ALL. B

Decreto Rettore Università di Roma "La Sapienza" n. 1442/2019 del 7.05.2019

RAFFAELLA SCHNEIDER

Curriculum Vitae

Rome, 4/06/2019

Part II - Education

Ph.D. in Physics at the Physics Department, Sapienza University of Rome (8/02/2000)
Ph. D. thesis title: *"Stochastic backgrounds of gravitational waves from cosmological populations of astrophysical sources"* (Supervisor: Valeria Ferrari, Co-supervisor: Sabino Matarrese)

Tesi di Laurea at the Physics Department, Sapienza University of Rome (13/07/1995) with title *"Anisotropies of the Cosmic Microwave Background Radiation: an analytic approach to the problem of the large-scale structure"* (Supervisor: Francesco Melchiorri, Co-Supervisor: Andrej Doroshkevich). Graduated with mark: 110/110 cum laude.

Erasmus Grant Fellow at the Niels Bohr Institute, Copenhagen (1994-1995)

Under-graduate studies in Physics at the Physics Department, Sapienza University of Rome (1990-1995)

Part III - Appointments

Academic long-term and permanent appointments

Associate Professor at the Physics Department, Sapienza University of Rome (since 1/11/2016);
Permanent Research Position at INAF/Osservatorio Astronomico di Roma (03/09/2010 - 31/10/2016)
Permanent Research Position at INAF/Osservatorio Astrofisico di Arcetri (30/12/2005 - 02/09/2010)
Senior Excellence Grant of the Centro Studi e Ricerche "Enrico Fermi" (2003-2005)
Postdoctoral Fellow of the Osservatorio Astrofisico di Arcetri (2000-2002)
Ph.D. student at the Physics Department, Sapienza University of Rome (1996-1999)

Career breaks
I took two maternity leaves, one during my Ph.D. (1997) and one when I was a Post Doc (2003).

Academic short-term appointments

Visiting scientist
Kavli Institute for Theoretical Physics, Santa Barbara (May - July 2016)
Kavli Institute for Theoretical Physics, Santa Barbara (July - August 2013)
Dark Cosmology Center, Copenhagen (July 2009)
Dark Cosmology Center, Copenhagen (July 2008)
Kavli Institute for Theoretical Physics, Santa Barbara (October - November 2004)

Short-term visitor
Institute for Astronomy, Cambridge (July 2019)
Institute for Astronomy, Cambridge (July 2018)
Institute d'Astrophysique Paris (March 2016)
University of Zurich (November 2015)
University of Texas, Austin (May 2010)
National Astronomical Observatory of Japan, Mitaka (January 2009)
Max Planck Institute for Astrophysics, (November 2008)
Institute for Nuclear Physics, Seattle (July 2006)

Commissions of trust

Expert reviewer for the European Research Council (ERC), Italian Ministry for Education, University and Research (MIUR), Agence Nationale de la Recherce (ANR), Swiss National Science Foundation (SNSF), Israel Science Foundation, Comisión Nacional de Investigación (Chile), Cottrell College Science Awards (USA).

Commission for the final PhD defence:
CEA Saclay, France (2019), Department of Physics, University of Trieste (2017, 2018), Department of Physics, University of Rome 3 (2017), Institut d'Astrophysique de Paris (15/09/2016).

Referee of PhD thesis:
Maximilien Franco, CEA Saclay (2019)
Lorenzo Gioannini, Università degli Studi di Trieste (2018)
Chiara Mongardi, Università degli Studi di Trieste (2017)
Adriana Postiglione, Università di Roma 3 (2017)

Federica Ricci, Università di Roma 3 (2017)
Melanie Habouzit, l'Institute d'Astrophysique de Paris (2016)
David Goz, Università degli Studi di Trieste (2015)

Peer reviewer for Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal, Astronomy & Astrophysics, Classical and Quantum Gravity, Reports on Progress in Physics, Reviews of Modern Physics (since 2000)

Institutional responsibilities

Member of the Ph.D. board in Astronomy Astrophysics and Space Science, Sapienza University of Rome and Tor Vergata University (since the academic year 2017/2018)
https://phd.uniroma1.it/web/SCIENTIFIC-BOARD-ASTRONOMY-ASTROPHYSICS-AND-SPACE-SCIENCE_nB3486_EN.aspx

Member of the Amaldi Research Center Steering Commitee (since 15/03/2018)
http://www.roma1.infn.it/amaldicenter/home.html

Member of the Commitee for General Seminars (since the academic year 2018/2019)
https://www.phys.uniroma1.it/fisica/en/node/5650

Member of the proposal writing team (with G. Cavoto, P. Mataloni, F. Ricci, F. Sciarrino) for the call *Dipartimenti di Eccellenza - Anno 2017*
https://www.phys.uniroma1.it/fisica/en/node/10181

Member of the Excellence Programmes Commitee, Physics Department, Sapienza University of Rome (since the academic year 2016/2017)
https://www.phys.uniroma1.it/fisica/corsilauree/percorsi-di-eccellenza

Organization and participation to the *ERC workshop per il Panel Physics and Engineering* (14 March 2017) and to the *ERC Open Labs* (15 March 2017) of the Physics Department within the ERC week *Celebrating Excellence in Research: 10 years of ERC in Sapienza*
https://www.uniroma1.it/en/pagina/sapienza-erc-week

Participation to international science teams and other appointments

Science working groups
Astrophysics working group for LISA (since 2018)
https://www.lisamission.org/articles/consortium/working-groups

Gravitational Wave International Commitee 3G Science Case Team (since 2017)
https://gwic.ligo.org/3Gsubcomm/

Galaxy Evolution Team of SPICA - a space infrared telescope for cosmology and astrophysics (since 2016) https://spica-mission.org/

EUCLID - Primordial Universe working group (since 2016)
http://sci.esa.int/euclid/

Epoch of Reionization Science Team dello Square Kilometer Array (SKA) (since 2014);
https://www.skatelescope.org/

Astrophysical Software Laboratory Committee appointed by ASTRONET Board (2010); http://www.astronet-eu.org/

ESA Science Advisory Group for LISA: Laser Interferometer Space Antenna (2001-2003)

International science teams
COST ACTION Gravitational waves, black holes and fundamental physics (since 2018) https://gwverse.tecnico.ulisboa.pt/

"EUROPA - Early Universe: Research On Plasma Astrochemistry" (2013-2015) http://www.issibern.ch/teams/europa/EUROPA.html

"Molecules and dust at low metallicity" (2009-2011) http://www.issibern.ch/teams/modulo/

Italy-Japan bilateral collaboration funded by the National Research Council (2002-2003)

European Research and Training Network *"The Physics of the Intergalactic Medium"* (acronimo IGM, codice: HPRN-CT-2000-00126) (2000-2004);
Task Group *"First Stars, UV background and Reionization*" of the EC-RTN "The Physics of the Intergalactic Medium" (2001);
Task Group *"Feedback*" of the EC-RTN "The Physics of the Intergalactic Medium" (2001);

Science white papers participation
Deeper, Wider, Sharper: Next-Generation Ground-based Gravitational-Wave Observations of Binary Black Holes Kalogera, V. et al. Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 242; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, 242 (2019) https://ui.adsabs.harvard.edu/abs/2019BAAS...51c.242K/abstract

Detecting the Birth of Supermassive Black Holes Formed from Heavy Seeds, Pacucci, F. et al. Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 117; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, 117 (2019) https://ui.adsabs.harvard.edu/abs/2019BAAS...51c.117P/abstract

Cosmic Dawn and Reionization: Astrophysics in the Final Frontier, Cooray et al. Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 48; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, 48 (2019) https://ui.adsabs.harvard.edu/abs/2019BAAS...51c..48C/abstract

Unveiling Cosmic Dawn: the synergetic role of space and ground-based telescopes
Cuby et al. Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 360; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, 360 (2019) https://ui.adsabs.harvard.edu/abs/2019BAAS...51c.360C/abstract

Measuring the Metallicity of Low-Mass, Low-Metallicity Galaxies in the Early Universe and the Galactic Habitability Burgarella et al. (2019) Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, 213 https://ui.adsabs.harvard.edu/abs/2019astro2020T.213B/abstract

Light from the Cosmic Frontier: Gamma-Ray Bursts Amati, L. et al. (2013) White paper submitted to ESA as a contribution to the deliberations on the science themes for the L2 and L3 mission opportunities http://adsabs.harvard.edu/abs/2013arXiv1306.5259A

Editorial teams
"*Understanding the Growth of the First Supermassive Black Holes*", proceedings del 2015 EWASS Symposium, PASA, (2016);

"Low Metallicity Star Formation: From the First Stars to Dwarf Galaxies", proceedings of the International Astronomical Union eds. L. K. Hunt, S. Madden, R. Schneider, IAU Symposium 255, (2008);

SIGRAV (Italian Society of General Relativity and Gravitational Physics) Bulletin, *Relativistic Astrophysics* (2008).

