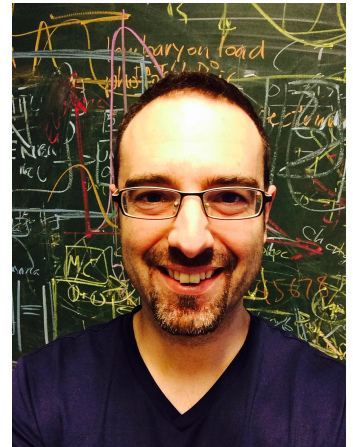


CURRICULUM VITAE

PANEQUE CAMARERO, DAVID

Personal Information

Place of birth/Nationality: Barcelona (Spain) / Spanish
Present work address: Max-Planck-Institut für Physik
Boltzmannstr. 8,
85748-D Garching, Germany
e-mail: dpaneque@mppmu.mpg.de
dpaneque@slac.stanford.edu
phone work: +49 89 32354349
ORCID: 0000-0002-2830-0502
Web site: <https://www.mpp.mpg.de/david-paneque>



Education

- 07/2001 – 11/2004 PhD in Physics from the Technische Universität (TU) München
Grade: *summa cum laude (mit Auszeichnung bestanden)*
PhD Thesis: *The MAGIC Telescope: developments of new technologies and first observations.*
<https://mediatum.ub.tum.de/doc/603045/603045.pdf>
Advisors: Prof. Dr. Siegfried Bethke and Dr. Eckart Lorenz
- 09/1998 – 09/2000 M.Sc. in Physics from the Universitat Autònoma de Barcelona (UAB)
Grade: *summa cum laude*
Master's Thesis: *An optical properties study of the new hemispherical PMTs from Electron Tubes*
Advisors: Prof. Dr. Enrique Fernández and Prof. Dr. Manel Martínez
- 09/1993 – 07/1998 B.Sc. in Physics from the Universitat Autònoma de Barcelona (UAB)

Work Positions

- 11/2010 – Present Senior scientist staff position at the Max-Planck-Institut für Physik (Werner-Heisenberg-Institut, München)
- 08/2019 – 11/2019 Visiting full professor position at the University of Tokyo, Institute for Cosmic Ray Research (ICRR)
- 09/2014 – 12/2014 Visiting associate professor position at the University of Tokyo, Institute for Cosmic Ray Research (ICRR)
- 05/2006 – 11/2010 Research associate position at SLAC National Accelerator Laboratory
- 11/2004 – 04/2006 Postdoc at the Max-Planck-Institut für Physik
- 07/2001 – 11/2004 Research Staff Formation Grant from the Max-Planck-Institut für Physik. I obtained the PhD Degree in Physics.
- 09/1998 – 07/2001 Research Staff Formation Grant from the Generalitat de Catalunya (Autonomous Government of Catalonia), at the Institut de Física d'Altes Energies (IFAE), Barcelona. I obtained the Master's Degree in Physics.

Selected Prizes and Awards

- 2011 Bruno Rossi Prize (given to the members of the *Fermi*-LAT collaboration), which is awarded annually in honor of Bruno Rossi for a significant contribution to High Energy Astrophysics, with particular emphasis on recent, original work.
- 2010 NASA Group Achievement Award (given to the *Fermi* Science team), for the successful early operation of the *Fermi* mission and discovery of new high-energy γ -ray sources.

Selected Prizes and Awards (continuation)

- 2008 NASA Group Achievement Award (given to the Large Area Telescope team), for producing a prominent scientific instrument that will advance NASA's space science mission.
- 2005 **PhD thesis awarded with the Otto Hahn Medal from the Max-Planck-Society, which is awarded annually to about 25 junior scientists (in both the natural and social sciences) in recognition of outstanding scientific achievement.**
- 1998 B.Sc. studies awarded with the Premio Extraordinario from the UAB, which is an award given to the two people with the best qualifications of that year.

Research Grants

- 2018 – 2025 Origins Excellence Cluster (Co-Investigator)
Connector 6 - Cosmic Accelerators (EXC-2094 – 390783311)
- 2010 – 2012 NASA Fermi GI (Principal Investigator)
The Extreme Fermi Universe (NNX10AP21G)
- 2009 – 2011 NASA Fermi GI (Principal Investigator)
Simultaneous Fermi LAT-MAGIC Observations of the Late Prompt and Early Afterglow Emission From GRBs (NNX10AP22G)

Institutional Responsibilities

- 2023–Current **Spokesperson of the MAGIC collaboration**
- 2020–2022 Deputy spokesperson of the MAGIC collaboration
- 2017–2019 Physics coordinator of the MAGIC collaboration
- 2012–2016 Publication manager of the MAGIC collaboration
- 2016–Current Regular member of the Time Allocation Committee of the MAGIC collaboration
- 2012–Current Regular member of the Executive Board of the MAGIC Collaboration
- 2011–Current Responsible for the calibration system of MAGIC telescopes
- 2011–Current MAGIC science group leader at Max-Planck-Institut für Physik
- 2011–Current *Fermi* group leader at Max-Planck-Institut für Physik
- 2014–Current Member of the computing commission at Max-Planck-Institut für Physik
- 2016–2020 Member of the budget commission at Max-Planck-Institut für Physik

Reviewing Activities

- 2011–Current Referee for Monthly Notices of the Royal Astronomical Society (MNRAS), Astroparticle Physics (Aph), Astrophysical Journal (ApJ), and Astronomy & Astrophysics (A&A).
- 2010–2013 Grant proposal reviewer for NASA *Fermi* Guest Investigator program (~8M\$ annually), during four consecutive years.

