

PERSONAL INFORMATION

Family name, first name Bianconi, Matteo
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EDUCATION

Oct 12-Jun 16 **PhD (Physics, 1st grade) at Institute of Astro- and Particle Physics, University of Innsbruck, AT**

Supervisor: Ass. Prof. Francine Marleau

Thesis title: “Star formation and black hole accretion activity in rich local clusters of galaxies”.

Thesis description: A new suite for Spitzer IR data reduction pipeline was developed specifically tailored for large-scale observations of galaxy clusters. Stellar population and dust modelling from multi-wavelength observations allowed to identify quenching of both obscured and non-obscured star formation, together with black hole accretion rates, due to ram-pressure stripping and tidal interactions between galaxies. These results were complemented by analysis of state-of-the-art Illustris cosmological simulation runs, showing the enhancement of black hole activity at the first encounter with the cluster environment. The analysis of galaxy peculiar velocities from optical spectrometry allowed the discovery of a new cluster filament candidate.

Sep 09-Mar 12 **Master Degree in Astrophysics and Cosmology (108/110) at University of Bologna, IT**

Supervisor: Dr Carlo Nipoti, Dr Stefano Ettori

Thesis title: “Gas rotation in galaxy clusters: signatures and detectability in X-rays”

Thesis description: We studied several models of massive galaxy clusters in which the intracluster medium (ICM) rotates differentially in equilibrium in the cluster gravitational potential. We obtained the X-ray surface brightness maps, evaluating the isophote flattening due to the gas rotation. Using a set of different rotation laws, we put constraint on the amplitude of the rotation velocity, finding that rotation curves with peak velocity up to $\sim 600 \text{ km s}^{-1}$ are consistent with the ellipticity profiles of observed clusters. We convolved each of our models with the instrument response of the X-ray Calorimeter Spectrometer on board the ASTRO-H observatory to calculate the simulated X-ray spectra at different distance from the X-ray centre. We demonstrated that such an instrument will allow us to measure rotation of the ICM in massive clusters, even with rotation velocities as low as $\sim 100 \text{ km s}^{-1}$.

PROFESSIONAL EXPERIENCE

01/2017 – present: Postdoctoral Research Fellow, **University of Birmingham**

06/2013 – 10/2014: Visiting scientist, **California Institute of Technology**

10/2012 – 06/2016: PhD candidate, **Institute of Astro- and Particle Physics, University of Innsbruck**

GRANTS & FUNDING

• “Seal of Excellence”, Marie Skłodowska-Curie actions 2019

Awarded to the CADENA proposal (PI: M. Bianconi) which passed the assessment threshold for excellence, impact, quality and efficiency of implementation for H2020-MSCA-IF-2018.

• “Excellence Cluster Munich Visiting Grant, 2018”, University of Munich (EUR 950)

Awarded to visit MPE and USM in Munich, advance the LoCuSS data analysis and promote eROSITA collaborations

• “LSST 2018 Blending Workshop”, LSST consortium (EUR 2.200)

Awarded to participate to the LSST community workshop on blending and to represent UK’s galaxy cluster community

• “Visiting Grant, University of Helsinki, 2017” (EUR 800)

Awarded to visit and supervise 2 undergraduate students

• “Forschungsstipendium 2016”, University of Innsbruck (EUR 6.600)

Awarded to allow the continuation of research between PhD and the first Post-doc contract

• “Förderungsstipendium 2014”, University of Innsbruck (EUR 2.200)

Awarded to allow graduate students to visit collaborators, to promote research and to foster new collaborations.