Organization of international conferences and workshops

Co-organizer and co-chair of the scientific organizing commitee
"The early growth of the first super-massive black holes", Sexten Center for Astrophysics (2018)
http://www.sexten-cfa.eu/event/the-early-growth-of-supermassive-black-holes/

"The Cold Universe", 3-months program funded and hosted by the Kavli Institute for Theoretical Physics (KITP) in Santa Barbara (15/04/2016 – 15/07/2016)
http://www.kitp.ucsb.edu/activities/dbdetails?acro=COLDUNIV16

"The formation of the first supermassive black holes", Special Symposium- EWASS 2015
http://eas.unige.ch/EWASS2015/session.jsp?id=S1

"Low-metallicity star formation: from the first stars to dwarf galaxies", IAU 255 Symposium, Rapallo (2008)
http://www.arcetri.astro.it/iaus255/

"HI Survival through Cosmic Times", Abbazia di Spineto, (2007)
http://www.arcetri.astro.it/hisur/

Member of the scientific organizing commitee
"First Stars VI Conference", University of Conception, Chile (2020)
http://www.astro.udec.cl/FirstStarsVI/

"Titans of the Early Universe - The Origin of the First Supermassive Black Holes" (2018, Monash Prato Centre, Italy)
http://titans.tewoods-astro.com/

"FOE Fifty-One Erg 2017 Conference" (2017)
http://www.science.oregonstate.edu/~lazzatid/FOE2017/

"First Stars V Conference", University of Heidelberg (2016)
http://www.lsw.uni-heidelberg.de/FirstStarsV/

"Molecules and dust as fuel to star formation"
KITP, Santa Barbara (USA)
21/06/2017 - 24/06/2017
https://www.kitp.ucsb.edu/activities/colduniv-c16

"The formation of the first supermassive black holes", Special Symposium- EWASS 2015
http://eas.unige.ch/EWASS2015/session.jsp?id=S1

"Active Galactic Nuclei XI: Where Black Holes and Galaxies Meet" ICTP Trieste (2014)
http://adlibitum.oats.inaf.it/meetings/AGN11-Sept2014/index.html

"The physics of first stars and galaxies", Higgs Center for Theoretical Physics, Edimburgh (2014)
https://higgs.ph.ed.ac.uk/workshops/physics-first-star-and-galaxy-formation

"The Life Cycle of Dust in the Universe: Observations, Theory, and Laboratory Experiments", Academia Sinica, Taipei (2013) http://www.asiaa.sinica.edu.tw/~TAN/2013/2013_129.txt

"The low-metallicity interstellar medium", Göttingen (2012)
http://www.usm.uni-muenchen.de/ISM-SPP/conferences/download/poster_lowmet.png

"The First Stars and Galaxies: Challenges for the Next Decade", Austin, USA (2010)
http://www.as.utexas.edu/~fsgcon/

"Current Problems in Extragalactic Dust", Niels Bohr Institute, Copenhagen, Danimarca (2009)
https://indico.nbi.ku.dk/conferenceDisplay.py?confId=78

"Tours Symposium on Nuclear Physics and Astrophysics", Kobe, Giappone (2009)
http://www.phys.konan-u.ac.jp/tours2009/

"Low-metallicity star formation: from the first stars to dwarf galaxies", IAU 255 Symposium, Rapallo (2008)
http://www.arcetri.astro.it/iaus255/

"HI Survival through Cosmic Times", Abbazia di Spineto, Giugno 2007
http://www.arcetri.astro.it/hisur/

Member of the local organizing commitee
"Low-metallicity star formation: from the first stars to dwarf galaxies", IAU 255 Symposium, Rapallo (2008)

"HI Survival through Cosmic Times", Abbazia di Spineto, June 2007

"Early Cosmic Structures and the End of the Dark Ages", International Elba Meeting (2002)

"The Physics of the Intergalactic Medium", EC-RTN International Meeting, Gargonza (2002)

DAVID-Dark Ages Virtual Department annual meetings (2005 - 2015)

Part IV - Teaching experience

Academic teaching since 1/11/2016 (before this date my position was a full research position)
2018/2019: 52 hours for the undergraduated course in Stellar Astrophysics, University of Rome

2018/2019: 84 hours for the undergraduated course in Physics for Biology, University of Rome

2017/2018: 60 hours for the undergraduated course in Stellar Astrophysics, University of Rome

2017/2018: 84 hours for the undergraduated course in Physics for Biology, University of Rome

2017/2018: 8 hours for the undergraduated course in Physics for Pharmacy, University of Rome

2016/2017: 56 hours for the undergraduated course in Stellar Astrophysics, University of Rome

Other teaching experience
2020: 4 hours for the international school "Multi-Messenger Astrophysics", Jan. 14 - 23, 2020 Asiago

2016: 2 hours lecture at the Awareness conference on "Hot topics in Astrophysics" Opticon/South Eastern European Countries (SREAC) meeting, Lake Ohrid, Sept. 26- 27, 2016

2016: 4 hours for the Ph.D. course in Astrophysics at Scuola Normale Superiore di Pisa

2009: 4 hours for the undergraduate course The Universe after Recombination (Prof. A. Ferrara), Scuola Normale Superiore di Pisa

2008: 6 hours for the undergraduate course in Cosmology (Prof. F. Pacini), University of Florence

Supervision of Ph.D. students
Federica Sassano *"The formation and coalescence sites of gravitational wave events at cosmic dawn"* Amaldi Research Center Ph.D. fellowship, Ph.D. program in Astronomy Astrophysics and Space Science, Sapienza University of Rome and University of Tor Vergata (2018-2020)

Michele Ginolfi *"The gas content of high-z galaxies"* (2016-2018)
Ph.D. program in Astronomy Astrophysics and Space Science, Sapienza University of Rome and University of Tor Vergata;

Edwige Pezzulli, *"Origin, growth and fate of the first black holes "* (2015-2017)
Ph.D. program in Astronomy Astrophysics and Space Science, Sapienza University of Rome and University of Tor Vergata;

Mattia Mancini, *"The properties of the first galaxies"* (2015-2017)
Ph.D. program in Astronomy Astrophysics and Space Science, Sapienza University of Rome and University of Tor Vergata;

Matteo de Bennassuti, *"From the first stars to the Local Universe"* (2013-2015)
Ph.D. program in Astronomy Astrophysics and Space Science, Sapienza University of Rome and University of Tor Vergata;

Rosa Valiante, "*Dust formation and evolution at high redshift*" (2008-2010)
Ph.D. in Astronomy and Astrophysics of the University of Florence

Supervision of master students at Sapienza University of Rome[1]
Alessandro Bonella, *"Supernovae as sources of interstella dust: the impact of the reverse shock destruction",* to be discussed in October 2019

Marco Mirabelli, *"The origin of the HeII emission in high redshift galaxies"* (co-supervised with Laura Pentericci), to be discussed in September 2019

Alessandro Trinca, *"The low mass end of the black hole mass function at cosmic dawn",* to be discussed in September 2019

Giulia Cerini, *"The early growth of the first supermassive black holes: dynamical interactions and black hole mergers in the early Universe",* to be discussed in July 2019

Simone Conti, *"The CII luminosity of high-z galaxies"* (2018)

Sofia Romeo, *"The gravitational wave signatures of the first stars"* (2018)

Francesco Conte, *"The formation and coalescence rates of compact binary systems"* (2018)

Matteo Alparone, *"Gravitational wave signals from the Local Group*" (2016, internal supervisor V. Ferrari)

Michele Ginolfi, *"The interstellar medium of high-z galaxies"* (2015, internal supervisor A. Fontana)

Mattia Mancini, *"Simulazione delle proprietà osservative delle prime galassie"* (2014, internal supervisor A. Melchiorri)

