

Elena Amato

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ACADEMIC TRAINING 2001, Ph.D. in Astronomy
University of Florence, Florence, Italy

1998, Laurea in Physics
University of Florence, Florence, Italy

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RESEARCH INTERESTS My research interests are in the field of *theoretical High Energy Astrophysics*. From the point of view of basic physics processes, I am interested in the *acceleration and transport of relativistic particles* and the *physics of relativistic plasmas*. From the point of view of specific astrophysical sources and phenomena, my interests cover *Cosmic Rays, Supernova Remnants* and *Pulsar Wind Nebulae*.

RESEARCH EXPERIENCE **Researcher** 2001 -
INAF - Osservatorio Astrofisico di Arcetri

PhD student 1998-2001
University of Florence, Italy
Advisor: Prof. Franco Pacini
Thesis: "Particle acceleration and transport in Pulsar Wind Nebulae"

Undergraduate student 1997-1998
University of Florence, Italy
Supervisor: Prof. Franco Pacini
Thesis: "Modeling the spatial distribution of particles in the Crab Nebula"

PUBLICATION RECORD My research has lead to the publication of 61 articles in peer-reviewed international journals and more than 50 conference proceedings, with a total of more than 2950 citations and a H-factor of 34, as from ADS. A complete list of my publications can be found [here](#).

TEACHING	“High Energy Astrophysics” for undergraduates, University of Florence	2016 -
	“Cosmic Accelerators” for graduate students University of Florence	2010 - 2016
	Lecturer on “Pulsar Wind Nebulae” at the Cargese International PhD School, Cargese, France	May 2013
	Lecturer on “Pulsars and Wind Nebulae” at the ISAPP International PhD School, Paris, France	July 2012
SUPERVISING	Coordinator of a Marie Curie fellowship (IEF program): Dr. Yves Gallant, on project PWN Torii	2013-2014
	Cosupervisor of a graduate student in Astronomy at the University of Florence: Delia Volpi, “Non-thermal emission from relativistic MHD simulations of Pulsar Wind Nebulae”	2006-2009
	Cosupervisor of 1 undergraduate student in Physics and Astronomy at the University of Florence: • Virginia Bresci, Master thesis on “Some new aspects of Cosmic Ray transport”	2017-2018
	Supervisor of 4 undergraduate students in Physics and Astronomy at the University of Florence: • Stefano Menchiari, Master thesis on “Modelling the diffuse gamma-ray emission for the Cherenkov Telescope Array ” • Marco Rossetti, BSc thesis on “Positrons from Pulsar Wind Nebulae”	2018- 2016
	• Roberto Poggini, BSc thesis on “Self-generated waves and Cosmic Ray acceleration at Supernova Remnant shocks” • Enrico Randellini, BSc thesis on “High energy emission from pulsars”	2013 2009

OUTREACH	Coordinator of the CR physics outreach program and facilities at the Arcetri Astrophysical Observatory	2016 -
	More than 30 astronomy lectures for general public delivered within the Arcetri Observatory outreach program	2015 -
	More than 60 lectures for students of all ages, from elementary to high school at Arcetri Astrophysical Observatory	2013 -
	Supervision of high school students attending stages in astronomy at the Arcetri Astrophysical Observatory	2013 -
	public lectures on “Stellar Remnants” and “The Violent Universe” at two campuses for the orientation of undergraduates’ orientation, Quarrata, Italy	2011-2012
	public lecture on “Faster than light neutrinos” at Florence Planetarium	2011

ACTIVITY FOR THE SCIENTIFIC COMMUNITY	Service as member or coordinator of Science Working Groups:	
	–coordinator of the Cherenkov Telescope Array (CTA) Science Working Group on Cosmic Rays	2019-
	– deputy coordinator of the Cherenkov Telescope Array (CTA) Science Working Group on Cosmic Rays	2018-2019
	– active member of all CTA Science Working Groups on Galactic sources of emission	2017-

Service as **chair** or **co-chair** of **7 Scientific Organizing Committee:**

–“CNOC XI: Congresso Nazionale Oggetti Compatti XI", Firenze, Italy, 19-21 November 2019	2019
–“Particle acceleration and transport: from the Sun to Extragalactic Sources”, Università della Calabria, Rende (CS), Italy, November 2018	2018
–“43 rd European Physical Society Conference on Plasma Physics”, Leuven, Belgium, June 2016	2016
–ISSI workshop on “Jets and Winds in Pulsar Wind Nebulae, Gamma Ray Bursts and Blazars: Physics of Extreme Energy Release”, Bern, Switzerland, November 2015	2015
–“Astroparticle Physics Conference 2014”, Amsterdam, The Netherlands, June 2014	2014
–“TeVPa2012 Symposium”, Mumbai, India, December 2012	2012
–“TeVPa2010 Symposium”, Paris, France, July 2010	2010

