

Paolo Esposito | Curriculum Vitae

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■ [REDACTED] ■ [REDACTED]
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Research interests

Neutron stars (in particular: magnetars and magnetic field, high-energy properties, timing, binary systems, pulsar wind nebulae and supernova remnants). Black hole binaries and ultraluminous X-ray sources. White dwarfs in binary systems. Precursors of gravitational wave events. Gamma ray-bursts and high-energy transients. Data mining of X-ray archives (systematic searches for periodic modulations and for short-lived transients).

Employment

- **University School for Advanced Studies – IUSS Pavia** **Pavia, Italy**
Senior researcher (assistant professor) 05/2019–present
- **INAF/IASF–Milano** **Milano, Italy**
Research associate 09/2018–04/2019
- **University of Amsterdam** **Amsterdam, The Netherlands**
Research associate at the Anton Pannekoek Institute 06/2016–08/2018
- **Harvard–Smithsonian Center for Astrophysics** **Cambridge (MA), USA**
Fulbright Research Scholar at the Smithsonian Institution 11/2014–07/2015
- **INAF/IASF–Milano** **Milano, Italy**
[REDACTED] *Fellow* 06/2012–05/2016
- **INAF/Astronomical Observatory of Cagliari** **Cagliari, Italy**
Research associate 06/2010–05/2012
- **INAF/IASF–Milano** **Milano, Italy**
[REDACTED] *Fellow* 12/2008–05/2010

Academic qualifications

Education

- **University of Pavia** **Pavia, Italy**
Ph. D. in Physics 01/2009
Thesis: *X-ray observations of Galactic isolated neutron stars*; Supervisors: [REDACTED]

University of Milan

Milano, Italy

- *Laurea in Physics (equivalent of B. Sc. and M. Sc.)*

04/2005

Thesis: *XMM–Newton observations of two soft gamma-ray repeaters: SGR 1806–20 and SGR 1627–41*;
Supervisors: [REDACTED]

Habilitation

- **Italian National Scientific Qualification (ASN)** to University Professor of Astronomy and Astrophysics (s.c. 02/C1, s.s.d. FIS/05; 2017–2026)

Honors

- **Fulbright Research Scholar** fellowship of the U.S. Department of State
- **Permanent research position** at INAF (Italian National Institute for Astrophysics), awarded in November 2018 but declined

Languages

- **Italian:** Mother tongue
- **English:** Good, spoken and written
- **Russian:** elements (one university course); **Croatian:** elements; **Dutch:** elements

Publications

Summary (for the complete list, see my ADS library online *here*)

- 158 refereed publications (A&A, ApJ, JHEAP, MNRAS, Nature, Nat. Astron., Science);
24 as first author, 27 as second, and 33 as third
- 3 book chapters (peer reviewed)
- 17 refereed conference proceedings
- 42 other conference proceedings
- 100 astronomical circulars (ATel, GCN)

Note that ~56% of these works are without my Ph.D. supervisors, and none of them resulted from the membership in collaborations that publish with all their members as authors, highlighting my personal high productivity and the independence of my research. Several results were the subject of press releases by the European Space Agency, NASA and other institutions (p. 6), and had resonance in mass and speciality media.

Citations and bibliometric indicators:

- NASA/ADS: more than 5,700 citations; H-index: 38; first author H-index: 16; i10-index: 123;
- Google Scholar: more than 6,700 citations; H-index: 43; first author H-index: 15; i10-index: 126.

Identifiers

- ORCID ID: 0000-0003-4849-5092
- Scopus Author ID: 15821745200
- Web of Science ResearcherID: ABE-6389-2020

Experience

Teaching

- **IUSS short course “Black Holes”** (creator and holder; 2019–20, 2020–21 college years).

- **Teaching assistant** in the course “*Astronomy*” at University of Pavia (2009–2010 college year, Master’s degree) held by Prof. [REDACTED] (I gave lectures on supernova explosions and neutron star physics).
- **Lecturer** at the School “*Principles of Multi-wavelength High Time Resolution Astrophysics*”, Santa Margherita di Pula (Sardinia, Italy), 2011 October 10–15, organised by the Opticon High Time Resolution Astrophysics (HTRA) network, the Cagliari Astronomical Observatory, and the University of Cagliari (I gave lectures on X-ray timing analysis techniques).
- **Unofficial advisor** for: 1 B. Sc. (U. Pavia), 2 M. Sc. (U. Milano; U. Massachusetts/Harvard), and 2 PhD students (U. Insubria; U. Amsterdam).
- **Supervisor** for:
 - [REDACTED] (M. Sc., U. Palermo / Erasmus+ @ U. Amsterdam, 2017);
 - [REDACTED] (B. Sc., U. Pavia, 2019);
 - [REDACTED] (B. Sc., U. Milano, 2020);
 - [REDACTED] (IUSS master diploma, 2020);
 - [REDACTED] (B. Sc., U. Milano Bicocca, 2021).

