



Carlo Ferrigno

Curriculum Vitæ (July 14, 2020)

Personal

Born in February 1975

Status Married with two children born in 2008 and 2011.

Nationality Italian - Swiss working permit C

Current position

2012 – today **Senior scientist**, *Collaborateur scientifique I et II*, Principal Investigator of the INTEGRAL science data centre (ISDC) (75% in 2020). I am head of a group of five scientists and engineers who are in charge of providing the data of the ESA/NASA mission INTEGRAL to the world-wide community, participating to the in-flight calibration activity, distributing the software to exploit the data, and performing quick-look analysis to find relevant X-ray transient phenomena. Representative of ISDC with ESA and the other mission partners., (former PI: Prof. T. J-L. Courvoisier).

2018 – today **Senior scientist**, *Project manager of the Swiss hardware contribution to the JAXA-NASA-ESA mission XRISM (25% in 2020)*, I coordinated the production, test, and delivery of the filter wheel mechanisms and electronics between Swiss industries, the Dutch Space Agency (SRON), University of Geneva, and the European Space Agency. My mission spanned from the review of past requirements for an analogous project, to the procurement of items, supervision of testing campaign, and delivery of hardware with data pack., (PI: Prof. S. Paltani).

Education

2001–2005 **PhD in physics**, *University of Palermo*, Very high energy counterparts of astrophysical source of ultra high energy cosmic rays., Supervisors: Dr. Bruno Sacco and Dr. Pasquale Blasi..

1994–1999 **Laurea in fisica**, *Beachelor + master. Università di Padova, 110/110 cum laude*, Specialization in astrophysics.

1989–1994 **Liceo Scientifico**, 60/60.

Research interests

Current topics

- Accretion physics Study of stellar-size Galactic compact objects. Observational characterisation of relativistic radiation transfer in a magnetized medium using timing and spectral signatures in the X-ray domain. Observational study of the accretion process mediated by stellar winds and/or accretion discs. Follow-up of transient celestial sources to determine their nature. Implementation of models of radiation transfer in relativistic systems using optimised computations.
- Multimessenger astronomy Detection of Gamma Ray Bursts and flares with hard X-ray facility and search for electromagnetic counterparts of gravitational wave events, fast radio bursts, and high-energy neutrino detection.

Past topics

- Ultra High Energy cosmic rays Propagation of particle induced electromagnetic showers in the radiation background and estimation of the gamma-ray signal
- Cluster of galaxies. Characterisation of cooling core clusters. Exploration of cluster outskirts.

Past Experience

2014–2016 **European science support centre (ESSC)**, as part of the Japanese/American/European mission *ASTRO-H/Hitomi*, ESSC was a centre based at the Department of astronomy of the Geneva University. Its mission was the support of European scientists to exploit the *ASTRO-H/Hitomi* mission by providing a help-desk and setting the frameworks of the European announce of observational opportunities. The centre was ruled in tight collaboration with the European Science operations centre in ESAC (Spain) and was led by Prof. S. Paltani.

Junior scientist

2010–2011 **INTEGRAL Science Data centre (ISDC)**, *Collaborateur Scientifique 1*, Operation coordinator of the quick-look analysis of INTEGRAL data at ISDC. I coordinated a group of scientists to monitor the variable X-ray sky through the INTEGRAL instruments, contact the guest observers, and prepare the publication of reports on relevant phenomena. Responsible of the project: Dr. R. Walter. Research activity: accretion flows onto neutron stars in X-rays. .

2008–2009 **IAAT of University of Tübingen, displaced at ISDC**, *Instrument specialist of the spectrometer on board INTEGRAL and INTEGRAL operation scientist*. Responsible Dr. R. Walter. Scientific research on X-ray binaries. Activity supervised by Prof. A. Santangelo. .

Post-Doc

2007–2008 **ISTITUTO NAZIONALE di ASTROFISICA INAF-IASF-Pa**, *Software development for X-ray coded mask missions. Pipeline development. Research on X-ray binary pulsars*. Activity supervised by Dr. A. Segreto. .

- 2005–2006 **University of Palermo**, *Software development for the ground based TeV detector ARGO-YBJ. Activity supervised by Prof. G. Dali Staiti. Research in high energy astrophysics.*
- 2004–2005 **ISTITUTO NAZIONALE di ASTROFISICA INAF-IASF-Pa**, *Software development for X-ray coded mask missions. Research on X-ray binary pulsars. Activity supervised by Dr. A. Santangelo and Dr. G. La Rosa.*
- 2001–2004 **University of Palermo and INAF**, *Study of the very high emission from counterparts of possible astrophysical sources of ultra high energy cosmic rays. Activity supervised by Dr. P. Blasi and Dr. B. Sacco (PhD in astrophysics).*
- 2000–2001 **SRON-NL**, *Research contract*, Research on the X-ray emission of clusters of galaxies. Participation to the performance and verification phase of the reflection grating spectrometer on board of the ESA/NASA mission XMM-Newton. Activity supervised by Dr. J. Kaastra.