Supervision of graduate students

- 2020–Current Felix Schmuckermaier (MPP), Technical University Munich
- 2019–2023 Lea Heckmann (MPP), University of Innsbruck
- 2017–2021 Giovanni Ceribella (MPP), Technical University Munich
- 2015–2020 Kazuma Ishio (MPP), Ludwig Maximilian University Munich
- 2011–2014 Shangyu Sun (MPP), Technical University Munich
- 2008–2009 Diego Tescaro (IFAE), Autonomous University of Barcelona
Visiting student to work with me at SLAC (while I was a postdoc there)
- 2007–2008 Miguel Angel Sanchez Conde (IAA-CSIC), University of Granada
Visiting student to work with me at SLAC (while I was a postdoc there)

Computing experience

Operating systems: MS-DOS, Windows, Unix, Linux, Mac OSX, QTS
Programming languages: C, C++, LabView
Scripting languages: Python, CINT, bash, csh

Languages

Spanish and Catalan: Mother languages.
English: Proficient level (reading, writing and speaking)
Italian: Medium level (reading, writing and speaking)
German: Basic level (reading, writing and speaking)
Japanese: Low level of understanding/speaking

Others

Military Service: *Base Aerea de Son San Juan*, Palma de Mallorca, Spain, December 1994 - August 1995

Last updated: February 2024

PUBLICATIONS

Most of my publications use gamma-ray data from the MAGIC telescopes, the *Fermi* satellite, and recently also the CTA-LST1 telescope. My involvement with MAGIC, *Fermi* and LST at the pre-commencement stage implied spending a large fraction of my research time on developing relevant hardware and/or software projects. Often, this so-called *service work* did not result in a scientific publication, but it was crucial for the scientific success of these instruments (see below for some examples). Owing to my continuous technical contributions, as well as my organization & coordination activities within these projects, I am co-author of most of the collaboration papers. Moreover, I also led myself several of these scientific publications (many of them with more than 100 citations). **In total, I have more than 420 scientific publications in peer-reviewed journals, including 6 Nature and 26 Science publications, providing me with a h-index of 121.** The full list of my publications can be found at this ADS link.

Selection of five scientific publications

Among the various publications in which I played a leading role, here I list 5 that had a large impact in the community. The publications relate to diverse scientific topics: three of them relate to black holes and blazars, one about a catalog of high-energy γ -ray sources, and one about the possibility to discover new particles using γ -ray observations of blazars. The publications are sorted chronologically, and the number of citations were retrieved from ADS on February, 2024. The **number of citations is larger than 150** for all these publications, which demonstrates my ability to make high-quality scientific publications on topics of interest for the scientific community. It is worth mentioning that 4 out of the 5 scientific publications listed here were done within the MAGIC and/or *Fermi*-LAT collaborations. These publications have long author lists with names sorted alphabetically (as it is custom in high-energy particle physics), despite the fact that I am the lead author in all these publications.

1. *The First Fermi-LAT Catalog of Sources Above 10 GeV*, ADS link more than 210 citations
Abdo et al., *Fermi* Collaboration (lead author: **D. Paneque**), 2013, ApJS, 209, 34
Work related to my efforts to characterize the very-high-energy (VHE) γ -ray sky, and particularly to increase the number of known extragalactic VHE sources.
2. *Fermi Large Area Telescope Observations of Markarian 421: The Missing Piece of its Spectral Energy Distribution*, ADS link more than 280 citations
Abdo et al., *Fermi*, & MAGIC Collaborations (lead author: **D. Paneque**), 2011, ApJ, 736, 131
Work related to the extensive multifrequency campaigns that I started to organize in 2009.
3. *Insights Into the High-energy γ -ray Emission of Markarian 501 from Extensive Multifrequency Observations in the Fermi Era*, ADS link more than 200 citations
Abdo et al., *Fermi*, MAGIC & VERITAS Collab. (lead author: **D. Paneque**), 2011, ApJ, 727, 129
Work related to the extensive multifrequency campaigns that I started to organize in 2009.
4. *Hints of the existence of Axion-Like Particles from the γ -ray spectra of cosmological sources*, ADS link more than 150 citations
M. Sánchez-Conde, **D. Paneque**, E. Bloom, F. Prada, A. Domínguez, 2009, Phys. Rev. D, 79, 123511
Work related to the studies performed (with former graduate student M. Sánchez-Conde) on the feasibility to use VHE AGNs to detect (discover) Axion-Like-Particles (ALPs).
5. *Variable Very High Energy γ -ray emission from Markarian 501*, ADS link more than 500 citations (second most cited publication from the MAGIC collaboration)
Albert et al., MAGIC collaboration (lead author: **D. Paneque**), 2007, ApJ, 669, 862
Work related to the extensive study of some selected VHE AGNs. This publication showed the large scientific potential of observing the classical TeV blazars with the new generations of γ -ray instruments, such as MAGIC.

Publications in referred journals with leading (or very active) participation

In this section I list the publications where I played a significant role. The publications are sorted chronologically.

