# Ettore Bronzini

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**Address**: via Gobetti, 101, Bologna (BO), Italy
**Affiliation**: University of Bologna/INAF
**Date of birth**: March 25$^{th}$, 1997
**Place of birth**: Bari (BA), Italy

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**OVERVIEW**

I am a Ph.D. student in Astrophysics at the University of Bologna. My research field is observational high-energy astrophysics: in particular, I am interested in understanding the physical processes connected with accreting compact objects, such as supermassive black holes in the center of active galaxies. I am also interested in studying the relativistic jets produced by these objects from observational and theoretical points of view. In particular, my interests include high- and very high-energy emission in jets, as well as their role in particle production and acceleration. This field is the topic of the Ph.D. project I have been currently working on, with a particular focus on its prospects for the Cherenkov Telescope Array Observatory (CTAO). I am expert in data analysis of major high-energy telescopes (e.g., *Chandra*, XMM-*Newton*, *Swift*, *NuSTAR*, *Fermi*-LAT, MAGIC) and non-thermal Spectral Energy Distribution (SED) modeling of radio galaxies.

**LANGUAGES**

Italian (mother-tongue), English (B2), Spanish (A2), French (A1)

**EMPLOYMENT**

**Teaching Tutor**
November-December, 2024
Teaching tutor in the module of High-Energy Astrophysics of the Multiwavelength Astrophysics Laboratory of the Master in Astrophysics and Cosmology at the University of Bologna.

**Teaching Tutor**
November, 2023
Teaching tutor in the module of High-Energy Astrophysics of the Multiwavelength Astrophysics Laboratory of the Master in Astrophysics and Cosmology at the University of Bologna.

**Internship Research Student**
May, 2021 - November, 2021
Internship to prepare the Master's degree thesis at IRA-INAF in Bologna.
Project title: *A multi-wavelength study of a sample of young radio sources*

**EDUCATION**

**Alma Mater Studiorum - Università di Bologna**, Bologna, Italy
November 2022 - present
PhD in *Astrophysics* - XXXVIII cycle
Thesis title: *Exploring TeV-Emitting Radio Galaxies with CTAO: Insights into the Physics of Relativistic Jets*
Supervisor: Dr. E. Torresi (INAF-OAS)
Academic supervisor: Prof. C. Vignali (UniBo)
Co-supervisors: Dr. P. Grandi (INAF-OAS), Dr. R. Zanin (CTAO)

**Alma Mater Studiorum - Università di Bologna**, Bologna, Italy
December 2019 - March 2022
Master degree in *Astrophysics and Cosmology*
Final mark: 110/110 with honors
Thesis title: *Investigating High-Energy Emission in Young Radio Galaxies*
Supervisor: Prof. C. Vignali (UniBo)
Co-supervisor: Dr. G. Migliori (INAF-IRA)

**Università degli Studi di Bari Aldo Moro**, Bari, Italy
September 2015 - December 2019
Bachelor degree in *Physics*
Final mark: 107/110
Thesis title: *Signal formation in electronic devices*
Supervisor: Prof. F. Loparco (UniBa & INFN)

**Liceo Classico Socrate di Bari**, Bari, Italy
September 2010 - July 2015
High School Diploma
Final mark: 85/100

**MAIN INTERNATION. COLLABORAT.**

Member of

- the *Fermi* Collaboration (October 2023, present);
- the CTA Consortium (November 2022, present);
- the INAF (November 2022, present);
- the MAGIC Collaboration (November 2022, present);
- the LST-1 Collaboration (November 2022, present).

**DATA ANALYSIS EXPERIENCE**

Large experience in data handling, spectral analysis and imaging of *Chandra*, XMM -*Newton, NuSTAR*, *Swift*, and *Fermi*-LAT data.
Good experience in MAGIC data reduction and analysis.
Large experience with mainly astrophysical and statistical python packages (e.g., astropy, scipy, seaborn, etc.).