Edwige Pezzulli, "*Coevolution of the first black holes and their host galaxies*" (2014, internal supervisor A. Melchiorri)

Co-supervision of master students at the University of Florence
Stefania Salvadori, *"Genealogia cosmologica e fossili stellari della Galassia"* (2005, co-supervised with Andrea Ferrara)

Francesco Pinna,*"Formazione e distruzione della polvere nei getti di supernova"*
Università degli studi di Firenze, (2006, co-supervised with Simone Bianchi)

Supervision of bachelor students at Sapienza University of Rome
Carlotta Addeo, *"La natura delle prime stelle e il loro impatto sull'evoluzione cosmica"* (to be discussed in July 2019)

Giulia Illiano, *"Il processo di reionizzazione cosmica"* (to be discussed in July 2019)

Simone Saltari, *"Fenomenologia e sorgenti astrofisiche dei lampi di luce gamma"* (2018, co-supervised with L. Stella)

Lorenzo Napolitano, *"Archeologia stellare: una prospettiva locale sull'Universo antico"* (2018)

Sara Marcello, *"Archeologia stellare: una prospettiva locale sull'Universo antico"* (2018)

[1] Before 1/11/2016 an internal supervisor was appointed for students who have worked under my supervision, as at that time I was still working for INAF.

Vania Vellucci, *"La ricerca dei primi buchi neri nelle galassie nane locali"* (2018)

Leandra Primicino, *"La funzione di massa iniziale delle stelle"* (2017)

Luca Consolini, *"Proprietà della polvere interstellare"* (2017)

Alessandro Trinca, *"La formazione dei primi buchi neri super-massicci"* (2017)

Supervision of postdoctoral fellows
Dr. Luca Graziani, Amaldi Research Center Fellow (2019-2021)

Dr. Stefania Marassi, INAF/Osservatorio Astronomico di Roma (2013-2016)

Dr. Luca Graziani, INAF/Osservatorio Astronomico di Roma (2013-2016)

Dr. Rosa Valiante, INAF/Osservatorio Astronomico di Roma (2011-2015, 2015-2018)

Dr. Antonella Maselli, INAF/Osservatorio Astrofisico di Arcetri (2008-2010)

Part V - Society memberships, Awards and Honors

Society memberships
EAS European Astronomical Society
IAU International Astronomical Union
SIGRAV Società Italiana per la Relatività Generale e la Fisica della Gravitazione

Awards
Riconoscimento per l'eccellente insegnamento universitario, attributed to the top 5% of Professors from the Faculty of Science of Sapienza University of Rome (Vth edition, 13/12/2018)

ERC-Starting Grant for the project *FIRST: the first stars and galaxies* (2012-2017)

Abilitazione scientifica nazionale 2017, idoneità a professore di prima fascia nel settore 02/C1

Abilitazione scientifica nazionale 2012, idoneità a professore di seconda fascia nel settore 02/C1

Senior Excellence Grant, Centro "Enrico Fermi" (http://www.centrofermi.it/) (2003-2006).

Press releases
Chandra Deep Field South: Early Black Holes May Have Grown in Fits and Spurts - Chandra-NASA press release (31/05/2017)
http://chandra.harvard.edu/photo/2017/cdfs2/
https://erc.europa.eu/projects-figures/stories/early-black-holes-may-have-grown-fits-and-spurts - European Research Council press release (31/05/2017)

Così ingrassarono i buchi neri primordiali- INAF press release (31/05/2017)

The first black holes keep revealing secrets about our universe - Horizon - The EU research and innovation magazine
https://horizon-magazine.eu/article/first-black-holes-keep-revealing-secrets-about-our-universe-prof-raffaella-schneider.html

Ricerca: un'astronoma italiana è FIRST - Media INAF (18/10/2012)
https://www.media.inaf.it/2012/10/18/ricerca-un'astronoma-italiana-e-first/

2004 ISI Special Topic Site Interview for the third most cited paper on black holes

Astronomi italiani risolvono il mistero della polvere nell'universo primordiale - INAF press release (30/09/2004)

Sulle tracce delle prime stelle - INAF press release (24/04/2003)

Part VI - Funding Information[2]

INAF/ASI GRANT TO SUPPORT THE ITALIAN PARTICIPATION TO PHASE A STUDY OF SPICA
Role: Research Unit Coordinator
Total Grant Amount: 400000 €
Project duration: 2018 – 2020

SAPIENZA VISITING PROFESSOR GRANT CALL 2018
Role: Proponent
Total Grant Amount: 4500 €

SAPIENZA SMALL PROJECT RESEARCH GRANT 2018
Role: Principal Investigator
Total Grant Amount: 3000 €
Project title: *The infrared view of the dusty Universe*
Project duration: 2018 – 2020

SAPIENZA SMALL PROJECT RESEARCH GRANT 2017
Role: Principal Investigator
Total Grant Amount: 3800 €
Project title: *The gas and dust cycle in and out of galaxies*
Project duration: 2017 – 2019

PRIN SKA/CTA INAF 2016
Role: co-Investigator
Total Grant Amount: 320000 €
Project title: *FORmation and Evolution of Cosmic STructures (FORECaST) with Future Radio Surveys*
Project duration: 2017 – 2019

FUNDING FOR A Ph.D. GRANT - INAF 2015
Role: Proponent and scientific supervisor
Grant amount (approximate): 49864 €
Project title: *The gas and dust content of high-redshift galaxies*
Project duration: 2015 – 2017

EUROPEAN RESEARCH COUNCIL STARTING GRANT 2012[3]
Role: Principal Investigator
Grant amount: 882807 €
Project title: *The First Stars and Galaxies*
Project number: 306476
Project duration: 1/10/2012 - 30/09/2017

PRIN-MIUR 2010 2011
Role: co-Investigator
Total Grant Amount: 798700 €
Project title: *Chemical and dynamical evolution of the Milky Way and Local Group galaxies*
Project duration: 2013 – 2016

[2] For National projects (PRIN and INAF/ASI), the grant amount refers to the total received by multiple institutions.

[3] The project was classified as a CONSOLIDATOR GRANT but in 2012 STARTING AND CONSOLIDATOR grants were still under a common call.

PRIN-INAF 2010
Role: Research Unit Coordinator
Total Grant Amount: 92500 €
Project title: *THE 1 BILLION YEAR OLD UNIVERSE: Probing Primordial Galaxies and the Intergalactic Medium at the Edge of Reionization*
Project duration: 2010 – 2012

PRIN-INAF 2009
Role: co-Investigator (before 2010) and National Research Coordinator (after 2010)
Total Grant Amount: 100000 €
Project title: *New light on the early Universe with sub-mm spectroscopy*
Project duration: 2009 – 2011

FUNDING FOR A Ph.D. GRANT - INAF 2009
Role: Proponent and scientific supervisor
Grant amount (approximate): 49864 €
Project title: *The origin of high-z dust*
Project duration: 2009 – 2011

PRIN-INAF 2008
Role: co-Investigator
Total Grant Amount (approximate): 46000 €
Project title: *Galaxies under a microscope: the cosmological evolution of mass accretion and metal enrichment from spatially-resolved elemental abundances and dynamics of high-redshift galaxies*
Project duration: 2008 – 2010

Part VII – Summary of Scientific Achievements

Early Achievement-Track-Record
141 publications (99 in peer-reviewed journals)
2 publications in Nature (1 as first author and 1 as second author)
34 publications as first author (18 in peer-reviewed journals)
Since 2000:
33 institute seminars and general colloquia
84 talks given at international conference of astrophysics and relativistic astrophysics
50 invited presentations
8 invited reviews

Bibliometric information
ISI web of knowledge database as of 3 June 2019 (https://apps.webofknowledge.com)
Total production:
123 Papers
99 Refereed papers
Citations (only refereed papers): 5006
Mean number of citations per article (only refereed papers): 50.57
h-index: 36
normalized h-index[4]: 1.44
Total impact factor[5]: 547.9
Mean impact factor per publication: 5.534

Production in the past 15 years (2004-2019):
111 Papers
88 Refereed papers
Citations 3994
Mean number of citations per article 45.39
h-index 34
Total impact factor: 477.89
Mean impact factor per publication: 5.430

SCOPUS database as of 3 June 2019 (https://www.scopus.com/)
Total production:
119 Papers
98 Refereed papers
Citations (only refereed papers): 4550
Mean number of citations per article (only refereed papers): 46.43
h-index 35
normalized h-index: 1.40

Production in the past 15 years (2004-2019):
108 Papers
87 Refereed papers
Citations (only refereed papers): 3574
Mean number of citations per article (only refereed papers): 41.1
h-index 34

[4] h-index divided by academic seniority, taken as time span from graduation.
[5] Based on the IF reported by ISI_JCR database (https://apps.webofknowledge.com).