A large fraction of the publications listed here were done within the MAGIC and/or *Fermi*-LAT collaborations. These papers have long author lists with names sorted alphabetically, as it is custom in high-energy particle physics. There are some (MAGIC and/or *Fermi*) collaboration publications where I contributed in a very significant manner, being sometimes one of the corresponding authors, but without being the actual leader of the publication. However, in many cases, I was the lead author (or one of the two lead authors) of the publication, which implied being the main responsible person for the contents of the publication, and writing most of the text of the document. In some occasions, I initiated the project (e.g. using the extensive data from the multi-year and multi-instrument observation campaigns that I regularly organize), and contributed in a crucial manner to the contents and the text of the publication, but there was another scientist (mostly a former PhD student and/or postdoc) who took large responsibility in the preparation of the publication (including the submission of the manuscript to the journal). These (MAGIC and/or *Fermi*) collaboration publications where I played a leading role are denoted with the string “Lead author(s): D. Paneque (+ ...)”, in order to differentiate them from the other publications where I played a significant role, but without being a lead author.

1. *A novel energy reconstruction method for the MAGIC stereoscopic observation*,
K.Ishio & D.Paneque,
2024, *Astroparticle Physics*, 158, 102937
2. *Multimessenger Characterization of Markarian 501 during Historically Low X-Ray and Gamma-Ray Activity*,
MAGIC and Fermi-LAT collab. (lead authors: L. Heckmann (former PhD student) and **D. Paneque**)
2023, *ApJS*, 266, 37A
3. *Correcting Imaging Atmospheric Cherenkov Telescope data with atmospheric profiles obtained with an elastic light detecting and ranging system*,
F. Schmuckermaier , M. Gaug , C. Fruck , A. Moralejo , A. Hahn , D. Dominis Prester , D. Dorner ,
L. Font , S. Micanović, R. Mirzoyan , **D. Paneque** , L. Pavletić, J. Sitarek , and M. Will
(publication led by my PhD student, Felix Schmuckermaier)
2023, *A&A*, 673, A2
4. *Detection of a Peculiar Drift in the Nuclear Radio Jet of the TeV Blazar Markarian 501*,
S. Britzen, G. Krishna, E. Kun, H. Olivares, I. Pashchenko, F. Jaron, J.Gonzalez, and **D. Paneque**
2023, *Universe*, 9, 115
5. *Long-term multi-wavelength study of 1ES 0647+250*,
MAGIC and Fermi-LAT collab. (corresponding authors: J. Otero-Santos, D. Morcuende, V. Fallah
Ramazani, D. Dorner and **D. Paneque**),
2023, *A&A*, 670, A49
6. *Multiwavelength variability and correlation studies of Mrk 421 during historically low X-ray and γ -ray activity in 2015-2016*,
MAGIC and Fermi-LAT collab. (corresponding authors: B. Banerjee (former PhD student), P. Ma-
jumdar, **D. Paneque** and T. Tercić)
2021, *MNRAS*, 504, 1427
7. *Investigation of the correlation patterns and the Compton dominance variability of Mrk 421 in 2017*,
MAGIC and Fermi-LAT collab. (lead authors: A.Arbet-Engels (former PhD student) and **D. Paneque**),
2021, *A&A*, 655, A89

8. *Electron-beam interaction with emission-line clouds in blazars*,
C. Wendel, J. Becerra, **D. Paneque** and K. Mannheim
2021, A&A, 646, A115
9. *Unraveling the Complex Behavior of Mrk 421 with Simultaneous X-Ray and VHE Observations during an Extreme Flaring Activity in 2013 April*,
Acciari V.A. et al., MAGIC and Fermi-LAT collaborations (lead authors: **D. Paneque** and A. Babić)
2020, ApJS, 248, 29
10. *Study of the variable broadband emission of Markarian 501 during the most extreme Swift X-ray activity*,
Acciari V.A. et al., MAGIC and Fermi-LAT collaborations (lead authors: J. Becerra and **D. Paneque**)
2020, A&A, 637, 86
11. *The Great Markarian 421 Flare of 2010 February: Multiwavelength Variability and Correlation Studies*,
Abeysekara, A. U et al., VERITAS and MAGIC collaborations
(publication using data from the observing campaigns organized by **D. Paneque**)
2020, ApJ, 890, 97
12. *Stable Radio Core of the Blazar Mrk 501 during High-energy Active State in 2012*,
Shoko Koyama, Motoki Kino, Akihiro Doi, Kotaro Niinuma, Marcello Giroletti, **David Paneque**,
Kazunori Akiyama, Gabriele Giovannini, Guang-Yao Zhao, Eduardo Ros, Jun Kataoka, Monica Ori-
enti, Kazuhiro Hada, Hiroshi Nagai, Naoki Isobe, Hideyuki Kobayashi, Mareki Honma, and Rocco
Lico
2019, ApJ, 884, 132
13. *Measurement of the extragalactic background light using MAGIC and Fermi-LAT gamma-ray observa-
tions of blazars up to $z = 1$* ,
Acciari, V. A. et al., MAGIC collaboration
(publication using data from the observing campaigns organized by **D. Paneque**)
2019, MNRAS, 486, 4233
14. *The extreme HBL behaviour of Mrk 501 during 2012*,
Ahnen M.L. et al., MAGIC, VERITAS and Fermi-LAT collaborations
(lead authors: G. Hughes and **D. Paneque**)
2018, A&A, 620, 181
15. *Multiband variability studies and novel broadband SED modeling of Mrk 501 in 2009*,
Ahnen M.L. et al., MAGIC, VERITAS and Fermi-LAT collaborations
(lead authors: **D. Paneque** and M. Doert (former PhD student))
2017, A&A, 603, 31
16. *A Search for Spectral Hysteresis and Energy-dependent Time Lags from X-Ray and TeV Gamma-Ray
Observations of Mrk 421*,
Abeysekara, A. U., VERITAS and MAGIC collaborations
(publication using data from the observing campaigns organized by **D. Paneque**)
2017, ApJ, 834, 2
17. *Very high energy outburst of Markarian 501 in May 2009*
(publication using data from the observing campaigns organized by **D. Paneque**)
Aliu, E. et al., VERITAS collaboration
2016, A&A, 594, 76
18. *Long-term multi-wavelength variability and correlation study of Markarian 421 from 2007 to 2009*
Ahnen M.L. et al., MAGIC collaboration
(publication using data from the observing campaigns organized by **D. Paneque**)
2016, A&A, 593, 91