Outreach

- I participated in various **outreach events** for the general public and programs to introduce astronomy and space sciences to high-school students. Among these: “*Seeing the Invisible – Hunting for Black Holes*” (Milan, 2007 June 12–20); “*Research on the Street*” (Milan, 2008 November 27–30); “*Cagliari Science Festival*” (III edition, 2010 November 5–12; IV edition, 2011 November 4–12); “*Italian Astronomy Olympiad*” (IX edition, Sardinian regional final, 2011 February 21; XIV edition, national final, Milan, 2016 April 19–22); “*March for Science*”, Dutch edition, Amsterdam, 2017 April 22; *Pavia Sharing Researchers’ Passions (Sharper) science week & Researchers’ Night* (Pavia, 2019 September 23–28; 2020 November 23–28). I contributed to the organization of a public lecture featuring simultaneous translation on the discovery of neutron stars by [REDACTED] (Cagliari, 2010 October 14) and a public duet at the Italian National Museum of Science and Technology ‘Leonardo da Vinci’ by [REDACTED] on the space exploration missions Rosetta and ExoMars (Milano, 2014 May 15; the event included an exposition of space and robotic instrumentation).
- I discussed many times scientific results with the media, also in video and audio interviews, wrote popular science pieces and articles, and edited online encyclopedia pages.
- **Tour guide** at the Sardinia Radio Telescope (2011–2012).
- **Student Orientation School** for the Federation IUSS–Sant’Anna–Normale (2019–2021).
- **Training course** for primary and secondary school students and their teachers: *The celestial zoo at different wavelengths* (2021).

IT skills

- Good working knowledge of the main computer operative systems (Linux, Macintosh and Windows). Excellent knowledge of the common application packages, such as MS/Open Office, and of the \LaTeX package for text editing. Experience with HTML and various graphic and image editing packages. Programming languages: good knowledge of IDL, some knowledge of ROOT/C/C++. Some experience with Fortran and Python.
- Excellent knowledge of the main data reduction and analysis software packages for high-energy astrophysics (Ftools, xspec, xronos, ximage, Ds9, CIAO, SAS, etc.) and very large experience with them. Experience with the packages PSRCHIVE and TEMPO/TEMPO2 for the analysis of pulsar radio data. Some experience with IRAF.

Observing experience.....

- Principal or co- investigator of many accepted programs with several space observatory (XMM–Newton, INTEGRAL, NICER, Suzaku, Swift, Insight-HXMT, NuSTAR, and Chandra; more than 100 proposals) and ground-based instruments (GBT, Parkes, ATCA, EVLA, WSRT, Medicina, SRT, VLT, and IRAM/PdB; more than 30 proposals). Principal or co-investigator of numerous target-of-opportunity observations with Swift, XMM–Newton, Chandra, NICER, NuSTAR, Suzaku, ATCA, Parkes, SRT and VLT.

Reviewer.....

- Frequent referee (more than 40 reviews) for:
 - The Astrophysical Journal (Main Journal and Letter)
 - Monthly Notices of Royal Astronomical Society
 - Astronomy & Astrophysics
 - Publications of the Astronomical Society of the Pacific
 - Advances in Astronomy
 - Journal of High Energy Astrophysics
 - Classical and Quantum Gravity.
- Time Allocation Committees:
 - XMM–Newton (AO-12)
 - Chandra (Cycle 17).
- Reviewer for:
 - The Poland's National Science Centre (2014)
 - The Netherlands Organisation for Scientific Research (2015).

Service and professional activities.....

- International Center for Astronomical and Remote-sensing Observations (ICARO) of the Institute for Advanced Study (IUSS) of Pavia: member of the scientific board (2015–2016) and of the advisory board (2016–2019).
- Athena Science Study Team, SWG 3.3: isolated neutron stars, pulsars, CVs, etc (2015–).
- THESEUS Science Study Team, SWG 3: Time-domain Astronomy (2019–)
- HERMES Science Team (2021–)
- XIPE (the X-ray Polarimetry Explorer) / eXTP (enhanced X-ray Timing and Polarimetry mission) WG 2.4: Magnetic Fields in compact objects / Magnetars (2015–).
- LOFT (Large Observatory For X-ray Timing) 'observatory science' working group member (isolated neutron stars / X-ray bright radio pulsars / pulsar wind nebulae; 2012–2015).
- Sardinia Radio Telescope astrophysical validation team member (2012).