Major scientific achievements[6]

(1) <u>Gravitational wave emission from astrophysical sources</u>

During my PhD, I have studied the stochastic backgrounds of gravitational waves from different populations of sources (rotating neutron stars, black holes, compact binary systems) and estimated their detectability for ongoing and planned interferometers. My work was the first one to extend this analysis to extragalactic sources exploiting data on the cosmic star formation rate coupled to single and binary stellar population synthesis models ([2] - [6]). As a result of my PhD achievements, I have been asked to be a member of the ESA science advisory group for the Laser Interferometer Space Antenna.
It is clear that these signals are interesting not only as sources of foreground for signals of primordial origin, but also because they contain information on the nature of stellar populations in high redshift galaxies and on the mechanisms of gravitational signal emission. For this reason, these studies have recently been resumed using new observational estimates of high redshift star formation rates and numerical simulations to quantify the contribution of different stellar populations (Pop III / Pop II), characterized by different initial mass functions ([32], [37]). Furthermore, new gravitational waveforms have been used to estimate the contribution of magnetars (neutron stars in rapid rotation with magnetic fields $B > 10^{14} - 10^{16}$ Gauss), and of the inspiral, coalescence and ring-down of binary black hole systems to a background of gravitational waves of astrophysical origin ([40], [42]).
Following the detection of the first GW event, GW150914, we investigated the possibility of using stochastic backgrounds produced by coalescing binary black holes to constrain modified theories of gravity, showing that advanced-LIGO/VIRGO will be able to significantly improve current bounds obtained from observations of binary pulsars ([75]).

Finally, the range of black hole masses inferred from the gravitational wave emission associated to their merger in the first and second observing runs of the LIGO/VIRGO collaboration has made clear that at least a fraction of these systems (particularly the most massive, such as GW150914 and GW170729) must have formed in low metallicity environments. Given my experience in low-metallicity star formation and galaxy evolution at high redshift (see points 2 and 3 below), I proposed a novel theoretical model to characterize the formation and coalescence sites of compact binaries in a cosmological context ([87]). This is based on the coupling between a binary population synthesis model, similar to the one used in [5] and [42], with a high resolution cosmological simulation, capable of resolving the low-metallicity star forming regions where the progenitor stars of these massive black holes have formed ([62], [82]). This approach allows to characterize the formation and coalescence sites of different populations of compact binaries ([99]), and it naturally accounts for observed galaxy scaling relations (such as the mass-metallicity and fundamental plane of metallicity, [33], [46], [47]) showing that low-metallicity star forming systems are preferentially confined in low mass galaxies that form stars at low rates. It is important to stress that none of the previous estimates of compact binary formation and coalescence, including our pioneering ([2]-[6]) and more recent ([32], [40], [42]) works could account for these effects, being based on metallicity-corrected, redshift dependent cosmic star formation rates. This new approach has a large potential and I have joined the Gravitational Wave International Commitee to contribute to third generation detectors science case, co-signing a dedicated science white paper for the Astro2020: Decadal Survey on Astronomy and Astrophysics.

(2) <u>Star formation in the high redshift Universe and stellar archaeology</u>
In 2002, I have proposed a physical scenario for the transition from very massive Population III stars to Population II/I stars with masses comparable to those presently observed ([7]). Although part of this research started in 2001 with the work by Bromm et al. (2001, MNRAS, 328, 969), I and my collaborators were the first who emphasized the role of cooling by dust grains. The so-called critical metallicity scenario, presented in a paper on Nature ([9]), has been widely accepted by the scientific

[6] Relevant scientific publications are referred to using their corresponding number in the Refereed publication list below.

community. Since then, I explored the observational consequences of the Pop III/II transition on cosmic scales, investigating this process through semi-analytical models and numerical studies ([19]-[23], [25], [26]).

By studying the collapse of protostellar clouds, we have shown that dust dominates the thermal evolution already at very low metallicity, $Z_{cr} = 10^{-6}\ Z_{sun}$, favoring the formation of low-mass stars ([17], [48]). This allowed me to make theoretical predictions to compare with observations of metal-poor stars of the halo of our Galaxy and its satellites, through the so-called stellar archaeology. The existence of a very metal-poor star in the Galactic halo, SDSS J1029 + 172927, discovered in 2012 by Caffau et al. (A&A, 542, A51) with a total metallicity of $Z < 5\ 10^{-5}\ Z_{sun}$, is very difficult to explain without invoking dust-driven fragmentation in its (almost) primordial star forming parent gas cloud. The theoretical interpretation of *"the star that should not exist"* ([49], [52]) was key for the success of my ERC consolidator grant proposal on *"The first stars and galaxies"* that run from 2012 to 2017. Systematic studies of low-metallicity star forming regions have allowed me to explore the consequences of adopting different Population III star initial mass functions on low-metallicity stars in the Galactic halo and the origin of their carbon-enhancement ([58], [62], [77]), including that of the most iron-poor star ([56], [59]).

It is clear that understanding the efficiency of star formation in the early Universe and the nature of the stellar populations that inhabit the first galaxies are essential to identify the sources of cosmic reionization and the feedback that these galaxies have on the intergalactic medium at redshift that are currently unaccessible to observations ([19], [25], [26], [62]). Hence, our model predictions will be key to interpret observations obtained with future facilities, such as JWST, ELT, and SKA. In addition, knowledge of the stellar mass distribution as a function of metallicity has an important impact on the rate of supernova explosions and on the mass distribution of stellar remnants, and hence on potential sources of gravitational waves for LIGO/VIRGO interferometers.

(3) <u>Dust sources: from the Local Universe to the high-redshift frontier of the observable Universe</u>

Observations in the mm and sub-mm bands obtained with ALMA and the interferometer at Plateau de Bure, have provided strong evidence for the presence of dust at very high redshift, as high as z = 8.38, when the Universe was only 600 Myr old. Dust continuum at these extreme redshifts has been detected in association with starbursts galaxies, quasar host galaxies, and - more recently - "normal" star forming galaxies, which form stars at rates of a few tens of solar masses per year. What are the sources capable of forming dust on such short time scales, such as those available at z > 6, when the Universe was less than 1 Gyr, is still a strongly debated topic. The importance of understanding the mechanisms of dust production in the early Universe is accentuated by the possibility that the properties of dust commonly used to interpret the observations of high redshift galaxies - normally calibrated on observations of nearby galaxies - may not be adequate.

Since 2004, I have been investigating the formation of dust in supernova ejecta, extending previous studies to the first pair-instability supernovae ([14]), to core-collapse supernovae with progenitor stars of different masses and metallicity ([24], [52]), explosion energies ([68]) and rotation rates ([98]). The model predictions have been confirmed by careful comparison with observations of local supernova remnants ([70]) and, in a paper published on Nature, have allowed to interpret the peculiar extinction curve inferred for a z = 6.2 QSO ([16]). Systematic analyses of additional quasars extinction curves at z > 4 have provided hints of a possible evolution of dust properties ([38]), while the interpretation of the emission properties of quasar hosts and of normal star forming galaxies at similar redshift seem to require additional dust formation channels ([41], [57], [64]).

In collaboration with experts on the late evolution of intermediate-mass stars, during my ERC project I have contributed to the development of the first grid of dust yields from Asymptotic Giant Branch stars

with varying mass and metallicity ([43], [44], [50], [51], [53], [80]) based of fully integrated stellar models. We have then compared model predictions with observations in the Magellanic Clouds ([54], [55], [60], [61]), in low-metallicity dwarf galaxies ([71]) and in the Milky Way ([90]). These new models have then been used to interpret the evolution of galaxy colours and their interstellar dust masses across the epoch of cosmic reionization ([76]) showing that the most massive stars are already dust-enriched even at redshifts as high as z = 8, in agreement with the observations. Thanks to these scientific achievements, I have been invited to participate to the Galaxy Evolution Team of SPICA (a space infrared telescope for cosmology and astrophysics, [88]), to three white papers on cosmic dawn, reionization and low metallicity galaxies submitted to the Astro2020: Decadal Survey on Astronomy and Astrophysics (Cooray et al. 2019, Cuby et al. 2019, Burgarella et al. 2019), and to several observational campaigns with ALMA, including a large program submitted to the last call (Cycle 7, April 2019) aimed at obtaining redshift, dust continuum, and kinematic properties for a large number of bright z = 7 - 9 galaxies. Finally, the ability to predict how metals and dust are distributed within galaxies has important implications for the properties of star forming regions, particularly at low metallicity where massive stars are more likely to end their lifes as massive black holes, comparable in mass to the most massive systems detected so far by the LIGO/VIRGO collaboration.