19. *Multiwavelength Study of Quiescent States of Mrk 421 with Unprecedented Hard X-Ray Coverage Provided by NuSTAR in 2013*,
Baloković, M., **Paneque, D.** et al., NuSTAR, MAGIC, VERITAS and Fermi-LAT collaborations
(lead authors: Mislav Baloković (former PhD student) and **D. Paneque**)
2016, ApJ, 819, 156
20. *First NuSTAR Observations of Mrk 501 within a Radio to TeV Multi-Instrument Campaign*
Furniss, A., et al., NuSTAR, VERITAS, MAGIC and Fermi collaborations
(publication using data from the observing campaigns organized by **D. Paneque**)
2015, ApJ, 812, 65
21. *Probing the precise location of the radio core in the TeV blazar Mrk 501 with VERA at 43 GHz*
Shoko Koyama, Motoki Kino, Akihiro Doi, Kotaro Niinuma, Kazuhiro Hada, Hiroshi Nagai, Mareki Honma, Kazunori Akiyama, Marcello Giroletti, Gabriele Giovannini, Monica Orienti, Naoki Isobe, Jun Kataoka, **David Paneque**, Hideyuki Kobayashi, Keiichi Asada
2015, PASJ, 67, 67
22. *Unprecedented study of the broadband emission of Mrk 421 during flaring activity in March 2010*,
Aleksić, J., et al., MAGIC, VERITAS and Fermi-LAT collaborations
(lead authors: Shangyu Sun (former PhD student) and **D. Paneque**)
2015, A&A, 578, 22
23. *The 2009 multiwavelength campaign on Mrk 421: Variability and correlation studies*,
Aleksić, J., et al., MAGIC, VERITAS and Fermi-LAT collaborations
(lead authors: **D. Paneque** and Nina Nowak)
2015, A&A, 576, 126
24. *Multiwavelength observations of Mrk 501 in 2008*,
Aleksić, J., et al., MAGIC, and VERITAS collaborations
(lead author: **D. Paneque**)
2015, A&A, 573, 50
25. *First broadband characterization and redshift determination of the VHE blazar MAGIC J2001+439*,
Aleksić, J., et al., MAGIC collaboration
(lead authors: Kazuhito Kodani (former PhD student) and **D. Paneque**)
2014, A&A, 572, 121
26. *Very Long Baseline polarimetry and the γ -ray connection in Markarian 421 during the broadband campaign in 2011*
R. Lico, M. Giroletti, M. Orienti, J. L. Gomez, C. Casadio, F. D'Ammando, M. G. Blasi, W. Cotton, P. G. Edwards, L. Fuhrmann, S. Jorstad, M. Kino, Y. Y. Kovalev, T. P. Krichbaum, A. P. Marscher, **D. Paneque**, B. G. Piner and K. V. Sokolovsky
2014, A&A, 571, 54
27. *Search for very high energy gamma-rays from the $z = 0.896$ quasar 4C +55.17 with the MAGIC telescopes*,
Aleksić, J., et al., MAGIC collaboration
(Corresponding authors: J. Sitarek, H. Takami, A. Dominguez, **D. Paneque**)
2014, MNRAS, 440, 530
28. *The First Fermi-LAT Catalog of Sources Above 10 GeV*,
Abdo et al., *Fermi* Collaboration (lead author: **D. Paneque**),
2013, ApJS, 209, 34