Teaching

- 2005–2007 **Lecturer of general physics**, *University of Palermo*, bachelor course of engineer, Subjects: Mechanics, Thermodynamics, Electromagnetism, Optics.
- 2013–2016 **Tutor of third year/master students**, *University of Geneva.*
- 2013–2019 **Tutor**, *of of young collaborators at ISDC.*
- 2016–2020 **Lecturer of high energy astrophysics**, *at the university of Geneva in the master and Phd course physics Subjects (course shared with Prof. A. Neronov, Dr. R. Walter)*, The course includes the most important topics in the field: high-energy electromagnetic emission processes (cyclotron curvature, synchrotron, Compton), relativistic motion near black-holes, particle acceleration processes, physics of gravitational accretion, atomic emission diagnostics for X-ray emitting plasma, phenomenology of neutron stars, accreting X-ray binaries, active galactic nuclei, cluster of galaxies, gamma-ray bursts.

Technical Skills

Informatics

- Design Optimisation of operational software in virtualised environments.
- Web Web portal for serving data and software (HTML,PHP, MYSQL,PERL)
- Programming Object oriented programming for data reduction pipelines (python, C/C++)
- Scientific Software for data exploitation such as Xspec, Isis, Sherpa, IDL, Python, Root. Usage of Monte-Carlo Markov chain samplers.
- Office Preparation of documents, brochures, and posters with MSOffice and other software suites.

Management

- Software project management (development, maintenance, and release of validated scientific S/W to the community.
- Hardware Project management of space-qualified hardware production.

- Operations Organisation of operation team which develops and ensures the functionality of automatic data processing
- Fund rising Scientific projects at the National fund of scientific research and the Swiss Space office. Response to tenders from the European Space Agency.

Languages

Italian **Mothertongue**
 English **Fluent**
 French **Intermediate**

Written and oral C1
Con conversationally fluent

Various qualifications

- PI of the Swiss federal fund for the INTEGRAL Science Data Centre (ISDC)
- FNRS project #200021_188556 “Multimessenger astronomy in gamma rays with INTEGRAL” funding for 38 months for 50% position to work on multi-messenger astronomy.
- Author of 136 referred journal papers in 19 years: 13 as first author and 15 as second author. My H-index is 25. A updating link can be found at this [clickabel ADS link](#)
- Author of 704 non-refereed publications of which astronomer’s telegrams GCNs are related to the INTEGRAL quick-look analysis; two white papers for the ASTRO-H mission. Others are contributions to conferences. The updating list can be retrieved at this [clickable ADS link](#)
- ESA Press releases:
 - 2017 INTEGRAL sees blast travelling with gravitational wave
 - 2016 INTEGRAL sets limits on gamma rays from merging black holes
 - 2015 Monster black hole wakes up after 26 years
- Member of the Swiss Society for Astrophysics and Astronomy (SSAA) and European Astronomical Society.
- Member of science working group of the space missions ASTRO-H/Hitomi, LOFT, Athena, and XIPE.
- Principal investigator of: the INTEGRAL proposal 1340011 “Searching for gravitational wave sources with INTEGRAL”, the XMM-Newton proposals ID #065419 “Hunting for magnetars in poorly known high mass X-ray binaries using XMM-Newton” and ID #074524 “Unveil accretion onset mechanisms of a normal outburst of EXO 2030+375”; the Suzaku proposal 72013 to observe the rising part of a Type I outburst of the Be/X-ray binary EXO 2030+375.
- Liaison of the INTEGRAL-LISA/VIRGO memorandum of understanding to perform electromagnetic follow-up of gravitational wave triggers.
- Referee for Astronomy and Astrophysics, Astrophysical Journal, and Monthly Notices of the Royal Astronomical Society.
- Member of the 2014, 2017, and 2019 XMM-Newton observation time allocation committee.
- Representative of ISDC in the INTEGRAL user group at ESA.
- Member of two ISSI meeting groups on cyclotron lines in high mass X-ray pulsars from 2008 to 2012. Member of the ISSI group in 2015 on the transitional pulsars.
- Participation to > 25 international conferences with contributed talks and posters
- Chair of the EWASS 2015 symposium science organising committee on Neutron stars at the crossroad: X-ray binaries and transitional millisecond pulsars. Presentation of the review talk on numerical magnetospheric - compact object interaction.
- LOC member and co-editor of Proceeding for Physics at the Magnetospheric boundary. Conference

held in Geneva in 2013

- Member of the science organising committee of the INTEGRAL workshops in Annapolis (2014) and Rome (2015)
- Main organizer of the 12th INTEGRAL conference and first AHEAD gamma-ray symposium held in February 2019 in Geneva (127 participants).
- Co-Organizer of the Saas-fee school on Multimessenger astronomy to be held in 2021 (selected on competitive basis).
- Winner for Italy in the “Future Astronomers of Europe” contest reserved to high-school students (1993).

Other interests

- Sport
- Mountaineering
- Triathlon
- Climbing

References

References can be obtained from:

- Prof. S. Paltani (University of Geneva)
- Prof. A. Santangelo (University of Tübingen)