

Edna L. Ruiz Velasco

Dr. rer. nat.

edna.ruizvelasco@lapp.in2p3.fr

<https://ednaruiz.github.io/>

ORCID: 0000-0001-6939-7825

Personal Information

Date of birth **July 11, 1993**, *Mexico City, Mexico.*

Nationality **Mexican.**

Marital status **Partnership, one daughter.**

Academic Background

August 2017–
June 2021 **PhD in Astrophysics**, *International Max Planck Research School of Astronomy and Astrophysics at the University of Heidelberg under the integrated master/doctoral (4+4) programme for excellent students*, Heidelberg, Germany, Magna Cum Laude.

Thesis: Search and first detection of very-high-energy photons from gamma-ray bursts: an analysis with HAWC and H.E.S.S. <https://archiv.ub.uni-heidelberg.de/volltextserver/29603/> Non-Thermal Astrophysics Group, Max Planck Institute for Nuclear Physics

August 2013–
August 2017 **Bachelor's Degree in Physics, Faculty of Sciences, National Autonomous University of Mexico**, Graduated with full credits and high academic performance.
GPA: 9.6 out of 10

August 2010–
June 2013 **High School Studies, National Preparatory School No. 9, UNAM.**

Professional Experience and Awards

Nov. 2023–
Present **CNRS Postdoctoral Researcher**, *Laboratoire d'Annecy De Physique Des Particules*, Annecy-Le-Vieux, France, Gamma-ray burst observations with LST, new statistical methods for GRB detection, and population synthesis.

Jan. 2023–
Oct. 2023 Maternity leave

May 2022– **Science Operations Manager**, *H.E.S.S. Collaboration.*

Apr. 2023 In this prestigious and important role, I coordinated and ensured proper observational coverage of various astrophysical targets with H.E.S.S.

Jul. 2021–
Apr. 2023 **Postdoctoral Researcher**, *Max Planck Institute for Nuclear Physics*, Heidelberg, GRB observations and data analysis with HAWC and H.E.S.S. GRB detectability studies and software development for SWGO.

Aug. 2017–
Jun. 2021 **PhD student**, *University of Heidelberg*, Max Planck Institute for Nuclear Physics, Heidelberg.

Feb. 2015–
Aug. 2017 **Assistant to Emeritus Researcher**, **CONACYT-SNI**, *National Autonomous University of Mexico*, Institute of Physics, Mexico City.

Systematic studies on HAWC's angular resolution. Instrumentation and commissioning of the first HAWC detector units

Jun. 2016– **Summer Student at CERN**, *CMS Collaboration*, CERN–CMS Heavy Ions Group, Geneva.

Aug. 2016 Feasibility studies for implementing a new double/triple-jet search algorithm in heavy-ion collisions

Memberships

- Nov 2023–Present **LST Collaboration**, ~400 members, Main GRB programme coordinator and lead analyst of GRB data. Maintainer of *lappana*, a Python package for LST data analysis.
- 2023–Present **SWGO Supporting Scientist**, Activities: Population synthesis for GRB detectability studies for SWGO.
- 2014–2023 **HAWC Collaboration**, ~100 members, PMT instrumentation, novel GRB analysis method using X-ray light curves and detector evolution. Machine learning methods for gamma/hadron separation. Simulation and electronics software development.
- 2017–Present **H.E.S.S. Collaboration**, ~200 members, GRB observations and trigger strategies. Full-chain GRB data analysis. On-call expert in multiple observation shifts.
- 2019–2023 **SWGO Collaboration**, ~80 members, Transient studies and GRB detectability prospects. Simulation chain software development and IRF production. Supporting scientist since Nov 2024.