29. *The TeV blazar Markarian 421 at the highest spatial resolution*,
Blasi, M. G.; Lico, R.; Giroletti, M.; Orienti, M.; Giovannini, G.; Cotton, W.; Edwards, P. G.; Fuhrmann, L.; Krichbaum, T. P.; Kovalev, Y. Y.; Jorstad, S.; Marscher, A.; Kino, M.; **Paneque, D.**;
Perez-Torres, M. A.; Piner, B. G.; Sokolovsky, K. V.
2013, A&A, 559, 75
30. *Detection of the Cosmic γ -ray Horizon from Multiwavelength Observations of Blazars*,
A. Domínguez, J.D Finke, F. Prada, J.R. Primack, B. Siana, **D. Paneque**,
2013, ApJ, 770, 77
31. *VLBA monitoring of Mrk 421 at 15 GHz and 24 GHz during 2011*,
Lico, R.; Giroletti, M.; Orienti, M.; Giovannini, G.; Cotton, W.; Edwards, P. G.; Fuhrmann, L.;
Krichbaum, T. P.; Sokolovsky, K. V.; Kovalev, Y. Y.; Jorstad, S.; Marscher, A.; Kino, M.; **Paneque, D.**;
Perez-Torres, M. A.; Piner, G.
2012, A&A 545 117
32. *Multiwavelength Observations of the Previously Unidentified Blazar RXJ0648.7+1516*,
Aliu E., et al., VERITAS and Fermi-LAT Collaborations (lead authors: A. Furniss and **D. Paneque**),
2011, ApJ, 742, 127
33. *Fermi-LAT observations of Markarian 421: the missing piece of its Spectral Energy Distribution*,
Abdo A.A., et al., Fermi-LAT and MAGIC collaborations (lead author: **D. Paneque**),
2011, ApJ, 736, 131
34. *Spectral Energy Distribution of Markarian 501: Quiescent State Versus Extreme Outburst*
Acciari, V. A, et al., VERITAS, MAGIC and Fermi-LAT collaborations
(publication using data from the observing campaigns organized by **D. Paneque**)
2011, ApJ, 729, 2
35. *Insights Into the High-energy- γ -ray Emission of Markarian 501 from Extensive Multifrequency Observations in the Fermi Era*,
Abdo A.A. et al., Fermi-LAT, MAGIC and VERITAS collaborations (lead author: **D. Paneque**),
2011, ApJ, 727, 129
36. *A Novel Approach in Constraining Electron Spectra in Blazar Jets: The Case of Markarian 421*,
Ushio, Masayoshi; Stawarz, Łukasz; Takahashi, Tadayuki; **Paneque, David**; Madejski, Grzegorz;
Hayashida, Masaaki; Kataoka, Jun; Tanaka, Yasuyuki T.; Tanaka, Takaaki; Ostrowski, Michal
2010, ApJ, 724, 1509
37. *Hints of the existence of Axion-Like-Particles from the γ -ray spectra of cosmological sources*,
M. Sánchez-Conde, **D. Paneque**, E. Bloom, F. Prada, A. Domínguez,
(lead authors: M. Sanchez-Conde (former PhD student) and **D. Paneque**)
2009, Phys. Rev. D, 79, 123511
38. *Improvement of quantum efficiency of photomultiplier tubes by humidity controlled coatings based on porous polymer structures*,
V. Körstgens, C.-C. Hsu, **D. Paneque** et al., 2008, Applied. Phys. Lett. 93, 041916
39. *Variable Very High Energy gamma-ray emission from Markarian 501*,
MAGIC collaboration (lead author: **D. Paneque**), 2007, ApJ, 669, 862
40. *A method to measure the mirror reflectivity of a prime focus telescope*,
R. Mirzoyan, M. Garczarczyk, J. Hose, & **D. Paneque**, 2007, Astroparticle Physics, 27, 509
41. *A method to enhance the sensitivity of photomultipliers for air Cherenkov telescopes by applying a lacquer that scatters light*,
D. Paneque, H.J. Gebauer, E. Lorenz, & R. Mirzoyan, 2004, Nucl. Instr. Meth. A, 518, 619-621

42. *A method to enhance the sensitivity of photomultipliers for air Cherenkov telescopes*,
D. Paneque, H.J. Gebauer, E. Lorenz, K. Mase, R. Mirzoyan, M. Martinez, A. Ostankov, & T. Schweizer, 2003, Nucl. Instr. Meth. A, 504, 109
43. *Ultrafast FADC multiplexer*,
R. Mirzoyan, **D. Paneque**, J. Cortina, E. Lorenz, M. Martinez, & A. Ostankov, 2002, IEEE Trans. Nucl. Sci., 49, 2473
44. *The optical calibration of the MAGIC Telescope camera*,
T. Schweizer, E. Lorenz, M. Martinez, A. Ostankov, & **D. Paneque**, 2002, IEEE Trans. Nucl. Sci., 49, 2497
45. *Studies of the optical properties of the new hemispherical photomultiplier tubes from Electron Tubes*,
D. Paneque, M. Martinez, A. Ostankov, P. Jacon, E. Lorenz, R. Mirzoyan, S. Weinfurtner, B. Lub-sandorzhev, & R. Vasiliev, 2001, IEEE Trans. Nucl. Sci., 48, 1215
46. *A study of the new hemispherical 6-dynodes PMT from Electron Tubes*,
A. Ostankov, **D. Paneque**, M. Martinez, E. Lorenz, & R. Mirzoyan, 2000, Nucl. Instr. Meth. A, 442, 117