(4) <u>The origin of the first supermassive black holes</u>

The history of formation of supermassive black holes and their impact on their host galaxy remain two fundamental unsolved problems in the history of cosmic structure formation. Theoretical models are not yet capable of predicting a unique formation route for supermassive black holes at z > 6 starting from initial black holes of much smaller mass, the so-called BH seeds. If they have masses $<10^4$ M_{sun}, these must form at z >> 10 and continuously increase their masses by accreting at the Eddington limit. BH seeds of mass ~ 100 - 1000 M_{sun} may form at high redshift from the collapse of Population III stars ("light" seeds) or from run-away collisions of Population II stars formed in dense clusters at very low metallicity ("intermediate-mass" seeds); an alternative scenario envisages the formation of "heavy" mass seeds ~ 10^5 M_{sun} from the direct collapse of protostellar clouds in the first galaxies, provided that they have virial temperatures > 10^4 K (to activate the Lyα emission cooling channel) and that their physical conditions allow to suppress the formation of H_2 and fragmentation into stars. Semi-analytical studies of the evolution of proto-stellar clouds in these environments have shown that - even in this case - a small concentration of metals and dust produced by first-generation stars can induce fragmentation and prevent direct collapse and consequent formation of heavy seeds ([28]). Starting from 2011, I and my collaborators have proposed a new approach to study the formation of the first super-massive black holes, based on a semi-analytical model for the joint growth of nuclear BH and the host galaxy in a cosmological scenario for hierarchical evolution of structures ([41], [45], [57]). This model allowed us to explore the growth of BH ab initio, by statistically studying the relative importance of heavy and light seeds ([72]), the consequent impact of nuclear BH on the host galaxy and their observational signatures for future telescopes, such as JWST and Athena ([91], [92]). The theoretical predictions were compared with quasar samples at 5 < z < 7 ([57]) and with partially resolved observations of the outflow induced by the deposition of energy released by the growth of the black hole ([45], [73]). By combining the results of the semi-analytical model with a radiative transport code, we conducted one of the few studies in the literature examining the relative contribution of central black hole and stars to dust heating in the host galaxy, demonstrating quantitatively that the brightness of the quasars in the far IR is very sensitive to the evolutionary stage of the host black hole-galaxy system ([63], [97]).

Finally, we have investigate the possibility of super-Eddington growth of light seeds ([73], [86]), providing an explanation for the lack of X-ray observations of accreting black holes at z > 6 as due to the intermittent nature of their accretion process ([79], this paper has led to a NASA/Chandra press release). Because of our theoretical work, I and my collaborators have been involved in a number of observational campaigns, aimed at understanding the feedback of the nuclear black hole on the host

galaxy ([65], [74], [78]) and on the connection between black hole growth at high redshift and the surrounding gas-rich environment ([81], [84], [85], [93]).
Understanding the mass distribution of black hole seeds at very high redshift, their formation redshift, and their pairing through galaxy mergers, are key to make sensible predictions for third-generation gravitational wave experiments, such as the Einstein Telescope and the space-based LISA mission. For this reason, I and my collaborators have been invited to join the Astrophysics working group for LISA and the Gravitational Wave International Commitee 3G Science Case Team.

Scientific publications

International Peer-Reviews Publications

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Institute seminars and general colloquia (since 2000)

33. Dust in the early Universe
Institute of Astronomy, Cambridge, July 2018

32. Dusty galaxies in the young Universe
Kapteyn Institute, University of Groningen, October 2017

31. Reconstructing the cosmic dawn
Institut d'Astrophysique de Paris, March 2016

30. Cosmic dust: sources and evolution
Scuola Normale Superiore, Pisa, February 2016

29. Growing the first super-massive black holes: head start or super-Eddington accretion?
University of Zurich, November 2015

28. The first stars and galaxies
Dipartimento di Fisica, Sapienza Università di Roma, May 2015

27. The first stars and galaxies
Dipartimento di Fisica, Università di Firenze, May 2015

26. The first stars and galaxies
INAF/Osservatorio Astrofisico di Arcetri, January 2015

25. The first stars and galaxies
Institute of Astronomy, Cambridge, November 2014

24. Dust formation in the first supernovae
Osservatorio Astrofisico di Trieste, November 2014

23. The growth of the first quasars: constraints from the host galaxies
KITP, Santa Barbara, July 2013

22. The first stars and galaxies
Heidelberg Joint Astronomical Colloquium, June 2013

21. The first stars and galaxies
Dipartimento di Fisica, Università di Roma 3, Roma, May 2013

20. Dust in the Early Universe
Tinsley Colloquium, University of Texas at Austin, January 2011

19. Dust in the Early Universe
INAF/Osservatorio Astronomico di Roma, October 2010

18. The formation of the first low-mass stars

NAOJ, Mitaka, January 2010

17. Beyond the frontiers of the observable Universe
INAF/Osservatorio Astrofisico di Arcetri, May 2009

16. Dust in the Early Universe
Heidelberg Joint Astronomical Colloquium, April 2009

15. Cosmic pollution: metals and dust from the first stars
INAF/Osservatorio Astronomico di Merate, March 2009

14. Star formation at the Cosmic Dawn
Dipartimento di Fisica, Sapienza Università di Roma, March 2009

13. Cosmic pollution: metals and dust from the first stars
ESO Joint Colloquium, November 2008

12. The transition from Pop III to Pop II stars
DARK Cosmology Center, July 2008

11. Chemical feedback and the Pop III to Pop II transition
DARK Cosmology Center, July 2007

10. The Cosmic Dawn: from first stars to the observable Universe
EGO – European Gravitational Observatory, March 2006

9. Star formation with the first dust
Institute for Nuclear Physics, Seattle, July 2006

8. The Cosmic Dawn: from first stars to the observable Universe
INAF/Osservatorio Astronomico di Brera, March 2005

7. The critical metallicity for cosmic star formation
Kavli Institute for Theoretical Physics, Santa Barbara, November 2004

6. The cosmic dawn
Centro studi e ricerche "Enrico Fermi" Roma, March 2004

5. L'alba cosmica: dalle prime stelle all'Universo osservato
Dipartimento di Fisica, Sapienza Università di Roma, February 2004

4. First stars, black holes and metals: facing the cosmic dawn
SISSA, Trieste, March 2003

3. First stars and early galaxy formation
Centro studi e ricerche "Enrico Fermi" Roma, March 2003

2. Stochastic backgrounds of gravitational waves from astrophysical sources
Dipartimento di Fisica dell'Università degli Studi di Milano, March 2001

1. Stochastic backgrounds of gravitational waves from astrophysical sources
Dipartimento di Fisica dell'Università degli Studi di Padova, January 2001

Talks given at international conference (since 2000)

Summary/discussion talks
Discussion leader
Euclid and beyond: the many faces of modern cosmology
February 11-14, 2019, Rome

Review talks
8. **"***Dust in high redshift galaxies"*
Hendrik van de Hulst Centennial Symposium
The interstellar medium of galaxies: status and future perspectives
November 5-9 2018, Leiden

7. "Dust in the early Universe"
Cosmic Dust: origin, applications & implications
June 11-15 2018, University of Copenhagen

6. "The formation and evolution of high-redshift dust"
EWASS 2017 European Week of Astronomy and Space Science
June 26–30 2017, Prague

5."Second generation stars"
First Stars V
August 1-5 2016 Heidelberg

4. "The first low-mass stars"
First stars, galaxies and black holes: now and then
June 15-19 2015, Gröningen, The Netherlands

