# Victor Barbosa Martins

*Curriculum Vitae*

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I am a Physics Engineer (BSc) with a Master's and a PhD degree in Physics. I am currently a Postdoctoral researcher at DESY. I have research experience in the field of Astroparticle Physics, in particular with instrumentation for gamma-rays experiments and with extra-galactic gamma-ray astrophysics (data analysis and interpretation). I have developed the software for the structure condition monitoring of the medium-sized telescope of CTA and develop now simtools, the simulation pipeline for CTA, both in Python. In the current position, I familiarized myself with the CORSIKA and Sim_telarray softwares. My current scientific interests lie mainly on extragalatic gamma-ray astronomy, especially blazars and radio galaxies, galaxy cluster, and on multimessenger astronomy. I am currently a member of the CTA Consortium and H.E.S.S. Collaboration.

## Personal Information

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| Full Name | Victor Barbosa Martins |
| Date of Birth | February, 18th, 1991 |
| Place of Birth | Sacramento-MG, Brazil |

## Education

2018 – 2022 **PhD degree in Experimental Physics**
Humboldt-Universität zu Berlin, Germany.

2016 – 2018 **Master's degree in Applied Physics**
São Carlos Institute of Physics, University of São Paulo (USP), Brazil.

2009 – 2014 **Bachelor's degree in Engineering Physics**
Federal University of São Carlos (UFSCar), Brazil.

## Work Experience

07/2022 – **Research assistant - Posdoctoral researcher**, *Deutsches Elektronen-Synchrotron (DESY), Zeuthen*, Germany
Leader: Dr. Gernot Maier.

09/2018 – 06/2022 **Research assistant - PhD candidate**, *Deutsches Elektronen-Synchrotron (DESY), Zeuthen*, Germany
Leaders: Prof. Dr. David Berge, Dr. Markus Garczarczyk, and Dr. Stefan Ohm.

09/2016 – 01/2018 **Technical development analyst**, *National Synchrotron Light Source (LNLS), National Center for Research in Material and Energy (CNPEM), Campinas – SP*, Brazil

Leader: Dr. Narcizo de Souza

01/2014 – 06/2014 **System analyst**, *Itaú Unibanco (bank), São Paulo*, Brazil

## Research projects

09/2018 – 06/2022 **"Probing the propagation of cosmic rays in the Virgo Cluster with H.E.S.S."**, *PhD project - science*, Deutsches Elektronen-Synchrotron (DESY), Zeuthen, Germany

Supervision: Prof. Dr. David Berge and Dr. Stefan Ohm

09/2018 – 06/2022 **"A monitoring system for the Medium-Sized Telescope (MST) of Cherenkov Telescope Array (CTA)"**, *PhD project - technical task*, Deutsches Elektronen-Synchrotron (DESY), Zeuthen, Germany

Supervision: Prof. Dr. David Berge and Dr. Markus Garczarczyk

02/2016 – 08/2018 **"Resistive plate chambers design, development and tests for the Pierre Auger Observatory"**, *Master's project*, São Carlos Institute of Physics (IFSC-USP), Brazil

Supervision: Prof. Dr. Vitor de Souza
Scholarship: National Council for Scientific and Technological Development

08/2013 – 12/2013 **"Characterization of Bragg Gratings in microstructured multicore optical fiber"**, *Internship*, IPHT Leibniz-Institut für Photonische Technologien, Jena, Germany

Supervision: Dr. Martin Becker
Scholarship: Science without borders

08/2010 – 08/2012 **"Configuration of Cherenkov Telescopes for particle astrophysics"**, *Undergraduate research*, São Carlos Institute of Physics (IFSC-USP), Brazil

Supervision: Prof. Dr. Vitor de Souza
Scholarship: National Council for Scientific and Technological Development

03/2009 – 12/2011 **"Pan-Starss and Killer Asteroid Projects"**, *group member*, Astronomy group, Federal University of São Carlos (UFSCar), Brazil

Leader: Prof. Dr. Gustavo Rojas

## Selected Publications

### Journal papers

*in internal review* (**corresponding author**) EHT Collaboration, HESS Collaboration, VERITAS Collaboration, MAGIC Collaboration, Fermi Collaboration, EAVN Collaboration, "Broadband Multi-wavelength Properties of M87 during the 2018 EHT Campaign and a Very High Energy Flaring Episode".