Last updated: February, 2024

Seminars and presentations

Invited Seminars in Universities, schools or research institutions

- *MAGIC as a CERN-recognized experiment*
CERN, Geneva (Switzerland), February 8 2024
- *Lectures on multi-messenger astrophysics*
Technical University Munich, Garching, Germany, June-July 2023
- *The MAGIC of gamma-ray astronomy*
Coimbra University, Coimbra, Portugal, March 17 2023
- *The MAGIC of gamma-ray astronomy: 20 years, 200 scientific publications and beyond*
Astronomski Centar, Rijeka, Croatia, February 15 2023
- *Multiwavelength and multi-messenger astrophysics*
High-energy physics school Maria Laach, Physikzentrum Bad Honnef, Germany, July/August 2021
- *High-Energy Cosmic-Ray studies through multi-messenger observations of blazars*
Max Planck Institute for Plasma Physics, Munich, Germany, February 12, 2020
- *New scientific challenges for CTA from the extreme character of our closest VHE blazars,*
Institute for Cosmic Ray Research, The University of Tokyo, Japan, November 14, 2019
- *The MAGIC of Time & Multi-Messenger studies on the most Extreme Cosmic Sources,*
Institute for Cosmic Ray Research, The University of Tokyo, Japan, November 8, 2019
- *Time & Multi-Messenger Astronomy of the most Extreme Cosmic Sources,*
Max Planck Institut für Physik, Munich, Germany, December 18, 2017
- *The challenge of studying blazars: the crucial role of gamma-ray astronomy,*
Aoyama Gakuin University, Japan, December 12, 2014
- *The challenge of studying blazars: the crucial role of gamma-ray astronomy,*
Institute for Cosmic Ray Research, The University of Tokyo, Japan, November 19, 2014
- *Review of the latest results on gamma-ray astronomy with the Fermi-LAT instrument,*
Max-Planck-Institut fuer Physik, Munich, Germany, April 17, 2012
- *Study of the classical TeV sources Mrk421 and Mrk501 with Fermi,*
Stanford University, Palo Alto, USA, June 3, 2010
- *Study of the classical TeV sources Mrk421 and Mrk501 with Fermi,*
JAXA/ISAS, Tokyo, Japan, May 7, 2010
- *Gamma-Ray Astronomy in the Fermi Era,*
Max-Planck-Institut für Physik, München, Germany, July 28, 2009
- *The Beginning of Gamma-Ray Astronomy with Fermi,*
Instituto de Astrofisica de Andalucia (IAA), Granada, Spain, December 20, 2008
- *The GLAST satellite and its impact on the understanding of high-energy phenomena in the Universe,*
Fermilab, Chicago, USA, May 5, 2008
- *Studying blazars with the Fermi/LAT and the connection to the TeV instruments,*
Universitat Autònoma de Barcelona (UAB.), Barcelona, Spain, September 6, 2007

Invited Talks in International Conferences

- *Two decades of MAGIC: Overview and recent highlights*
2024 LHC days in Split, Hvar island (Croatia), September 30-October 4, 2024
- *Highlights from the MAGIC telescopes*
VIII Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy (Gamma 2024), Milano (Italy), September 2-6, 2024
- *MAGIC, current status and future*
20 MAGIC years Symposium, La Palma (Spain), October 4-7, 2023
- *20 MAGIC years of gamma-ray astronomy*
20 MAGIC years Symposium, La Palma (Spain), October 4-7, 2023
- *The MAGIC of gamma-ray astronomy: 20 years, 200 scientific publications and beyond*
XVIII International Conference on Topics in Astroparticle and Underground Physics (TAUP), Vienna, Austria, August 28-September 1 2023
- *The MAGIC of gamma-ray astronomy: 20 years, 200 scientific publications and beyond*
International Cosmic Ray Conference Satellite Workshop, Chiba, Japan, August 7-8 2023
- *The MAGIC of Gamma-Ray Astronomy*
Advances in Astroparticle Physics and Cosmology (AAPCOS), Kolkata (India), January 23-27, 2023
- *High Energy Gamma Rays*
Astroparticle Physics European Coordination (APPEC) Town Meeting, Berlin, Germany, June 9-10, 2022
- *The challenge of understanding AGNs through extensive multiwavelength observations*
Ninth Fermi international Symposium, Johannesburg, South Africa, April 2021
- *The challenge of understanding AGNs through extensive multiwavelength observations*
Black Hole Astrophysics with VLBI: Multi-Wavelength and Multi-Messenger Era, Tokyo, Japan, January 2021
- *The MAGIC of very-high-energy gamma-ray astronomy*
XVI International Conference on Topics in Astroparticle and Underground Physics (TAUP), Toyama, Japan, September 2019
- *The Extreme character of our closest VHE blazars, Mrk421 and Mrk501*
Extreme19, Padova, Italy, January 2019
- *Unravelling the complex behaviour of our closest very-high-energy gamma-ray blazars, Mrk421 and Mrk501*
Towards a global multi-wavelength network, Cochem, German, September 2018
- *The MAGIC Pieces in the Radio Galaxies Puzzle: Fast Flares from IC310 and NGC1275*
Astrophysics and MAGIC (A+M) conference, La Palma, Spain, 26-29 June 2018
- *Indirect dark matter searches with the MAGIC telescopes*
TeV Particle Astrophysics Conference, Geneva, Switzerland, September 2016
- *Mrk421 and Mrk501 as high-energy physics laboratories to study the nature of blazars*
Blazars through Sharp Multi-Wavelength Eyes, Malaga, Spain, May 2016
- *The MAGIC Telescope System: Status and Scientific Highlights*
XIV International Conference on Topics in Astroparticle and Underground Physics (TAUP), Torino, Italy, September 2015