3. "Low-metallicity star formation"
First Stars IV
May 23-27 2011 Kyoto, Japan

2. "The PopIII/II transition"
The First Stars and Galaxies: Challenges for the Next Decade
March 8-11, 2010 Austin, Texas

1. "*Stochastic backgrounds of GWs from extragalactic sources"*
14th Gravitational Wave Data Analysis Workshop
January 26-29, 2010 Rome, Italy

Invited talks
50. "Population III stars and gravitational waves"
Black Holes and Neutron Stars with Gravitational Waves
The Yukawa International Seminar 2019,
October 7-11 2019 Kyoto University

49. "The early growth of the first supermassive black holes"
Extremely big eyes on the early universe, Accademia de Lincei, from the
September 9-13 2019, Accademia dei Lincei Roma

48. "To grow or not to grow: constraints on early black hole formation"
Supermassive Black Holes: Enviroment and Evolution

June 19-22 2019, Corfù

47. "Astrophysical sources of gravitational waves: stochastic backgrounds, compact binaries, and massive black hole mergers"
On the crest of a wave: a four-decade long scientific journey in honor of Valeria Ferrari
February 22 2019 Sapienza University of Rome

46. "The dust content and colours of high redshift galaxies"
The growth of galaxies in the early Universe V
January 21-24 2019, Sesto Val Pusteria

45."The prodigious history of the first SMBHs and their host galaxies: Gargantua and Pantagruel at cosmic dawn"
The beauty and the beast, 13th meeting on Active Galactic Nuclei
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44."Titans in the early Universe: the early growth of the first quasars"
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41."Formation and coalescence sites of the first GW events"
New frontiers in gravitational-wave astrophysics
June 19-22 2017, Sapienza Università di Roma

40. "Bridging the near and the far: constraints on first star formation from stellar archaeology"
Francesco's Legacy: star formation in space and time
June 5–9 2017, Istituto degli Innocenti, Firenze

39. "Reconstructing the cosmic dawn"
Awareness conference on "Hot topics in Astrophysics"
Opticon/South Eastern European Countries (SREAC) meeting
Sept. 26-27, 2016, Lake Ohrid

38. "First stars and dust"
Molecules and dust as fuel to star formation
June 21–24 2016, KITP, Santa Barbara

37. "Dust and metal enrichment in the first galaxies"
The Metal Enrichment of Diffuse Gas in the Universe
July 27–31 2015, Sexten Center for Astrophysics

36. "First stars and their local relics"
Chemical and dynamical evolution of the Milky Way and Local Group galaxies
January 19 –24 2015, Sexten Center for Astrophysics

35. "The first stars and galaxies"

From Inflation to Galaxies: a workshop in honor of Sabino Matarrese
August 31-September 3 2015, Castiglioncello

34. "The first stars and galaxies"
Galaxy Evolution and Environment – GEE 4
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33. "Dust in the early universe and the contribution of AGB stars"
Why galaxies care about AGB stars III
July 28–1 August 2014, Vienna

32. "The evolution of the first quasars"
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June 30–4 July 2014, Sexten Center for Astrophysics

31. "Stelle e Galassie Primordiali"
Strutture cosmiche: dal sistema solare ai confini dell'Universo
58esimo congresso della Società Astronomica Italiana SAIT
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30. "The first stars and galaxies"
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29. "from the first stars to the Local Universe: stellar archaeology shed light on the first supernovae"
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28. "The patway to the first quasars: constraints from the host galaxies"
Italian Israeli Conference on High-Energy Astrophysics
October 13-14 2013, Akko

27. "Metals and dust: from molecular clouds to quasar host galaxies"
Metals in Tuscany 2012
June 17-22 2012, Abbazia di Spineto

26. "*The IMF of the first stars and galaxies*"
National Reionization Workshop
April 11-12 2012, Milano

25. "*Probing the formation of the first low-mass stars with stellar archaeology"*
The Low-metallicity ISM: Chemistry, Turbulence, and Magnetic Fields
October 8-12 2012, Göttingen

24. "The important role of dust for the formation of the first low-mass stars"
Data and Models for the Chemistry of the Early Universe
February 6-7 2012, Villa Il Gioiello, Firenze

23. "Chemical evolution of the first molecular clouds and the stellar initial mass function"
Theoretical and computational Astrochemistry
30 Agosto – 1 September 2012, Scuola Normale Superiore, Pisa

22. "From the first stars to the Local Universe: the role of dust as probed by stellar archaeology"
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21. "From the first black holes to the first quasars"
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20. "From dust to galaxies: testing the evolution of the stellar IMF"
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26 June- 1 July 2011, Ringberg Castle

19. "The nature of dust at high redshift"
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May 16-20, 2011, Como, Italy

18. "Stochastic backgrounds of GWs from extragalactic populations"
XIX SIGRAV Conference on General Relativity and Gravitational Physics
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17. "The role of dust and the CMB in high-redshift star formation"
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16. "High-redshift dust"
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June 29–July 3 2009 Niels Bohr Institute, Copenhagen Denmark

15. "The transition from Pop III to Pop II stars"
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May 12-15 2008 Boston, USA

14."Catching chemical feedback in action"
The first stars and gamma-ray bursts
April 16–20 2007 Niels Bohr Institute, Copenhagen Denmark

13. "The role of chemical feedback in high-z star formation"
First Stars III
July 16-20 2007 Santa Fe, USA

12. "*Star formation with the first dust"*
The First Stars and Evolution of the Early Universe
July 3-7 2006 Seattle, USA

11. "Chemical feedback and the stellar IMF"
From the first stars to local galaxies
July 10-14 2006 Lyon, France

10. "From CMB observations to high redshift star formation"
Francesco Melchiorri Memorial Conference
April 12-14 2006, Rome, Italy

9. "Constraining the epoch of very massive star formation"
First Light and Reionization

May 19-21 2005 Center for Cosmology, Irvine, USA

8. "A Pop III/II transition?"
Open questions in Cosmology: the first billion years
August 22-24, 2005 Garching, Germany

7. "The critical metallicity for cosmic star formation"
Galaxy-Intergalactic Medium Interactions
October 25-29 2004, Kavli Institute, Santa Barbara (USA)

6. "Gravitational Waves from the Cosmic Dawn"
XVI SIGRAV Conference on General Relativity and Gravitational Physics
September 13-16 2004, Vietri sul Mare, Italy

5. "The critical metallicity for cosmic star formation"
Detecting the first stars and AGN
AAS Meeting June 1 2004, Denver, Colorado (USA)

4. "The Cosmic Dawn: from first stars to the the observable universe"
XLVIII Congresso Nazionale della SAIt "I colori dell Universo"
April 19 - 23 2004, Milano (Italy)

3. "Signatures from the high redshift Universe"
VESF Virgo EGO scientific forum
December 9–10 2004 Cascina, Italy

2. "The critical metallicity"
Early Cosmic Structures and the End of the Dark Ages
June 4-7 2002 Marciana Marina, Italy

1. "Stochastic backgrounds at LISA frequencies"
NASA/ESA III LISA Symposium
July 11-14 2000, Potsdam, Germany

<u>Contributed talks</u>
26. The first black hole seeds: sustainable growth or failed development?
The early growth of the first super-massive black holes
July 2-7 2018 Sexten Center for Astrophysics

25. The formation and coalescence sites of the first gravitational wave events
CNOC X - X Congresso Nazionale Oggetti Compatti
December 12-15 2017, Padova

24. The multiwavelength view of the gravitational wave Universe
EWASS 2017 European Week of Astronomy and Space Science
June 26–30 2017, Prague

23. Unraveling the first billion years
EWASS 2017 European Week of Astronomy and Space Science
June 26–30 2017, Prague

22. **Italian SPICA workshop**
Settembre 4–5 2016, Osservatorio Astronomico di Roma

21. **Multiple Faces of Interstellar Dust**
September 13-16 2016, ISM – SPP Workshop, Garching

20. **South by High Redshift Meeting**
March 31 – April 3 2015, Austin

19. **Europa: Early Universe Research on Plasma Astrochemistry – ISSI meeting**
March 2015, Bern

18. **Metals and dust at low metallicity – ISSI meeting II**
January 2012, Bern

17. **Metals and dust at low metallicity – ISSI meeting I**
December 2010, Bern

16. **RTN meeting "The Physics of the Integalactic Medium"**
August 28 – September 1 2005 Kloster Seeon, Germany