TELESCOPE TIME GRANTED

- ESO 4MOST. “A Stellar Population Survey using 4MOST”, 100k fibre hours, PI: A. Iovino
- ESO 4MOST. “CHANCES: CHileAN Cluster galaxy Evolution Survey”, 175k fibre hours, PI: C. Haines
- ESO VISTA-VIRCAM. “A panoramic VISTA of galaxies in Planck-selected massive galaxy clusters at $0.2 < z < 0.6$ ”, 80h, Cycle 106-109, PI: C. Haines
- Gemini: GMOS. “GMOS Discovery of Kilonova Counterparts to Strongly-lensed Binary Neutron Star (NS-NS) and Neutron Star- Black Hole (NS-BH)”, Semester 2020B: 2 h, PI: M. Bianconi
- Gemini: GMOS. “GMOS Discovery of Kilonova Counterparts to Strongly-lensed Binary Neutron Star (NS-NS) and Neutron Star- Black Hole (NS-BH)”, Semester 2020A: 2 h, PI: M. Bianconi
- WHT-WEAVE. “Stellar Populations at intermediate redshifts Survey (StePS)”, 250k fibre hours, PI: A. Iovino
- ESO VLT-MUSE. “BUFFALO-WINGS: The Frontier Fields/BUFFALO Clusters in 3D”, Cycle 106-109, 280h, PI: D. Lagattuta
- Gemini: GMOS. “GMOS Discovery of Kilonova Counterparts to Strongly-lensed Binary Neutron Star (NS-NS) and Neutron Star- Black Hole (NS-BH)”, Semester 2019B: 2 h, PI: M. Bianconi
- Gemini: GMOS. “GMOS Discovery of Kilonova Counterparts to Strongly-lensed Binary Neutron Star (NS-NS) and Neutron Star- Black Hole (NS-BH)”, Semester 2019A: 2 h, PI: M. Bianconi
- Gemini: GMOS. “Searching for Strong-lensing of Gravitational Waves by Galaxy Clusters”, Semester 2017A: 14 h, PI: G. Smith
- ESO: VLT-MUSE. “MUSE: Searching for Strong-lensing of Gravitational Waves by Galaxy Clusters”, Period 99: 6 h, PI: M. Jauzac
- ESO: VLT-VIMOS. “Evolution of dwarf galaxies in Abell 85 and its filament”, Period 91: 16.3 h, PI: F.R. Marleau

TEACHING AND SUPERVISING EXPERIENCE

Jan 22 - current: coordinator of the laboratory for Observational Astronomy at University of Birmingham

Jan 19 - current: Guest Lecturer of Evolution of Cosmic Structures (led by Dr. Sean McGee) at University of Birmingham

Sep 18 - current: Co-supervisor of 1 PhD candidate at the University of Birmingham

Jan 17 - current: Assistant Lecturer of Observational Astronomy (led by Dr. Graham Smith) and of Observational Cosmology (led by Dr. Sean McGee) class at University of Birmingham

Jan 17 - current: Co-supervisor of 4 undergraduate and 3 postgraduate student at University of Birmingham

Jan 18 - current: Organiser of the fortnightly group meeting and science seminars of the Astrophysics and Space Research group at University of Birmingham

May 17-Oct 17: Co-supervisor of 2 undergraduate student at the University of Helsinki

Sep 12 - Jun 16: Assistant Lecturer of Extragalactic Astronomy and Advanced Mathematical Method class in the Astromundus program at the University of Innsbruck

REVIEWER ROLES

- Monthly Notices of the Royal Astronomical Society (MNRAS)
- Astrophysical Journal (ApJ)
- NASA FINESST Fellowship

COMPUTING SKILLS

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|---------------------|---|
| • Operating systems | Linux/Unix, Windows |
| • Programming | C, C++, Python, Fortran |
| • Typography | Latex, BibTex, Microsoft Office, Pages, OpenOffice |
| • Scientific | Python, Fortran, Mathematica |
| • Astronomy | AIPS, IRAF, X-SPEC, CIAO, HIPE, MAGPHYS, SExtractor |

OUTREACH

2017 - current Lead organiser of *Astronomy in the city*, University of Birmingham

2012 - 2016 Presentation to prospective students of the Astromundus program

2012 - 2016 Outreach talks at the University of Innsbruck and Bologna

2016 - current Collaboration with graphic designer Alberto Lot

PROFESSIONAL AFFILIATIONS

- LSST Galaxy and Strong Lensing Collaboration and UK consortium
- *LoCuSS* collaboration
- BUFFALO collaboration
- LIGO-VIRGO consortium: electromagnetic follow-up team
- WEAVE-StePS collaboration
- 4MOST-StePS and 4MOST-CHANCES collaboration
- Fellow of the Royal Astronomical Society
- Associate Fellow of the Higher Education Academy

LANGUAGES

- Italian (mother tongue)
- English (fluent)
- German (intermediate)
- Spanish (intermediate)

RESEARCH PERFORMANCE

Publications: 19 Publications (of which 6 are first-author) in refereed international journals

Presentations: 2 conference leadership roles, 19 oral presentations (5 invited)