Conference organization.....

- Member of the local organizing committee of the conference "*Radio pulsars: an astrophysical key to unlock the secrets of the Universe* (Pulsar 2010)", Chia Laguna Resort (Sardinia, Italy), 2010 October 10–15. Co-editor of the proceedings volume (p. ??).
- Member of the local organizing committee of the school "*Principles of Multi-wavelength High Time Resolution Astrophysics*", Santa Margherita di Pula (Sardinia, Italy), 2011 October 10–15.
- Member of the local organizing committee of the conference "*X-ray Astronomy: towards the next 50 years!*", Milan (Italy), 2012 October 1–5.
- Member of the local organizing committee for the LVIII meeting of the Italian Astronomical Society (SAIt), "*Strutture cosmiche: dal sistema solare ai confini dell'universo*", Milan (Italy), 2014 May 13–16.

- Member of the scientific organizing committee for the European Astronomical Society Annual Meeting Symposium “*Extremes in Accretion onto Strongly Magnetised Neutron Stars: Observations vs. Theory*”, Leiden (The Netherlands), 2020 June 29–July 3.

Scholarships and grants

- *ACDC - Astri/CTA Data Challenge*
€679 830, Co-I, INAF, 2017
- *The extreme properties of the HMXB population from NuSTAR and XMM–Newton observations*
€6 000, Co-I, INAF, 2016
- *Getting the GUNS (Grand Unification of Neutron Stars) through X-Ray variability studies of non-accreting neutron stars*
€80 000, Co-I, INAF, 2014
- *Identification of astrophysical sources: study of new X-ray pulsators*
\$15 000, PI, U.S.–Italy Fulbright Commission (visiting fellowship), 2014
- *A hard X-ray view of magnetars*
€24 000, Co-I, INAF, 2014
- *Fundamental physics in the unique laboratory of the double pulsar: study of the high energy emission in tight double-neutron-star systems*
€161 460, Co-I, Sardinian Regional Government, 2012
- *Magnetars anatomy: a theoretical and observational study of ultra-magnetised neutron stars*
€65 000, Co-I, INAF, 2011
- *Understanding the extreme properties of magnetars*
€75 000, PI, INAF (fellowship, declined), 2010
- *All the colours of the recycled pulsars: multi-wavelength study of the fastest-spinning neutron stars*
€70 000, PI, Sardinian Regional Government (fellowship), 2009

Seminars, schools and conferences

- CNOG IV - IV Congresso Nazionale Oggetti Compatti, Padova; 2005 November 23–25.
- 363rd Heraeus Seminar - Neutron Stars and Pulsars: about 40 years after the discovery, Bad Honnef, Germania; 2006 May 14–19.
- XIX Seminario Nazionale di Fisica Nucleare e Subnucleare di Otranto, Serra degli Alimini, Otranto; 2006 September 20–27 (Ph. D. school).
- Simbol-X: the hard X-ray universe in focus, Bologna; 2007 May 14–16.
- 40 Years of Pulsars: Millisecond Pulsars, Magnetars and More, Montréal, Canada; 2007 August 12–17.
- X-ray Astronomy 2009, Bologna, Italy; 2009 September 7–11.
- CNOG VI - VI Congresso Nazionale Oggetti Compatti, Santa Margherita di Pula, Cagliari, Italy; 2009 September 22–25.
- Pulsar Conference 2010 - Radio pulsars: an astrophysical key to unlock the secrets of the Universe, Chia Laguna Resort, Italy; 2010 October 10–15 (solicited talk).
- Opticon Autumn School - Principles of Multi-wavelength High Time Resolution Astrophysics, Santa Margherita di Pula, Cagliari, Italy; 2011 October 10–15 (lecturer).
- Swift and the surprising sky - The first seven years of Swift, Milano, Italy; 2011 November 24–25.