15. **RTN meeting "The Physics of the Integalactic Medium"**
September 12 – 16 2004 Leiden, The Netherlands

14. **Reionizing the Universe**
June 27 – July 1 2005 Groningen, The Netherlands

13. **Centro Enrico Fermi – annual meeting**
April 14 2004 Roma, Italy

12. **Centro Enrico Fermi – annual meeting**
March 25 2003 Roma, Italy

*11***. Gravitational Waves: A Challenge to Theoretical Physics**
June 5 -9 2000 ICTP Trieste, Italy

10. **Incontri Nazionali di Fisica Teorica, *Le onde gravitazionali***,
March 2003, Vietri sul Mare, Salerno

9. **Italy-Japan bilateral collaboration**
Formation of the First Generation of Galaxies and Cosmological Implications (II)
December 2003 Niigata University, Niigata, Japan

8. **Italy-Japan bilateral collaboration**
Formation of the First Generation of Galaxies and Cosmological Implications (I)
December 2002 Osservatorio Astrofisico di Arcetri, Firenze, Italy

7. **XXI Texas Symposium on Relativistic Astrophysics**
December 2002, Firenze, Italy

6. **VII Congresso della Società Italiana di Cosmologia**
Osservatorio di Monteporzio, Roma, Italy

5. **RTN meeting "The Physics of the Integalactic Medium"**
September 12 – 16 2002 Castello di Gargonza, Italy

4. **RTN meeting "The Physics of the Integalactic Medium"**
October 4 – 7 2001 Eibsee, Germany

3. **EC-RTN *The Physics of the Intergalactic Medium***
Task group meeting on *First Stars, UV background and Reionization*
July 2001 Firenze, Italy,

2. **EC-RTN *The Physics of the Intergalactic Medium***
Task group meeting on *Feedback*
June 2001 Durham, UK

1. **EC-RTN *The Physics of the Intergalactic Medium***
General Meeting,
September 2000 Durham, UK

Participation to numerical and observational proposals

"Circumgalactic molecular medium fuels the growth of massive galaxies in the densest regions of the Universe"
Michele Ginolfi; Roberto Maiolino; Tohru Nagao; Stefano Carniani; Alessandro Marconi; Filippo Mannucci; Giovanni Cresci; Andrea Pallottini; Francesco Belfiore; Paola Santini; Raffaella Schneider; Avishai Dekel; Seiji Fujimoto, ALMA Cycle 7 Proposal (2019)

"ALMA & MUSE synergy to explore the impact of AGN-feedback on the circumgalactic gas"
Michele Ginolfi, Roberto Maiolino; Stefano Carniani; Raffaella Schneider; Manuela Bischetti, ALMA Cycle 7 Proposal (2019)

"Circumgalactic molecular gas fuels the growth of massive galaxies in protoclusters"
M. Ginolfi, R. Maiolino, R. Schneider, proposal for the IRAM/NOEMA interferometer (2018)

"A look around the Hot-DOGs: MUSE follow-up of three hyper-luminous, dust-obscured, outflowing QSOs at z > 3"
M. Ginolfi, R. Maiolino, E. Piconcelli, F. Arrigoni-Battaia, S. Carniani, S. Cantalupo, R. Schneider, L. Zappacosta, ESO call for proposal for period 102A (2018);

"Measure of BH mass and feedback in local obscured AGN"
F. Ricci, F. La Franca, E. Sani, E. Treister, M. BrusaA. Bongiorno, E. Piconcelli, C. Vignali, S. Bianchi, F. Onori, F. Duras, R. Schneider, ESO call for proposal for period 102A (2018);

"The role of fast outflows in quenching star formation from deep ALMA observations" S. Carniani, B. Balmaverde , M. Brusa, M. Cano Diaz, C. Cicone, G. Cresci, A. Ferrara, C. Feruglio, F. Fiore, A. Flütsch, S. Gallerani, R. Maiolino, V. Mainieri, F. Mannucci, A. Marconi, T. Nagao, H. Netzer, E. Piconcelli, E. Sani, R. Schneider, O. Shemmer, L. Testi, ALMA Cycle 5 Proposal (2017);

"Molecular gas reservoirs in hyper-luminous QSOs at the Cosmic Noon"
Manuela Bischetti, Fabrizio Fiore; Federica Duras; Angela Bongiorno; Enrico Piconcelli; Chiara Feruglio; Raffaella Schneider; Miguel Ángel Perez-Torres; Gabriele Bruni, ALMA Cycle 5 Proposal (2017)

A puzzling outflow in a QSO a z=2.4
Stefano Carniani; Hagai Netzer; Ohad Shemmer; Giovanni Cresci; Filippo Mannucci; Tohru Nagao; Fabrizio Fiore; Leonardo Testi; Mariana Cano Diaz; Roberto Maiolino; Claudia Cicone; Marcella Brusa; Vincenzo Mainieri; Simona Gallerani; Andrea Ferrara; Chiara Feruglio; Barbara

Balmaverde; Enrico Piconcelli; Eleonora Sani; Alessandro Marconi; Andrin Flütsch, ALMA Cycle 5 Proposal (2017)

"High Performance release of the GAMESH pipeline" L. Graziani, R. Schneider, M. de Bennassuti, S. Salvadori, PRACE Preparatory Access – 16th cut-off evaluation grant, Resource Awarded: 200000 GPU core hourse on CURIE FN@ GENCI @ CEA, France; 200.000 GPU core hours on CURIE TN @ GENCI @CEA, France (2014);

"The chemical properties of the first galaxies" L. Graziani, R. Schneider, K. Dolag ISCRA/CINECA project, Resource awarded: EURORA/PLX Clusters Budget (standard hours): 50000 hours; Galileo Host Budget: 25000 hours (2014-2015);

"High resolution- Milky Way type Galaxy formation simulation with GCD+" R. Schneider, L. Graziani, M. de Bennassuti, D. Kawata ISCRA/CINECA project, Resource awarded: EURORA/PLX Clusters Budget (standard hours): 100000 hours; Galileo Host Budget: 48308 hours (2014-2015);

"Gas and dust in the most luminous Lyman-alpha emitter at the epoch of re-ionisation: PopIII?" D. Sobral, D. Schaerer, F. Boone, A. Ferrara, L. Vallini, J. Matthee, B. Mobasher, H. Rottgering, R. Schneider, B. Darvish, ALMA Cycle 3 Proposal (2015);

"Exploring the Earliest Epoch of the Massive Dust Production", M. Ouchi, M. Ishigaki, R. Ellis, R. Schneider, K. Kohno; K. Nakanishi, H. Hirashita, S. Fujimoto, Y. Kurono, M. Mancini, Y. Harikane, Y. Ono, T. Shibuya, ALMA Cycle 3 Proposal (2015);

"Catching feedback in action: kinematical maps of galactic-scale outflows in luminous quasars", A. Marconi, D. Axon, M. Cano Diaz, G. Cresci, A. Gnerucci, R. Maiolino, F. Mannucci, T. Nagao, H. Netzer, G. Risaliti, M. Salvati, R. Schneider, O. Shemmer, M. Sirigu, ESO SINFONI proposal, 30 hours, observing period 86A (2010)

"A new source of cosmic dust", R. Maiolino, E. Oliva, S. Bianchi, R. Schneider, F. Mannucci, A. Ferrara, M. Pedani, TNG (Telescopio Nazionale Galileo) proposal, accepted for observing period AOT10 (August 2004 – January 2005), 7.5 nights

"The extreme gas and dust properties of the most distant quasars", R. Maiolino, E. Oliva, F. Mannucci, A. Marconi, A. Ferrara, R. Schneider, S. Bianchi, ESO-proposal, accepted for observing period 74 (October 2004-March 2005), 44 hours at VLT+8 hours at NTT

Part VIII - Public engagement and outreach

Publications
"*Apri gli Occhi Al Cielo*", E. Pezzulli, M. Orofino, R. Schneider, R. Valiante, S. Gallerani, T. Sbarrato, Mondadori Edizioni, in press
Collaboration with "*Il giornale dell'Astronomia*", journal of the SAIT (Italian Astronomical Society) for the column "*A come AstronomA*" (2011-2012) and with the astronomical dissemination newspaper "*L'Astronomia*" (2003-2004).