- *Mrk421 and Mrk501 as high-energy physics laboratories to study the nature of blazars*
Relativistic Jets: Creation, Dynamics, and Internal Physics, Krakow, Poland, April 2015
- *The First Fermi-LAT Catalog of Sources Above 10 GeV*,
The annual meeting 2013 of the German Astronomical Society, University of Tübingen, September 2013
- *RXTE and the Extensive Multifrequency Campaigns on Mrk421 and Mrk501 in the Fermi Era*,
16 Years of Discovery with RXTE, Goddard Space Flight Center, USA, March 29, 2012
- *Review of the latest results on gamma-ray astronomy with the Fermi-LAT instrument*,
High Energy Astroparticle Physics (HEAP), Tsukuba, Japan, November 13-15, 2011
- *Indirect Searches for Axion-Like-Particles with Fermi and Imaging Atmospheric Cherenkov Telescopes*,
High Energy Astroparticle Physics (HEAP), Tsukuba, Japan, November 13-15, 2011
- *Review of Gamma-Ray Astronomy (observations)*,
12th International Conference on Topics in Astroparticle and Underground Physics (TAUP), Munich, Germany, September 5-9, 2011
- *Study of the classical TeV blazars Mrk421 and Mrk501 with Fermi*,
RXTE Workshop: current programs and recent results, Washington DC, USA, November 5, 2009
- *The Beginning of Gamma-Ray Astronomy with Fermi*,
Kinetic Modeling of Astrophysical Plasmas, Jagiellonian University in Krakow, Poland, October 5 - 9, 2008
- *The MAGIC Telescope; Developments of New Technologies and First Observations*,
Particles and Radiation from Cosmic Accelerators, Chiba University, Japan, March 2 - 4, 2005

Talks in International Conferences

- *Unravelling the complex behaviour of Active Galactic Nuclei, the most powerful (persistent) cosmic accelerators*
Origins Science week, Kloster Irsee (Germany) December 3-6, 2023
- *The MAGIC of gamma-ray astronomy: 20 years, 200 scientific publications and beyond*
International Cosmic Ray Conference, Nagoya (Japan), July 26 - August 3, 2023
- *Unravelling the complex behaviour of our closest very-high-energy gamma-ray blazars, Mrk421 and Mrk501, through decades-long multi-instrument observations*
Roma International Conference on Astroparticle Physics, Roma, Italy, September 6-9 2022
- *The extreme character of our closest VHE blazars, Mrk421 and Mrk501*
High Energy Phenomena in Relativistic Outflows VII (HEPRO VII), Barcelona, Spain, 9-12 July 2019
- *Unravelling the complex behaviour of our closest very-high-energy gamma-ray blazars, Mrk421 and Mrk501*
TeV Particle Astrophysics Conference, Berlin, Germany, 27-31 August 2018
- *Unravelling the complex behaviour of our closest very-high-energy gamma-ray blazars, Mrk421 and Mrk501*
Seventh International Fermi Symposium, Garching, Germany, 15-20 October 2017
- *Mrk421 and Mrk501 as high-energy physics laboratories to study the nature of blazars*
TeV Particle Astrophysics Conference, Geneva, Switzerland, 12-16 September 2016
- *Mrk421 and Mrk501 as high-energy physics laboratories to study the nature of blazars*
Fifth International Fermi Symposium, Nagoya, Japan, 20-24 October 2014

- *The First Fermi-LAT Catalog of Sources Above 10 GeV*,
Fourth International Fermi Symposium, Monterey, California, October 28 - November 02, 2012
- *The First Fermi-LAT Catalog of Sources Above 10 GeV*,
5th International Symposium on High-Energy Gamma-Ray Astronomy, June 9-13, Heidelberg, Germany, 2012
- *Extensive multi-frequency campaigns on the classical TeV blazars Mrk421 and Mrk501 in the Fermi era*,
25th Texas Symposium on Relativistic Astrophysics, Heidelberg, Germany, December 6-10, 2010
- *Extensive multifrequency campaigns on the classical TeV blazars Mrk421 and Mrk501 in the Fermi era*,
38th Assembly of the COSPAR, Bremen, Germany, July 18 - 25, 2010
- *Fermi view of the classical TeV high Peaked BL Lacs*,
TeV Particle Astrophysics, Menlo Park, California, July 13 - 17, 2009
- *Study of indirect detection of Axion-Like-Particles with the Fermi-LAT instrument and Imaging Atmospheric Cherenkov Telescopes*,
TeV Particle Astrophysics, Menlo Park, California, July 13 - 17, 2009
- *Fermi view of the classical TeV high Peaked BL Lacs*,
Accretion and Ejection in AGNs, Como, Italy, June 22- 27, 2009
- *Study of indirect detection of Axion-Like-Particles with the Fermi-LAT instrument and Imaging Atmospheric Cherenkov Telescopes*,
American Physical Society (APS), Denver, Colorado, May 2 - 5, 2009
- *Search for Axion Dark Matter with GLAST*,
UCLA Dark Matter Symposium, Marina del Rey, California, Feb 20 - 22, 2008
- *Prospects of GLAST to study blazars*,
TeV Particle Astrophysics, Venice, Italy. August 27 - 31, 2007
- *Study of the Flux and Spectral Variations in the VHE Emission from the Blazar Markarian 501, with the MAGIC Telescope*,
1st GLAST symposium, Stanford, California, February 5 - 8, 2007
- *Observation of γ -ray emission above 200 GeV from the AGN 1ES1959+650 during low x-ray and optical activity*,
29th International Cosmic Ray Conference, Pune, India, August 3 - 10, 2005
- *Calibration of the pixel chain in the MAGIC Telescope*,
Deutsche Physikalische Gesellschaft, Berlin, Germany, March 4 - 11, 2005
- *Analyzing sub-100 GeV showers with the MAGIC Telescope*,
Deutsche Physikalische Gesellschaft, Berlin, Germany, March 4 - 11, 2005
- *Performance of the Optical Link System used in the MAGIC Telescope to transmit the PMT Analogue Signals*,
Deutsche Physikalische Gesellschaft, Mainz, Germany, March 29 - April 1, 2004
- *Enhancement in the sensitivity of photomultipliers for air cherenkov telescopes*,
29th Reunión Bienal de la Real Sociedad Española de Física, Madrid, Spain, July 7 - 11, 2003
- *Enhancement in the sensitivity of photomultipliers for air cherenkov telescopes*,
Deutsche Physikalische Gesellschaft, Aachen, Germany, March 10 - 13, 2003
- *First studies for a multiplexed GHz FADC prototype for future Air Cherenkov Telescopes*,
Deutsche Physikalische Gesellschaft, Aachen, Germany, March 10 - 13, 2003

