and Pierre Omalý, *Investigation of Radiative Heat fluxes for ExoMars entry in the Martian Atmosphere*. Proceedings of the International Workshop on Radiation of High Temperature Gases, Lausanne, Switzerland, October 2010.

PRESENTATIONS

Invited Talks (2):

- *Evolution of groups and clusters since $z=1.5$ in cosmological simulations*, High-redshift (proto)clusters: Anecdotal or important phases?, October 2016, Observatoire de Paris-Meudon, Paris, France
- *Simulating Large-Scale Structures*, CNRS-CSIC Workshop, September 2015, Madrid, Spain

Seminars (5): *Galaxy Clusters as Cosmological Probes and Astrophysical Laboratories*

1. University of Melbourne, July 2016, Melbourne, Australia
2. CAS, Swinburne University, July 2016, Melbourne, Australia
3. ICRAR, University of Western Australia, July 2016, Perth, Australia
4. ICS, University of Zürich, January 2016, Zürich, Switzerland
5. CRAL, December 2015, Lyon, France

Conference Talks (9):

- *Scatter and evolution of the hot gas properties of a realistic population of galaxy groups and clusters* at:
 1. The physics of groups and galaxy properties therein, December 2016, IAP, Paris, France
 2. PNCG days, December 2015, Nice, France
 3. Let's group: The life cycle of galaxies in their favourite environment, June 2015, Garching, Germany
 4. SnowCluster: The Physics of Galaxy Clusters, March 2015, Snowbird, United States
 5. The physics of groups and galaxy properties therein, December 2016, IAP, Paris, France
- *Evolution of the dark matter profiles of the most massive galaxy clusters since redshift 1* at:
 6. Diving Into The Dark, July 2016, Cairns, Australia
 7. SF2A days, June 2016, Lyon, France
 8. The Galaxy-Halo Connection, March 2016, Snowbird, UTAH, United States
- *Internal dark matter structure of the most massive galaxy clusters since $z=1$* at:
 9. SnowCluster: The Physics of Galaxy Clusters, March 2018, Snowbird, United States

Consortium Meetings Talks (8):

- *Internal dark matter structure of the most massive galaxy clusters since $z=1$* , RAMSES User Meeting, September 2017, Nice, France
- *Evolution of the dark matter profiles of the most massive galaxy clusters since redshift 1*, RAMSES User Meeting, September 2015, Oxford, United Kingdom
- *Matching between X-ray synthetic detections and (sub)halo catalogues in the case of the cosmo-OWLS simulation*, XXL Consortium Meeting, June 2015, Mljet, Croatia
- *Baryon fractions in cosmo-OWLS: comparisons to existing observations*, XXL Consortium Meeting, June 2015, Mljet, Croatia
- *Matching between X-ray synthetic detections and (sub)halo catalogues*, XXL Consortium Simulation Workshop, February 2015, Paris, France

- *Scatter and evolution of the hot gas properties of a realistic population of simulated groups and clusters*, Virgo Consortium meeting, December 2014, Garching, Germany
- *Towards a realistic population of simulated groups and clusters*, Virgo Consortium meeting, January 2014, Leiden, The Netherlands
- *Cluster science with cosmo-OWLS and XXL*, XXL Consortium meeting, July 2013, Bonn, Germany

Other Talks (2):

- *Galaxy Clusters as Cosmological Probes and Astrophysical Laboratories*, Extragalactic Group Meeting, May 2015, ARI, Liverpool John Moores University, United Kingdom
- Outreach Talk: *Galaxy Clusters as Cosmological Probes and Astrophysical Laboratories*, Universities of Liverpool Astronomical Society, February 2013