Promoting Gender balance and diversity in science
Co-proposer and coordinator of the observatory on *Gender and diversity in Physics at Sapienza (GIPSI)* https://sites.google.com/uniroma1.it/gender-and-diversity-physics/home

Chair of the organizing committee of the International Day of Women and Girls in Science (11 February 2019) at the Physics Department of Sapienza University of Rome https://sites.google.com/uniroma1.it/fisica-le-donne-e-la-ricerca/home

Public talks celebrating women achievements in Astronomy for the international women's day (2012, 2014, 2016, 2019)

Participation to the public initiative "*Dialoghi sulla costituzione, Articolo 9*" promoted by Laterza (21 May 2018, Florence)

Participation to the "She is an Astronomer" program on the occasion of the international year of astronomy (2009), coordinating the statistical analysis project "In the skies of statistics" (http://sheastro.arcetri.astro.it/)

Public and educational activities (2010-2019)
I contributed to the organization of the GWDAY 2018 and GWDAY 2019 organized by the Amaldi Research Center at the Department of Physics of Sapienza University of Rome. I have co-organized and contributed to the *ERC Open Labs* (15 March 2017) of the Physics Department within the ERC week *Celebrating Excellence in Research: 10 years of ERC in Sapienza*.
I was involved in the educational initiatives of the Astronomical Observatory of Rome, including the *Cosmoscuola* (July 2014, April 2015), participation to the *European Researchers' Night* (Editions 2013 and 2014). As a member of the *Science and Society Observatory* promoted by the II municipality of Rome, I participated to the science festival "*Scienza 3*" with initiatives in primary schools (from 2011 to 2014).

Public and educational activities (2001-2010)
As a member of the Astronomical Association Amici di Arcetri (since 2009), I was involved in educational initiatives of the Arcetri Astrophysical Observatory (2001-2010), including guided tours, astronomical exhibitions, participation to festivals and events, public conferences organized at the Planetarium of Florence and conferences in high schools within the "*Pianeta Galileo*" program funded by the Tuscany Region (2005-2010).

Part IX– Selected Publications[7]

(1) *Stellar sources of dust in the high-redshift Universe*
R. Valiante, **R. Schneider**, S. Bianchi, A. C. Andersen, MNRAS, 397, 1661 (2009)
DOI: 10.1111/j.1365-2966.2009.15076.x
Citations: 150
Journal IF: 5.103

(2) *Gravitational wave backgrounds and the cosmic transition from Population III to Population II stars*
S. Marassi, **R. Schneider**, V. Ferrari, MNRAS, 398, 293 (2009)
DOI: 10.1111/j.1365-2966.2009.15120.x
Citations: 26
Journal IF: 5.103

(3) *LSD: Lyman-break galaxies Stellar populations and Dynamics - I. Mass, metallicity and gas at z ~ 3.1*
F. Mannucci, G. Cresci, R. Maiolino, A. Marconi, G. Pastorini, L. Pozzetti, A. Gnerucci, G. Risaliti, R. **Schneider**, M. Lehnert, M. Salvati, MNRAS, 398, 1915 (2009)
DOI: 10.1111/j.1365-2966.2009.15185.x
Citations: 237
Journal IF: 5.103

(4) *Metals, dust and the cosmic microwave background: fragmentation of high-redshift star-forming clouds*
R.Schneider & K. Omukai, MNRAS, 402, 429 (2010)
DOI: 10.1111/j.1365-2966.2009.15891.x
Citations: 58
Journal IF: 4.888

(5) *The origin of dust in high-z QSOs: the case of SDSS J1148*
R. Valiante, **R. Schneider**, S. Salvadori, S. Bianchi, MNRAS, 416, 1916 (2011)
DOI: 10.1111/j.1365-2966.2011.19168.x
Citations: 107
Journal IF: 4.900

(6) *Imprint of the merger and ring-down on the gravitational wave background from black hole binaries coalescence*
Marassi, S.; **Schneider, R.**; Corvino, G.; Ferrari, V.; Portegies Zwart, S. Physical Review D, 84, 124037 (2011)
DOI: 10.1103/PhysRevD.84.124037
Citations: 33
Journal IF: 4.558

(7) *The first low-mass stars: critical metallicity or dust-to-gas ratio?*
Schneider, Raffaella; Omukai, Kazuyuki; Bianchi, Simone; Valiante, Rosa, MNRAS, 419, 1566 (2012)
DOI: 10.1111/j.1365-2966.2011.19818.x
Citations: 76

[7] The reported number of citations and journal impact factor have been taken from ISI web of knowledge database as of 31 May 2019 (https://apps.webofknowledge.com).

Journal IF: 5.521

(8) *The formation of the extremely primitive star SDSS J102915+172927 relies on dust*
Schneider, Raffaella; Omukai, Kazuyuki; Limongi, Marco; Ferrara, Andrea; Salvaterra, Ruben; Chieffi, Alessandro; Bianchi, Simone, MNRAS, 423, L60 (2012)
DOI: 10.1111/j.1745-3933.2012.01257.x
Citations: 52
Journal IF: 5.521

(9) *Dust formation around AGB and SAGB stars: a trend with metallicity?*
Ventura, P.; Criscienzo, M. Di; **Schneider, R**.; Carini, R.; Valiante, R.; D'Antona, F.; Gallerani, S.; Maiolino, R.; Tornambé, A. MNRAS, 424, 2345 (2012)
DOI: 10.1111/j.1365-2966.2012.21403.x
Citations: 66
Journal IF: 5.521

(10) *Decoding the stellar fossils of the dusty Milky Way progenitors*
M. de Bennassuti, **R. Schneider**; R. Valiante; S. Salvadori, MNRAS, 445, 3039 (2014)
DOI: 10.1093/mnras/stu1962
Citations: 51
Journal IF: 5.107

(11) *Dust production rate of asymptotic giant branch stars in the Magellanic Clouds*
Schneider, Raffaella; Valiante, Rosa; Ventura, Paolo; dell'Agli, Flavia; Di Criscienzo, Marcella; Hirashita, Hiroyuki; Kemper, Francisca, MNRAS, 442, 1440 (2014)
DOI: 10.1093/mnras/stu861
Citations: 50
Journal IF: 5.107

(12) *The dust mass in z > 6 normal star forming galaxies*
Mattia Mancini, **Raffaella Schneider**, Luca Graziani, Rosa Valiante, Pratika Dayal, Umberto Maio, Benedetta Ciardi and Leslie K. Hunt, MNRAS Letters, 451, L70 (2015)
DOI: 10.1093/mnrasl/slv070
Citations: 47
Journal IF: 4.952

(13) *Super-Eddington growth of the first black holes*
Pezzulli, Edwige; Valiante, Rosa; **Schneider, Raffaella**; MNRAS, 458, 3047 (2016)
DOI: 10.1093/mnras/stw505
Citations: 37
Journal IF: 4.961

(14) *From the first stars to the first black holes*
Valiante, Rosa; **Schneider, Raffaella**; Volonteri, Marta; Omukai, Kazuyuki; MNRAS, 457, 3356 (2016)
DOI: 10.1093/mnras/stw225
Citations: 25
Journal IF: 4.961

(15) *Faint progenitors of luminous z ~ 6 quasars: why don't we see them?*
Pezzulli, Edwige; Valiante, Rosa; Orofino, Maria C.; **Schneider, Raffaella**; Gallerani, Simona; Sbarrato, Tullia; MNRAS, 466, 2131 (2017)
DOI: 10.1093/mnras/stw3243
Citations: 16

Journal IF: 5.194
Press release: Chandra Deep Field South: Early Black Holes May Have Grown in Fits and Spurts - Chandra-NASA press release (31/05/2017) http://chandra.harvard.edu/photo/2017/cdfs2/
European Research Council press release (31/05/2017) https://erc.europa.eu/projects-figures/stories/early-black-holes-may-have-grown-fits-andspurts
INAF press release (31/05/2017) https://www.media.inaf.it/2017/05/31/cosi-ingrassarono-i-buchi-neri-primordiali/

(16) *The formation and coalescence sites of the first gravitational wave events*
Schneider, Raffaella; Graziani, Luca; Marassi, Stefania; Spera, Mario; Mapelli, Michela; Alparone, Matteo; de Bennassuti, Matteo, MNRAS Letters, 471, L105 (2017)
DOI: 10.1093/mnrasl/slx118
Citations: 14
Journal IF: 5.194

Rome, 4/6/2019