Main Publications

Top Three

- 2025 **The Second H.E.S.S. GRB catalogue: Fifteen years of GRB observations with the H.E.S.S. telescopes**, *H.E.S.S. Collaboration*, Under peer review with Astronomy and Astrophysics, First Author.
Led the data analysis, population studies, and multi-wavelength modelling. Coordinated manuscript with corresponding authors.
- 2020 **Revealing X-ray and gamma-ray temporal and spectral similarities in the GRB 190829A afterglow**, *Abdalla, H., Ruiz-Velasco, E. et. al.*, Science 372 (6546) DOI: 10.1126/science.abe8560, Corresponding Author.
Main H.E.S.S. data analyst. Cross-validation with Gammapy. Contributed substantially to manuscript writing.
- 2018 **A very-high-energy component deep in the gamma-ray burst afterglow**, *Abdalla, H., Ruiz-Velasco, E. et. al.*, Nature 575 (7783), 464-467 DOI: 10.1038/s41586-019-1743-9, First Author.
Main H.E.S.S. data analyst. Coordinated multi-wavelength data collection and co-led manuscript writing.

Other Selected Publications

- 2025 **Science Prospects for the Southern Wide-field Gamma-ray Observatory: SWGO**, *P. Abreu et al. (SWGO Collaboration)*, arXiv preprint arXiv:2506.01786, June 2025.
Key contributor to GRB detection prospects section, including population synthesis modelling.
- 2023 **The case of the missing VHE GRBs: A retrospective study of Swift gamma-ray bursts with Imaging Atmospheric Cherenkov Telescopes.**, *H. Ashkar, A. Sangare, S. Fegan, J. Damascene Mbarubucyeye, E. Ruiz-Velasco and S.J. Zhu*, Accepted in The Astrophysical Journal.
Contributed core idea and initial studies. Provided software for retrieving Swift and Fermi alerts.
- 2021 **Gamma-ray burst detection prospects for next generation ground-based VHE facilities**, *La Mura, G., Ruiz-Velasco, E. et. al.*, MNRAS 508.
Contributed to core concept. Led first detectability studies of recent GRBs for SWGO.
- 2020 **Multi-messenger astronomy with very-high-energy gamma-ray observations.**, *Hinton, J. and Ruiz-Velasco, E.*, Proceedings of TAUP2019, 2020 Journal of Physics: Conference Series, 1468, 012096..
- 2020 **The H.E.S.S. detection of GRB 180720B and GRB 190829A.**, *Ruiz-Velasco E.*, Proceedings of TMEX 2020.

- 2019 **Measurement of the Crab Nebula spectrum past 100 TeV with HAWC**, *Abeysekara, A. U., Ruiz-Velasco E. et. al.*, *The Astrophysical Journal* 881 (2), 134.
Developed systematic analysis method adopted for future HAWC spectral publications.
- 2019 **Gamma-Ray Burst observation at Very High Energy with H.E.S.S.**, *Piel, Q., Ruiz-Velasco E., et. al.*, *Proceedings of 36th International Cosmic Ray Conference (PoS-ICRC2019)*, pp. 761.
 ○ Over 100 publications and proceedings (see: <https://scholar.google.com/citations?user=NrLU4sEAAAAJ&hl=en>)
h-index and citation impact (INSPIREHEP), h-index: 42, with 11,145 total citations., inspirehep.net/authors/1634524.

Presentations and Schools

Invited Talks

- May 2024 **Center for Astrophysics and Gravitation Seminar**, *Lisbon, Portugal*, Invited seminar on VHE photon observations in GRBs.
- May 2022 **Workshop on GRBs at VHE, MPG Harnack Haus**, *Berlin, Germany*, Two invited talks: H.E.S.S. GRB detections and the SWGO GRB programme.
- Feb 2022 **Kaffeepalaver, MPIK**, *Heidelberg, Germany*, Invited talk on recent GRB detections.
- Jan 2022 **Ángel Dacal Seminar, IFUNAM**, *Mexico City, Mexico*, Invited talk on GRBs observed with HAWC and H.E.S.S..
- Oct 2021 **Rencontres de Blois**, *Blois, France*, Plenary talk: "Recent TeV GRB measurements".
- Oct 2021 **Marcel Grossmann Meeting**, *Online Conference*, Invited talk: "VHE observations of GRB 190829A with H.E.S.S..".
- Jun 2020 **TMEX 2020 (Rencontres du Vietnam)**, *Quy Nhon, Vietnam*, Plenary talk: "The detection of GRB 180720B with H.E.S.S..".
- Dec 2019 **TeV Particle Astrophysics (TeVPA)**, *Sydney, Australia*, Plenary: "The detection of VHE emission in the deep afterglow of GRB 180720B".
- May 2019 **First CTA Science Symposium**, *Bologna, Italy*, Plenary: "Discovery of Late-Time VHE Emission from a GRB Afterglow".

