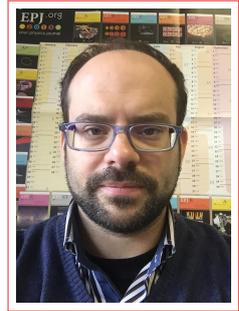


# MICHELE PALATIELLO



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## Personal Details

name **Michele**  
surname **Palatiello**  
place of birth Trieste  
date of birth 7 April 1982  
nationality Italian

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## Work Experience

2018 - 2019 *Postdoctoral Researcher*, University of Udine, Italy.  
2016 - 2018 *Postdoctoral Researcher*, University of Trieste, Italy.

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## Education

2015 *Ph.D. in Mathematics and Physics*, University of Udine, Italy.  
2011 *Laurea Specialistica in Astrofisica e Fisica Spaziale*,  
University of Trieste, Italy.  
2007 *Laurea in Fisica*, University of Trieste, Italy.

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## Ph.D. Thesis (2011 - 2015)

title *The Cosmic-ray Electron Spectrum Measured with the MAGIC Telescopes.*  
supervisor Prof. MASSIMO PERSIC.  
co-supervisors Prof. ALESSANDRO DE ANGELIS, Prof.ssa BARBARA DE LOTTO.

summary This thesis deals with the nature and propagation of Galactic cosmic-ray electrons and positrons (CRe). Very high energy (VHE;  $E > 30$  GeV) CRe, reaching the Earth from beyond the solar system, are important tracers of recent energetic events in our Galactic neighbourhood (1-2 kpc). Spectral measurements of this radiation may help checking standard astrophysical scenarios of CRe origin (e.g., pulsars, SNRs) versus exotic scenarios (e.g., DM particle annihilation). MAGIC results are crucial to firmly validate some previous experimental results by bridging the gap, at low and high energies, with data from (respectively) space-borne and ground-based detectors. In this thesis I present a MAGIC data analysis optimized for diffuse sources of emission. New tools and Monte-Carlo particle production are essential ingredients of this method. In this framework I have applied a specific, non-conventional cleaning algorithm to MAGIC data to finally obtain the CRe spectrum in the VHE band [TeVPA 2015, Kashiwa, Japan].

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## Master Thesis

- title *Preliminary  $\gamma$ -ray Detection of the BL Lac source 1ES 0033+595 with the MAGIC Telescopes.*
- supervisors Prof. MASSIMO PERSIC, Dott. NIJIL MANKUZHIYIL.
- summary The goal of this thesis work is to process  $\gamma$ -ray data for the BL Lac source 1ES 0033+595 obtained with the imaging air Cherenkov MAGIC telescopes. The AGN 1ES 0033+595 is included in the Costamante & Ghisellini (2002) list of candidate TeV Blazars. The source had already been observed before 2009 when only the first telescope (MAGIC I) was operative giving a null result but suggesting a possible detection with more observational time. That's because in 2009, after the second telescope (MAGIC II) became operative, 20 hours were devoted to the observation of this BL Lac source. In the analysis of this thesis, for the first time, the emission in VHE-ray band of the AGN 1ES 0033+595 has been discovered [M.N.R.A.S. **446** (2015) 217-225].

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## Bachelor Thesis

- title *Modelli Analitici di Topologie Magnetiche a Simmetria Assiale: Applicazioni alle Regioni Attive Solari.*
- supervisor Prof. MAURO MESSEROTTI
- summary Most of the energetic phenomena observed on the Sun are associated with the topological reorganization of the coronal magnetic field. This thesis deals with an alternative resolution method (with respect to the numerical approach) of the Magneto-Hydro-Static equation in the force-free and current-free magnetic field approximation using axial symmetry in cylindrical coordinates. To this end is used a preliminary code, available at INAF-Osservatorio Astronomico of Trieste, written in IDL. The results indicate an appropriate code flexibility that highlights a restricted range of possible parameter values due to the chosen geometry.

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## Research Activities

- 2017 - As a member of the Cherenkov Array Telescope experiment (CTA) I am involved in the development of the device (CaliBox) to calibrate the camera for the Large Size Telescope (LST) for CTA. The *CaliBox* has been developed by INFN Roma1 (Prof. Maurizio Iori PI) with the collaboration of INFN Udine and Udine University (Prof. Barbara De Lotto and Prof. Diego Cauz, Udine team). The *CaliBox* consists in an aluminium box containing a UV pulsed laser (355 nm wavelength with 400 ps width), a set of filters (for a large dynamic photon range), a Ulbricht sphere (properly designed to fulfill the LST photon density requirements at the camera plane) and an internal system of inter-calibration at low (SiPM) and high (photodiode) light intensity. The *CaliBox* is furthermore hermetically closed and filled with dry air for a complete system insulation. My responsibility was to integrate (from hardware and software point of view) all the software (managed inside a ODROID-C1 ARM7 cpu board) to pilote the entire *CaliBox* instrumentation with the Open Platform Communications Unified Architecture protocol (OPC-UA), starting from the OPC-UA Server *CaliBox* installation. I made myself various required tests such as the photon uniformity, the OPC-UA integration with the Camera Control software (CACO) of the LST Camera and the Trigger Interface Board.