Service as **member** of **14 Scientific Organizing Committees:**

–“36 th International Cosmic Ray Conference", Madison, Wisconsin, USA, July 2019	2019-
–“Supernova Remnants II: An Odyssey in Space after Stellar death", Crete, Greece, June 2019	2018-
–“Black Hole as Cosmic Batteries: UHECRs and Multi-messenger Astronomy”, Iguazu Falls, Brazil, 12- 14 September 2018	2018

–“High Energy Phenomena in Relativistic Outflows VI”, Moscow, Russia, September 2017	2017
– “35 th International Cosmic Ray Conference”, Bexco, Busan, Korea, July 2017	2017
– “Cosmic-Ray Origin Beyond the standard models: sec- ond edition”, San Vito di Cadore, Italy, September 2016	2016
–“6 th International Symposium on High-Energy γ -ray Astronomy”, Heidelberg, July 2016	2016
–“Modeling Pulsar Wind Nebulae”, Barcelona, Spain, June 2016	2016
–“High Energy Phenomena in Relativistic Outflows V”, La Plata, Argentina, October 2015	2015
–“COSPAR meeting 2014”, session E4, Moscow, Russia, August 2014	2014
–“Cosmic-Ray Origin Beyond the standard models”, San Vito di Cadore, Italy, March 2014	2014
–“High Energy Phenomena in Relativistic Outflows IV”, Heidelberg, Germany, July 2013	2013
–“Frontiers of Plasma Astrophysics”, Berkeley, CA, USA, January 2012	2012
–“Pulsars in their diversity”, Elba Island, Italy, June 2009	2009

Referee for all main international journals in Physics and Astrophysics:	2001-
The Astrophysical Journal, The Astrophysical Journal Letters, Astronomy and Astrophysics, Monthly Notices of the Royal Astronomical Society, Space Science Review, Physics of Plasmas, Physical Review Letters, Physical Review D, Journal of Cosmology and Astroparticle Physics, Astroparticle Physics, Physics Today, Reports on Progress in Physics, Science	
Referee for funding agencies:	
Italian Ministry of Education and Research	2013 -
Netherlands Organisation for Scientific Research	2017 -
National Science Foundation	2016 -
French National Research Agency	2016 -
German Israel Foundation	2015
Romanian Research Council	2011-2014
Service in international juries and selection committees	
Member of several postdoc and young researcher selection committees for positions at the Arcetri Astrophysical Observatory and at the University of Florence	2005-
Member of PhD thesis jury at the University of Paris	2017
Member of the committee awarding the Magini prize for laurea theses in Astrophysics	2017
Referee of theses at the University of Florence	2016-
Member of a “habilitation” jury at the University of Paris	2014

RESEARCH GRANTS	2017-14-H.0 ASI-INAF: <i>A Modern Approach to Cosmic Ray Transport in the Galaxy</i>	research unit PI	2017-2019
	CTA-SKA INAF 2016: <i>Probing particle acceleration and γ-ray propagation with CTA and its precursors</i>	participant	2017-2019
	PRIN-MIUR: <i>Multi-scale simulations of High Energy Astrophysical Plasmas</i>	participant	2017-2020
	FP7-PEOPLE-2012-IEF: <i>MHD modeling of wind tori and particle acceleration in Pulsar Wind Nebulae</i>	coordinator	2013-2014
	PICS INAF 2012: <i>Pulsar Wind Nebulae, Supernova Remnants and the origin of Cosmic Rays</i>	participant	2012-2015
	PRIN-INAF 2012: <i>High Energy Phenomena in the remnants of stellar collapse</i>	participant	2013-2015
	ASTRI <i>Astrofisica con Specchi a Tecnologia Replicante Italiana</i>	participant	2012-2014
	PRIN-INAF 2010: <i>Particle acceleration in Supernova Remnants and the Origin of Cosmic Rays: a modern perspective</i>	participant	2011-2013
	ASI TH-031: <i>MHD Simulations of relativistic plasmas and their high energy emission</i>	participant	2006-2009
	ASI TH-022: <i>Non-linear particle acceleration at shock waves: implications for X/gamma-ray astronomy and the origin of cosmic rays</i>	participant	2006-2009
	PRIN-MIUR 2006: <i>Particle acceleration in astrophysical sources and the origin of Cosmic Rays</i>	participant	2007-2009
	PRIN-INAF 2004: <i>Relativistic plasma in astrophysical sources</i>	participant	2005-2007
	PRIN-MIUR 2002: <i>Cosmic sources of high energy particles and photons</i>	participant	2003-2005

**SELECTED
INVITED
TALKS**

More than 29 invited talks delivered at international workshop and conferences during the last 10 years. A selection of these is listed below