- CNOC VII - VII Congresso Nazionale Oggetti Compatti, Bormio, Italy; 2011 December 13–16 (invited review talk).
- XIII Marcel Grossmann Meeting on General Relativity, Stockholm, Sweden; 2012 July 1–7 (invited review talk).
- X-ray Astronomy: towards the next 50 years!, Milan, Italy; 2012 October 1–5.
- IV Italian Meeting on Ultraluminous X-ray Sources (ULXs), Padova, Italy, 2012 Dicembre 13–14.
- Neutron stars 2013 – Latest results from the neutron-star laboratory, Amsterdam, The Netherlands, 2013 May 6–10.
- Invited colloquium at Padua Astronomical Observatory, Padova, Italy, 2013 October 17.
- V Italian Meeting on Ultraluminous X-ray Sources (ULXs), Milano, Italy, 2014 January 30–31.
- Seminar at the Harvard–Smithsonian Center for Astrophysics’ Institute for Theory and Computation, Cambridge Ma, USA, 2015 May 13.
- CNOC IX - IX Congresso Nazionale Oggetti Compatti, Monte Porzio Catone, Italy; 2015 September 22–25.
- Seminar at the IEEC–CSIC’s Institut de Ciències de l’Espai, Barcelona, Spain, 2017 February 10.
- X-ray Astronomy 2017, Rome, Italy; 2017 June 5–9.
- INTEGRAL Symposium 2017, Venice, Italy; 2017 October 15–20 (invited review talk).
- CNOC X - X Congresso Nazionale Oggetti Compatti, Padua, Italy; 2017 December 12–15 (invited review talk).
- Invited colloquium at SRON Netherlands Institute for Space Research, Utrecht, The Netherlands, 2018 March 28.
- Invited colloquium at the Institute of Astro- and Particle Physics, University of Innsbruck, Innsbruck, Austria, 2018 June 4.
- CNOC XI - XI Congresso Nazionale Oggetti Compatti, Florence, Italy; 2019 November 19–22.

Plus several seminars at the institutions where I worked (IASF–Mi, Cagliari Observatory, Harvard–Smithsonian CfA, and API/UvA).

Press releases and images

- ESA – XMM–Newton watches lazy pulsar being jazzed up by companion (2008)
- ESA – XMM–Newton measures speedy spin of rare celestial object (also NASA’s HEASARC Picture of the week and XMM–Newton Image Gallery; 2009)
- NASA – NASA’s Swift, Fermi probe fireworks from a flaring gamma-ray star (also NASA’s HEASARC Picture of the week and XMM–Newton Image Gallery; 2009)
- ESA – Giant eruption reveals ‘dead’ star (2009)
- NASA – European Satellites Probe a New Magnetar (2009)
- ESA – XMM–Newton weighs up a rare white dwarf and finds it to be a heavyweight (2009)
- ESA – XMM–Newton uncovers a celestial Rosetta stone (2009)
- Instituto de Astrofísica de Canarias – GTC observes an exotic magnetar (2009)
- ESA – Are most pulsars really magnetars in disguise? (2010)
- NASA – Chandra: What Lies Beneath? Magnetar Enigma Deepens (2010)
- UK Space Agency – Mysterious pulsar with hidden powers discovered (2010)
- CEA-IRFU – Close cousins (2010)
- NASA – NASA Telescopes Join Forces to Observe Unprecedented Explosion (2011)
- NASA – Swift Press Releases and Images: XRT Image of Supernova Remnant RCW 103 (also NASA’s HEASARC Picture of the Week; 2011)

- NASA – Researchers Detail How A Distant Black Hole Devoured A Star (2011)
- Max-Planck-Institut für Radioastronomie – A Distant Stellar Meal (2011)
- JAXA – First observation of a massive black hole swallowing a star (2011)
- ESA – A magnetic monster’s dual personality (2012)
- NASA/CXC – A Hidden Population of Exotic Neutron Stars (2013)
- ESA – Mysterious magnetar boasts one of strongest magnetic fields in Universe (2013)
- ESA – Weakling magnetar reveals hidden strength (2013)
- NASA/CXC – NASA’s Chandra Finds Intriguing Member of Black Hole Family Tree (2015)
- NASA/CXC – SGR 1745–2900: Magnetar Near Supermassive Black Hole Delivers Surprises (2015)
- ESA – Found: Andromeda’s First Spinning Neutron Star (also NASA’s HEASARC Picture of the week and XMM–Newton Image Gallery; 2016)
- NASA – Young Magnetar Likely the Slowest Pulsar Ever Detected (2016)
- ESA – The brightest, furthest pulsar in the Universe (2017)
- NASA – NuSTAR Helps Find Universe’s Brightest Pulsars (2017)
- ASTRON – Super-slow pulsar challenges theory (2018)
- ESA – XMM-Newton reveals giant flare from a tiny star (2020)
- ESA – XMM-Newton spies youngest baby pulsar ever discovered (2020)
- NASA/JPL – A Cosmic Baby Is Discovered, and It’s Brilliant (2020)

Plus several further press releases in Italian issued by the Italian National Institute of Astrophysics (INAF), Italian Space Agency (ASI), Italian National Institute of Nuclear Physics (INFN) and in Dutch by the Netherlands Research School for Astronomy (NOVA).