I am also involved in all other aspects of the *CaliBox* such as the hardware design, the future development and commissioning (PoS ICRC2019 (2019) 757).

2016 - Member for the NASA Fermi-LAT GRB and Solar group team (Prof. Francesco Longo, Trieste team). For the GRB side, as responsible for the research of high energy GRB photons at very late time (late afterglow phase) I wrote my personal software pipeline. The research was made to cover all the detected so far GRB by the Fermi-LAT instrument (corresponding author for the ongoing draft "The Second Fermi LAT Gamma-ray Burst Catalog" paper) with a particularly time resolved study on the GRB 160509A (corresponding author for the ongoing draft paper). During the "Sexten School in Gamma Ray Astrophysics with CTA" I was responsible for the production of the CTA-Fermi virtual machine used for the entire tutors courses by the school participants. This machine encompasses all the tools for the CTA and Fermi-LAT data analysis. Moreover I was responsible for the generation of the SED production of the GRB 160821B inside a multiwavelength project [3] (PoS IFS2017 (2017) 084, ongoing draft paper). As active member of the GRB group I made the scheduled Burst Advocate shift. For the Solar group I generated the time resolved Bayesian block analysis for all of the most energetic solar flares detected by Fermi-LAT so far.

2011 - 2015 As a PhD student inside the MAGIC collaboration (Prof. Massimo Persic, Prof. Alessandro De Angelis and Prof. Barbara De Lotto) I made the study and the analysis of the MAGIC data to extract the CRe spectrum. My initial work had been concerned in the finalization of an already existed not-standard chain programs, difficult due to a very radicate changes with respect to the standard MAGIC point-like  $\gamma$ -ray analysis (CRe are diffuse background particles). The last part of my work relates to the completely new analysis of background data where it has been necessary the use of MC protons and electrons for the correct CRe extraction. During this period I got familiar with all the MAGIC Analysis and Reconstruction Software chain (MARS), with ROOT as a Data Analysis Framework and all the scientific literature about CRe to finally provide a first preliminary CRe spectrum with the MAGIC data. Starting from the second PhD year I am part of the restricted MAGIC team that provides a Fermi-LAT Daily report source analysis (with free Fermi data for MAGIC internal group).

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## Talks & Poster

- 24/07 - 1/08/2019 36<sup>th</sup> International Cosmic Ray Conference - ICRC2019, Madison, USA, contributed poster.
- 15 - 20/10/2017 7<sup>th</sup> International Fermi Symposium, Garmisch-Partenkirchen, Germany, contributed poster.
- 12 - 20/07/2017 35<sup>th</sup> International Cosmic Ray Conference - ICRC2017, Busan, Corea, contributed poster.
- 26 - 30/10/2015 TeV Particle Astrophysics - TeVPA 2015, Kashiwa, Japan, contributed talk.
- 16 - 21/05/2014 *Cosmic Ray Origin - Beyond the Standard Models*, San Vito di Cadore, Italy, contributed talk.
- 23 - 26/09/2013 99<sup>th</sup> Meeting of the Italian Physical Society (SIF), Trieste U., Italy, contributed talk.

- 12-21/09/2012 98<sup>th</sup> Meeting of the Italian Physical Society (SIF),  
Napoli U. "Federico II", Italy, contributed talk.
- 21-23/11/2011 12<sup>th</sup> International Symposium on Frontiers of Fundamental Physics (FFP12),  
Udine U., Italy, contributed poster.

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## Computer Skills

- op. systems Linux, Mac OS, Windows.
- prog. lang. IDL, Root, C++.
- software OPC-UA, MARS (MAGIC Analysis and Reconstruction Software),  
Fermi Science Tools, Aladin, Maxim, The Sky X, Stellarium.

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## Languages

- english Cambridge certificate.  
Attended classes "Lecturing in English" at Udine U..

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## Professional Skills

- 2016 - Member of a restricted INFN team responsible for the building of the first prototype device to calibrate the *Large Size Telescope* camera for the *Cherenkov Telescope Array* observatory.
- 2016 - Member of the Gamma-Ray Burst and Solar Flare group inside the Fermi-LAT team providing transients analysis and Burst Advocate shifts.
- 2012 - Member of a MAGIC team providing daily Fermi-LAT quick-look data analysis reports, for MAGIC internal use.
- 05-06/2013/2014 Monthly data-taking shift, as shift leader, with MAGIC at the European Northern Observatory (ENO), La Palma (Canary Islands), Spain.
- 11/2012 Monthly data-taking shift, as deputy shift Leader, with MAGIC at ENO, La Palma, Spain.
- 06-07/2011 Monthly data-taking shift, as shifter, with MAGIC at ENO, La Palma, Spain.