- *A Method to Enhance the Sensitivity of Photomultipliers for Air Cherenkov Telescopes*,
New developments in photodetection, Beaune, France, June 17 - 21, 2002
- *An Optical Properties Study of the New Hemispherical PMTs from Electron Tubes*,
IEEE Nuclear Science Symposium and Medical Imaging Conference, Lyon, France, Oct. 15-20, 2000

Last updated: February, 2024

SHORT (1 page) SUMMARY OF MAIN TECHNICAL AND SCIENTIFIC ACHIEVEMENTS

The main research activities, since I finished my university studies in July 1998, are mostly related to the the MAGIC Telescope and the *Fermi* Satellite. In this page I list, and briefly describe, some of the main technical and/or scientific achievements.

1) Characterization of the optical properties of a new kind of hemispherical windowed PMT from *Electron Tubes (ET9116A/ET9117A)*, which were the photodectors chosen for the camera of the first MAGIC telescope (EEE Trans. Nucl. Sci., 48, 1215). This study had a large impact in the telescope camera design.

2) The discovery of a method to enhance the detection efficiency of the PMTs *ET9116A/ET9117A* using a special coating with a lacquer that scatters light (NIM A 504: 109-115, 2003, NIM A 518: 619-621, 2004, Applied. Phys. Lett. 93, 041916, 2008). The overall improvement in the detection efficiency of MAGIC was estimated to be $19 \pm 2\%$, which would have been much more expensive to achieve by other (more conventional) means.

3) Construction of an optical system to transfer with minimal distortion and attenuation the short (≤ 3 ns FWHM) analogue PMT signals from the camera of the telescope to the acquisition building, that is located ~ 100 m away from the telescope. This work was done in collaboration with scientific personnel from Max-Planck-Institut für Physik, München.

4) Extraction of the first significant gamma-ray signals obtained with the MAGIC Telescope. The sources (Crab Nebula and Mrk421) were observed during the commissioning phase in February 2004.

5) I proposed the observations, performed the data analysis and interpretation of the results, and finally wrote the manuscript reporting the MAGIC observations of Mrk501 in 2005 (ApJ 669, 862-883, 2007). This was the first time that flux-doubling times as short as 2 minutes were observed from any AGN source, which constrained the size of the emitting region to be comparable to the black hole horizon. I also observed a small delay between the highest and the lowest MAGIC energies, which enabled to put constraints on Lorentz Invariance violation (MAGIC Collaboration, 2008, Physics Letters B, 668, 253).

6) Characterization of the particle beam profiles in the beam test runs taken in the SPS accelerator at CERN on spare towers from the *Fermi*-LAT instrument. I went to CERN, helped with the set up and the retrieval of the beam test data, and performed a comparison of the experimental data with the Monte-Carlo simulated data, which helped improving the description of the LAT detector in the simulation. I also performed a validation of the GEANT 4 simulations of electromagnetic showers using EGS5.

7) Development of a code package (in C++) to retrieve and compute low/high level parameters that provide a diagnosis of the performance of *Fermi*-LAT. This code is one of the essential pieces in the automated procedures used to constantly monitor the performance of the *Fermi*-LAT detector in space.

8) A realistic study of the prospect to indirectly detect Axion-Like-Particles (ALP) with *Fermi* and Cherenkov Telescopes. This work was published on Physical Review D 79, 123511 (2009).

9) I initiated the usage of the highest *Fermi*-LAT energies and the all-sky monitoring capabilities of *Fermi* to improve the efficiency in the search for new very-high-energy (VHE) objects with Cherenkov Telescopes. I produced a list of good VHE-source-candidates that were (at least some of them) observed later on with the major Cherenkov Telescopes (i.e., H.E.S.S., MAGIC and VERITAS). In only 3 years, 10 out of 24 targets from the list were detected at VHE, which increased the total number of known VHE sources by about 25%. Ultimately, this project evolved towards the first Fermi High-energy LAT catalog, 1FHL (Abdo et al., 2013, ApJS, 209, 34), of which I am the lead author. The 1FHL catalog was later on followed by two additional catalogs of this type, 2FHL & 3FHL.

10) Initiator and main responsible for the extensive multi-instrument observing campaigns on the bright TeV blazars Mrk 421 and Mrk 501. These campaigns involve more than 10 distinct astronomy groups that regularly contribute with data across the electromagnetic spectrum (including polarization), and provide the largest time and energy coverage among all very-high-energy (VHE) gamma-ray objects. This long-term study, that started in the year 2009, uses Mrk 421 & Mrk 501 as a sort of astrophysical high-energy physics laboratories to study the blazar's phenomenom, and has delivered more than 25 scientific publications in peer-review journals.