Publications in international peer-reviewed journals

- 12/2021 - **M. Bianconi**, G.P. Smith, M. Nicholl, D. Ryczanowski, R. Massey, A. Robertson, M. Jauzac, *Search for electromagnetic counterparts to candidate strong-lensing gravitational wave events from LIGO-Virgo Observing run 3, in preparation*
- 09/2021 - D. J. Lagattuta, J. Richard, F.E. Bauer, C. Cerny, A. Claeysens, L. Guaita, M. Jauzac, A. Jeanneau, A.M. Koekemoer, G. Mahler, G.P. Lyon, **M. Bianconi**, T. Connor, R. Cen, A. Edge, A. L. Faisst, M. Limousin, R. Massey, M. Sereno, K. Sharon, J.R. Weave, *Pilot-WINGS: An extended MUSE view of the structure of Abell 370*, submitted
- 09/2021 - F. Sun, E. Egami, P. G. Pérez-González, I. Smail, K. I. Caputi, F. E. Bauer, T. D. Rawle, S. Fujimoto, K. Kohno, U. Dudzevičiūtė, H. Atek, **M. Bianconi**, S. C. Chapman, F. Combes, M. Jauzac, J.-B. Jolly, A. M. Koekemoer, G. E. Magdis, G. Rodighiero, W. Rujopakarn, D. Schaerer, C. L. Steinhardt, P. Van der Werf, G. L. Walth, J. R. Weaver, *Extensive Lensing Survey of Optical and Near-Infrared Dark Objects (El Sonido): HST H-Faint Galaxies behind 101 Lensing Clusters*, [arXiv:2006.04516v1](#)
- 10/2020 - **M. Bianconi**, R. Buscicchio, G.P. Smith, S. L. McGee, C.P. Haines, A. Finoguenov, A. Babul, *LoCuSS: The splashback radius of massive galaxy clusters and its dependence on cluster merger history*, *ApJ*, 911, 136, [arXiv:2010.05920](#)
- 06/2020 - R. Buscicchio, C. J. Moore, G. Pratten, P. Schmid, **M. Bianconi**, A. Vecchio, *Constraining the lensing of binary black holes from their stochastic background*, *PhysRevLett.* 125.141102, [arXiv:2006.04516v1](#)
- 03/2020 - D. Ryczanowski, G.P. Smith, **M. Bianconi**, R. Massey, A. Robertson, M. Jauzac, *On building a cluster watch-list for identifying strongly lensed supernovae, gravitational waves and kilonovae*, *MNRAS*, 495, 1666, [arXiv:2005.02296](#)
- 01/2020 - A. Robertson, G.P. Smith, R. Massey, V. Eke, M. Jauzac, **M. Bianconi**, Dan Ryczanowski, *What does strong gravitational lensing? The mass and redshift distribution of high-magnification lenses*, *MNRAS*, 495, 3727, [arXiv:2002.01479](#)
- 01/2020 - **M. Bianconi**, G.P. Smith, C.P. Haines, S. L. McGee, A. Finoguenov, E. Egami, *LoCuSS: exploring the connection between local environment, star formation and dust mass in Abell 1758*, *MNRAS*, 492, 4599, [arXiv:2001.04478](#)
- 02/2019 - G.P. Smith, A. Robertson, **M. Bianconi**, M. Jauzac, *Discovery of Strongly-lensed Gravitational Waves - Implications for the LSST Observing Strategy*, [arXiv:190205140S](#)
- 05/2018 - G.P. Smith, **M. Bianconi**, M. Jauzac, J. Richard, A. Robertson, C. P. L. Berry, R. J. Massey, K. Sharon, W. M. Farr, J. Veitch, *Deep and rapid observations of strong-lensing galaxy clusters within the sky localisation of GW170814*, *MNRAS*, 485, 5180, [arXiv:1805.07370v1](#)
- 04/2018 - G.P. Smith, C. P. L. Berry, **M. Bianconi**, W. M. Farr, M. Jauzac, R. J. Massey, J. Richard, A. Robertson, K. Sharon, A. Vecchio, J. Veitch, *Strong-lensing of Gravitational Waves by Galaxy Clusters*, *IAUS*, 338, 98, [arXiv:1803.07851v1](#)
- 10/2017 - **M. Bianconi**, G.P. Smith, C.P. Haines, S. L. McGee, A. Finoguenov, E. Egami, *LoCuSS: Pre-processing in galaxy groups falling into massive galaxy clusters at $z=0.2$* , *MNRAS* 473,79, [arXiv:1710.04230](#)
- 09/2017 - C. P. Haines, A. Finoguenov, G. P. Smith, A. Babul, E. Egami, P. Mazzotta, N. Okabe, M. J. Pereira, **M. Bianconi**, S. L. McGee, F. Ziparo, L. E. Campusano, C. Loyola, *LoCuSS: The infall of X-ray groups onto massive clusters*, *MNRAS* 477, 493, [arXiv:1709.04945](#)
- 03/2017 - T. Mackenzie, D. Scott, **M. Bianconi**, *SCUBA-2 follow-up of Herschel-SPIRE observed Planck overdensities*, *MNRAS* 468, 4006, [arXiv:1703.02074](#)
- 02/2016 - **M. Bianconi**, F. R. Marleau, D. Fadda, 2016, *Star formation and black hole accretion activity in rich local clusters of galaxies*, *A&A* 588, A105, [arXiv:1601.06080](#)
- 05/2015 - C. Nipoti, L. Posti, S. Ettori, **M. Bianconi**, *Magnetorotational instability in cool cores of galaxy clusters*, *Journal of Plasma Physics* 81, [arXiv:1506.01387](#)
- 11/2014 - F.R. Marleau, D. Clancy, **M. Bianconi**, R. Habas, *Infrared Signature of Active Massive Black Holes in Nearby Dwarf Galaxies*, *A&A* 602,28, [arXiv:1411.3844](#)
- 05/2013 - **M. Bianconi**, S. Ettori, C. Nipoti, *Gas rotation in galaxy clusters: signatures and detectability in X-rays*, *MNRAS* 434, 1565, [arXiv:1305.5519](#)
- 11/2012 - F.R. Marleau, D. Clancy, **M. Bianconi**, *The ubiquity of supermassive black holes in the Hubble*