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## Teaching Experience

- 2018-2019 Assistant Professor for the course "*Fisica Generale I*" for Engineering and Architecture at Trieste University.
- 2018-2019 Lab assistant for the course "*Fisica Generale I*" for Engineering at Udine University.
- 2017-2018 Assistant Professor for the course "*Fisica Generale II*" for Engineering and Architecture at Trieste University.
- 2017-2018 Assistant Professor for the course "*Fisica Generale I*" for Engineering and Architecture at Trieste University.
- 24-28/07/2017 Tutor for the session "How to produce a SED with the Fermi-LAT DATA" during the School on HE&VHE  $\gamma$ -ray Astrophysics - "*Gamma Ray Astrophysics with CTA*", Sexten Center for Astrophysics, Italy.
- 2016-2017 Co-Supervisor of Master Degree Thesis in Astrophysics and Cosmology, "*Gamma Ray Bursts study with low energy telescopes*", Student: Sig. Stefano Miniussi, Supervisor: Prof. Francesco Longo.

- 2016-2017 Assistant Professor for the course "*Fisica Generale I*" for Engineering and Architecture at Trieste University.
- 02-06/2016 Professor in Mathematics at "*I.S.I.S. A. Malignani*" high-school, Udine, Italy.
- 2013-2014 Co-Supervisor of Laurea Thesis in Mathematics, "*A short Introduction to Astrobiology*", Student: Ms Sara Salvador, Supervisor: Prof. Alessandro De Angelis.
- 2013-2014 Teaching experience as Assistant Professor, Physics for Master's Degree in Mathematics.

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## Participation to Schools/Conferences

- 24-28/06/2019 Staff internal member and responsible for the Virtual Machine used for the Workshop "*Multimessenger data analysis in the era of CTA*", Sexten Center for Astrophysics, Italy.
- 21-26/01/2018 Conference on "*Chemical and dynamical evolution of galaxies*", Sexten Center for Astrophysics, Italy.
- 24-28/07/2017 School on HE&VHE  $\gamma$ -ray Astrophysics - "*Gamma Ray Astrophysics with CTA*", Sexten Center for Astrophysics, Italy.
- 03-07/06/2014 10<sup>th</sup> SciNeGHE Workshop "*Science with the New Generation of High Energy  $\gamma$ -ray Experiments*", Lisbon, Portugal.
- 24-28/02/2014 4<sup>th</sup> MAGIC Software School, Padova U., Italy.
- 29-31/01/2014 Workshop on "*New Worlds in Particles, Astroparticles and Cosmology*", Minho U., Braga, Portugal.
- 20-28/01/2014 4<sup>th</sup> International Doctorate Network in Particle Physics, Astrophysics and Cosmology (IDPASC) School, Minho U., Braga, Portugal.
- 04-06/10/2013 IDPASC School on Frontier Detectors for HE and Astroparticle Physics, Siena U., Italy.
- 22-26/06/2013 Ph.D. School on HE  $\gamma$ -ray Astrophysics "*From solar activity to black holes*", Sexten Center for Astrophysics, Italy.
- 04-08/03/2013 *Time & Matter*, Venice, Italy.
- 21-25/01/2013 3<sup>rd</sup> MAGIC Software School, Barcellona U., Spain.
- 23/01-03/02/2012 2<sup>nd</sup> International Doctorate Network in Particle Physics, Astrophysics and Cosmology School, CISM, Udine, Italy.
- 07/2008 Summer School in Cosmology, ICTP, Trieste, Italy.
- 16-22/09/2007 INAF International Astrophysics School "*Fundamental Physics Using  $\gamma$ -ray Bursts*" & "*The Atmospheres of the Terrestrial Planets*", Venice, Italy.

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## Science Outreach

- 2019 - Series of lectures in Astrophysics at "*I.S.I.S. A. Malignani*" high-school, Udine, Italy.
- 2016 - *Helping tour inside the INFN laboratories for high school and general public*, Trieste.
- 2016 - *Helping tour for the public and schools observational nights inside the Specola Hack*, Trieste.
- 29/09/2016 *Notte dei Ricercatori*, Trieste.

- 23-25/09/2016 *NEXT*, Trieste.
- 02-06/2016 Series of lectures in Astrophysics at "*I.S.I.S. A. Malignani*" high-school, Udine, Italy.
- 2013-2014 *Co-Supervisors for the Italian Astronomy Olympics*, first selection Trieste.
- 2010-2014 *Stars go to School* (Le stelle vanno a scuola), an INAF project for high-school students.
- 27/09/2013 *Notte dei Ricercatori*, Udine, presented talk.
- 2001 "*Youths & Science*" (I giovani e la scienza) – Liceo scientifico G. Marinelli, Udine, presented talk, "*Interazioni Io-Giove in banda decametrica con il radiotelescopio dell' Associazione Friulana di Astronomia e Meteorologia (AFAM)*".

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## Interests

- Astrophotography (with a MEADE Schmidt-Cassegrain 20 cm F/10)
- Speleology & Canyoning
- Sailing & Traveling
- Art & Philosophy

Udine, October 21, 2019