- ▷ “Non-linear self-generated turbulence” at the workshop *Searching for the sources of Galactic cosmic rays*, APC, Paris, France, 11-14 December, 2018 2018
- ▷ “On the acceleration and transport of Galactic Cosmic Rays” at 42nd *COSPAR Scientific Assembly*, Session E1.5, Pasadena, CA, USA, 14-22 July 2018 2018
- ▷ “Non-linear diffusive shock acceleration: theory confronts observations” at 42nd *COSPAR Scientific Assembly*, Session D1.1, Pasadena, CA, USA, 14-22 July 2018 2018
- ▷ “Non linear Cosmic Ray transport” at the workshop *CRATER 2018*, Gran Sasso Science Institute, L’Aquila, Italy, 2018 2018
- ▷ “On the mechanisms of particle acceleration in astrophysical sources” at the workshop *Cosmic Rays: the salt of the star formation recipe*, Firenze, Italy, May 2-4, 2018 2018
- ▷ “Origin and propagation of Galactic Cosmic Rays” at *LXII Congresso SAIIt*, Teramo, Italy, May 2-5, 2018 2018
- ▷ “On the origin of Galactic Cosmic Rays” at the workshop *Cosmic Accelerators: Understanding Nature’s High-Energy Particles and Radiation*, Annapolis (MD), USA, November 6-9, 2017 2017
- ▷ “On the transport of Cosmic Rays throughout the Galaxy” at the workshop *Plasma Astrophysics, from the Laboratory to the Non-Thermal Universe*, Oxford, UK, July 3-5, 2017 2017
- ▷ “3D MHD simulations of electron-positron plasmas in PWNe” at *1st JPP Frontiers in Plasma Physics Conference*, Spineto, Italy, May 24-26, 2017 2017
- ▷ “Recent Developments on the CR-SNR connection” at *Supernova Remnants: an Odyssey in Space after Stellar Death*, Crete, Greece, June 6-11, 2016 2016
- ▷ “The origin of Galactic Cosmic Rays”, at the workshop *Relativistic Laboratory Astrophysics*, Harnack House, Berlin, Germany, November 22-25, 2015 2015
- ▷ “Particle Acceleration and Radiation in Pulsar Wind Nebulae” in parallel session of *Frontiers in Fundamental Physics 14*, Marseille, France, July 14-18, 2014 2014

- ▷ “Particle Acceleration in Astrophysical Sources” in plenary session of *Frontiers in Fundamental Physics 14*, Marseille, France, July 14-18, 2014 2014
- ▷ “Isotropy/anisotropy in Galactic CRs: sources and magnetic fields” at the workshop *The anisotropic Universe*, Amsterdam, Netherland, September 25-27, 2013 2013
- ▷ “The theory of Pulsar Wind Nebulae” at the workshop *High Energy Phenomena in relativistic Outflows IV*, Heidelberg, Germany, July 22-26, 2013 2013
- ▷ “On the origin of the positron excess” at the *11th AGILE workshop*, Rome, Italy, May 16-17, 2013 2013
- ▷ “Pulsar Winds and Nebulae” at the workshop *Neutron Stars 2013*, Amsterdam, The Netherlands, May 6-10, 2013 2013
- ▷ “Particle Acceleration in Pulsar Wind Nebulae” at the workshop *Arcetri 2012 Workshop on Plasma Astrophysics*, Florence, Italy, November 5-8, 2012 2012
- ▷ “The origin of Galactic Cosmic Rays: theory confronts observations” at the *2012 April Meeting of the American Physical Society*, Atlanta (GO), USA, March 31-April 3, 2012 2012
- ▷ “Galactic Cosmic Rays: old and new puzzles” at the workshop *Frontiers of Plasma Astrophysics*, Berkeley (CA), USA, January 27-28, 2012 2012
- ▷ “On the origin of Galactic CRs” at the workshop *Arcetri 2011 Workshop on Plasma Astrophysics*, Florence, Italy, 17-21 October 2011 2011
- ▷ “The streaming instability” at the workshop *Cosmic Rays and their interstellar medium*, Montpellier, France, June 26-July 1, 2011 2011
- ▷ “Theory of Pulsar Wind Nebulae” at the workshop *Pulsars: Theory and Observations*, Meudon, France, November 16-20, 2009 2009
- ▷ “Modeling of Pulsar Wind Nebulae” at the KITP Conference on *Nonlinear Processes in Astrophysical Plasmas*, Kavli Institute in Santa Barbara, CA, USA, September 28 - October 2, 2009 2009
- ▷ “Particle Acceleration in Pulsar Wind Nebulae” at the Conference *TeV Particle Astrophysics 2009*, SLAC National Laboratory Accelerator, Menlo Park, CA, USA, July 13-17, 2009 2009

- ▷ “Pulsar Wind Nebulae and Relativistic Shocks” at the workshop on *Supernova Remnants and Pulsar Wind Nebulae in the Chandra Era*, Boston, MA, USA, July 8-10, 2009

2009
- ▷ “Dynamics and non-thermal emission properties of PWNe” at the Ringberg Workshop on *The high-energy astrophysics of outflows from compact objects*, Ringberg, Germany, December 2008

2008
- ▷ “Particle acceleration at Relativistic Transverse Magnetosonic Shocks” at the Workshop on *Kinetic modeling of astrophysical plasmas*, Cracow, Poland, October 5-9, 2008

2008
- ▷ “Pulsar Wind Nebulae: Theoretical Overview” in the session on *Astrophysical Studies of Neutron Stars from Multi-wavelength Observations* at the COSPAR Scientific Assembly, Montreal, Canada, July 2008

2008