PERSONAL CONTRIBUTIONS TO CONFERENCES/SEMINARS

Organization

Jul 14 - current LOC of the annual Alpine Cosmology Workshop
Sep 17- current SOC and LOC of the Birmingham-Nottingham Extragalactic Workshop

Presentations

- 07/2021 - *The splashback radius of massive galaxy clusters and its dependence on cluster merger history*, National Astronomy Meeting, Bath (virtual), UK
- 06/2021 - *The splashback radius of massive galaxy clusters and its dependence on cluster merger history*, Galaxy cluster formation meeting II, Garching (virtual), DE
- 05/2020 - *LoCuSS: exploring the connection between local environment, star formation and dust mass in Abell 1758*, EAS2020, Leiden (virtual), NL
- 05/2019 - *Strong-lensing of Gravitational Waves by Galaxy Clusters*, LSST:UK All hands meeting, Cardiff, UK
- 04/2019 - *LoCuSS: pre-processing in massive galaxy clusters around $z=0.2$* , RAS meeting, London, UK
- 02/2019 - *LoCuSS: Galaxy properties in and around massive clusters at $z=0.2$* , ESO-Australia, Sydney, AUS
- 09/2018 - *LoCuSS: Galaxy properties in and around massive clusters at $z=0.2$* , Cluster 2 meeting, Napoli, Italy
- 07/2018 - *Strong-lensing of Gravitational Waves by Galaxy Clusters*, INAF-Bologna, Italy (**invited**)
- 08/2018 - *LoCuSS: Galaxy properties in and around massive clusters at $z=0.2$* , 10th Alpine Cosmology Workshop, Val Vogna, Italy
- 07/2018 - *Deep and rapid observations of strong-lensing galaxy clusters within the sky localisation of GW170814*, ESO Garching, Germany (**invited**)
- 05/2018 - *LoCuSS: Galaxy properties in and around massive clusters at $z=0.2$* , INAF-Brera, Milano, Italy (**invited**)
- 10/2017 - *LoCuSS: Pre-Processing in galaxy groups falling into massive galaxy clusters*, Durham, UK (**invited**)
- 09/2017 - *LoCuSS: Pre-Processing in galaxy groups falling into massive galaxy clusters*, 15th Extragalactic Workshop, Birmingham, UK
- 08/2017 - *Discovery of a new sample of infalling galaxy groups*, 9th Alpine Cosmology Workshop, Algau, Germany
- 07/2017 - *Star formation suppression in a sample of newly discovered galaxy groups*, Galaxy Clusters across cosmic time, Aix-en-Provence, France
- 09/2016 - *Star formation and black hole accretion activity in rich local clusters of galaxies*, SRON Amsterdam, Netherlands
- 08/2016 - *Star formation and black hole accretion activity in rich local clusters of galaxies*, INAF-Trieste, Italy (**invited**)
- 08/2015 - *Discovery of a new filament candidate extending from A1731*, 6th Alpine Cosmology Workshop
- 07/2015 - *Galaxy activity in rich nearby clusters of galaxies: a view on star formation and AGN*, EWASS, Tenerife
- 03/2014 - *Extending the black hole-bulge mass relation to the dwarf galaxy regime*, 5th Alpine Cosmology Workshop
- 09/2013 - *The ubiquity of supermassive black holes in the Hubble sequence*, INAF-Bologna, Italy
- 05/2013 - *Gas rotation in galaxy clusters: signatures and detectability in X-rays*, Bonn, Germany

Poster presentations

- 09/2015 - *Obscured and non-obscured star formation rate measurements*, Graduate Research Day, University of Innsbruck