*in internal review* (**first author**) HESS Collaboration, "The spectrum of the VHE gamma-ray high state of M 87".

2023 (**first author**) HESS Collaboration, "Constraining the cosmic-ray pressure in the inner Virgo Cluster using H.E.S.S. observations of M 87", A&A, 675, A138, 2023.

2018 (**corresponding author**) P. Abreu et al., "MARTA: a high-energy cosmic-ray detector concept for high-accuracy muon measurement", EPJC, 78, 333, 2018.

### Proceedings and conference presentations

2023 (**poster**) Rahul Cecil, V. Barbosa Martins, Iryna Lypova et al. (H.E.S.S. Collaboration), "Probing Gamma-Ray Propagation at Very-High Energies with H.E.S.S. Observations of M87", PoS(ICRC2023)908, 2023.

2023 (**poster**) V. Barbosa Martins (H.E.S.S. Collaboration), "Probing the morphology of the low state gamma-ray emission of M87 with H.E.S.S.", PoS(ICRC2023)696, 2023.

2022 (**poster**) P. Zilberman, V. Barbosa Martins, I. Lypova, et al. (H.E.S.S. Collaboration), "Constraining the Extragalactic Background Light using H.E.S.S Observations of M87", 7th Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy ($\gamma$-2022), 2022.

2022 (**talk**) V. Barbosa Martins (H.E.S.S. Collaboration), "The gamma-ray morphology of M87 and the cosmic-ray pressure in the Virgo Cluster with H.E.S.S.", 7th Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy ($\gamma$-2022), 2022.

2020 (**poster**) V. Barbosa Martins and M. Garczarczyk (CTA Consortium), "The structure monitoring of the MST prototype of CTA", Proc. SPIE, 11445, 114456E, 2020.

2019 (**poster**) V. Barbosa Martins et al. (CTA Consortium), "A Condition Monitoring Concept Studied at the MST Prototype for the Cherenkov Telescope Array", PoS(ICRC2019)626, 2019.

## Teaching Experience

### Teaching assistant at Humboldt-Universität zu Berlin

2019 **Extragalactic astronomy**, *Undergraduate course*

Assistant to Prof. Dr. David Berge and Prof. Dr. Marek Kowalski.

## Supervision

2023 **Summer school project, DESY, Zeuthen, Germany**, *Science verification of CTA: the construction phase and the monitoring arrays.*

Student: Julia Lagunas Miralles

2023 **Ukraine winter school project, DESY, Zeuthen, Germany**, *The effect of the atmospheric composition on CTA performance.*

Student: Kateryna Solovian

2022 **Summer school project, DESY, Zeuthen, Germany**, *Event-type Analysis for CTA.*

Student: Evgenia Kennedy

## Organisation

12/2022 – **Astroparticle Physics Seminar, DESY, Zeuthen, Germany**

Weekly seminar co-organized for the Astroparticle Division at DESY.

## Software development

07/2022 – **simtools**, *Simulation tools and applications for CTA*

09/2018 – 06/2022 **MST health monitoring system**, *Health monitoring system for the MST structure of CTA)*

## Languages

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| Native | Brazilian Portuguese |
| Fluent | English and German |
| Intermediate | Spanish |
| Basic | Polish |

## Skills

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| Programming languages | Advanced level: Python (e.g. Numpy, Scipy, Matplotlib, Pandas, Astropy, Gammapy, Gamera, Naima); Intermediate level: LaTeX, bash, C, C++ |
| Software | Advanced level: Pycharm (IDE for python), Artemis Modal Pro (vibration measurements), Autodesk Inventor (mechanical drawing); Intermediate level: CORSIKA (simulation of atmospheric shower), Sim_telarray (simulation of the detection of atmospheric showers by Cherenkov telescopes), Zemax (optical ray tracing) |
| Tools | Github, Notion, Mendeley. |
| Soft skills | Organized, good time and project management skills, good listener, contribute to a healthy work atmosphere. |

## References

**Dr. Gernot Maier**
Deutsches Elektronen-Synchrotron (DESY)
Zeuthen, Germany
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**Prof. Dr. David Berge**
Deutsches Elektronen-Synchrotron (DESY) and Humboldt-Universität zu Berlin
Zeuthen, Germany
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**Dr. Stefan Ohm**
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**Dr. Markus Garczarczyk**
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