Conference Talks and Posters

- 2023 **TeV Particle Astrophysics (TeVPA)**, *Naples, Italy*, Contributed talk as corresponding author: "Exploring GRBs at VHE: Insights from 15 Years of H.E.S.S. Observations".
- 2019 **TeVPA**, *Sydney, Australia*, Contributed talk: "Highlights from the H.E.S.S. GRB observation program".
- 2016 **National Physics Congress**, *Monterrey, Mexico*, Poster: "Gamma/hadron separation with convolutional neural networks for HAWC".
- 2015 **National Physics Congress**, *Merida, Mexico*, Poster: "Observation of quasi-horizontal trajectories with HAWC".
- 2021 **Astronomy Outreach in Namibia: H.E.S.S. and Beyond**, *PoS (ICRC 2021)*, Outreach contribution to ICRC 2021, corresponding author.

Teaching, Supervision and Outreach

- Since 2023 **Co-supervision of PhD thesis by Léo Le Moigne**, *Laboratoire d'Annecy de Physique des Particules (LAPP)*, Joint supervision of a PhD thesis focused on GRBs with LST-1, addressing real-data analysis and simulation-based optimisation of observing strategies.
- Dec 2024 **Spanish subtitles for Physik im Advent**, *Voluntary translation of educational physics videos aimed at high-school students worldwide*.

- June 2022 **Data analysis and simulation workshop for SWGO**, *Three-hour session on gamma/hadron separation and IRF production methods.*
- 2019–2024 **H.E.S.S. outreach group member**, *Social media content and GRB poster design for H.E.S.S. anniversary display in Namibia.*
- May 2020 **Press release and media coverage**, *Science publication: GRB 190829A VHE similarities.*
- Nov 2019 **Press release and media coverage**, *Nature publication: GRB 180720B VHE component.*
- 2018–2019 **MPIK**, *Advanced lab supervisor (Zeeman effect) for undergraduate students at University of Heidelberg.*
- 2017 **Faculty of Sciences, UNAM**, *Teaching assistant for undergraduate electromagnetism lab, two semesters.*
- 2015–2017 **IF-UNAM**, *Supervised high-school students on summer projects on machine learning and cellular automata with Python.*
- Conducted internal reviews for articles, proceedings, and publications within HAWC, SWGO, and H.E.S.S. Served as external referee for MDPI journal.

Computer Skills

Programming Languages	C/C++ (intermediate), Python (advanced)
Data Analysis	ROOT, NumPy, pandas, Keras/TensorFlow, gammapy, astropy, matplotlib, aerie (HAWC), pyswgo (SWGO), HAP (H.E.S.S.), lstchain (LST)
Workflow Tools	Git, CVS, SVN
Others	LaTeX, HTML, CSS, Procreate

Languages

Spanish	Native language.
English	Fluent , <i>High competence in reading, writing, and speaking.</i>
Italian	Fluent , <i>High competence in reading, writing, and speaking.</i>
French	Intermediate , <i>Good reading and listening comprehension; competent in speaking and writing.</i>
German	Upper beginner , <i>Good oral comprehension; competent speaking skills.</i>

Hobbies

Photography, hydroponics, music production and mixing, Mexican cooking with limited European ingredients, design, and modern art.