**COMPUTER SKILLS**

**Programming Languages**
C (basic), Python (advanced), LaTeX(advanced)

**Scientific Software**
`Xspec` (advanced), `DS9` (advanced), `Fermipy` (advanced), `HEASoft` (medium), `Sherpa` (medium), `SAS` (medium), `CASA` (basic), `IRAF` (basic), `ROOT Cern` (basic), `TOPCAT` (basic), `Mathematica` (basic).

**Operating Systems**
Mac OSX, Linux, Windows

**PROPOSAL EXPERIENCE**

Instrument: EAVN, Role: PI, Proposal ID: 0432, Status: accepted
Instrument: EVN, Role: PI, Proposal ID: E24B022, Status: accepted
Instrument: MAGIC, Role: PI, Proposal ID: AGN20, Status: accepted/partially observed
Instrument: XMM-*Newton*, Role: Co-PI, Proposal ID: 0904530201, Status: observed

**MAIN COLLABORAT. (alphabetic order)**

Dr. A. **Arbet-Engels** (MPP), Prof. S. **Buson** (DESY, Univ. of Wuerzburg), Dr. L. **Di Venere** (INFN-Bari), Dr. M. **Giroletti** (INAF-IRA), Dr. P. **Grandi** (INAF-OAS), Dr. G. **Migliori** (INAF-IRA), Dr. M. **Sobolewska** (CfA), Dr. E. **Torresi** (INAF-OAS), Dr. A. **Tramacere** (UniGe), Prof. C. **Vignali** (UniBo & INAF), Dr. R. **Zanin** (CTAO)

**RESEARCH GRANTS**

2023 - INAF Mini-Grant (€10k), *Investigating the Quiescent State of the TeV-emitting Radio Galaxy 3C 264.*

## LIST OF PUBLICATIONS

### Published

1. **Bronzini, E.**, Migliori, G., Vignali, C., et al. 2024
   *Investigating X-ray emission in the GeV-emitting compact symmetric objects PKS 1718-649 and TXS 1146+596*
   A&A, 684, A65. doi:10.1051/0004-6361/202348208
2. Abe S., Abhir J., Abhishek, A.,. . . , **Bronzini, E.**, et al. 2024
   *Constraints on VHE gamma-ray emission of Flat Spectrum Radio Quasars with the MAGIC telescopes*
   MNRAS, 2024, doi:10.1093/mnras/stae2313
3. Abe K., Abe S., Acero F.,. . . , **Bronzini, E.**, et al. 2024
   *Prospects for a survey of the Galactic plane with the Cherenkov Telescope Array*
   JCAP, 2024, 004. doi:10.1088/1475-7516/2024/10/004
4. Abe, S., Abhir, J., Abhishek, A.,. . . , **Bronzini, E.**, et al. 2024
   *Dark matter line searches with the Cherenkov Telescope Array*
   JCAP, 2024, 047. doi:10.1088/1475-7516/2024/07/047
5. Abe, S., Abhir, J., Abhishek, A.,. . . , **Bronzini, E.**, et al. 2024
   *Constraints on Lorentz invariance violation from the extraordinary Mrk 421 flare of 2014 using a novel analysis method*
   JCAP, 2024, 044. doi:10.1088/1475-7516/2024/07/044

### Accepted for publication

1. **Bronzini, E.**, P. Grandi, E. Torresi, and S. Buson
   *Fermi-LAT detection of the low-luminosity radio galaxy NGC 4278 during the LHAASO campaign*
   accepted for publication in ApJL
2. Marchesi, S., Iuliano A., Prandini E., . . . , **Bronzini, E.**, et al.
   *A new look at the extragalactic Very High Energy sky: searching for TeV-emitting candidates among the X-ray bright, non-Fermi detected blazar population*
   accepted for publication in A&A
3. MAGIC collaboration, :, Abe K., Abe S., . . . , **Bronzini, E.**, et al.
   *Standardised formats and open-source analysis tools for the MAGIC telescopes data. Establishing the MAGIC Data Legacy*
   accepted for publication in JHEAP

### Submitted

1. Abe, S., Abhir, J., Abhishek, A., . . . , **Bronzini, E.**, et al.
   *Cosmic-ray acceleration and escape from SNR as probed by Fermi-LAT and MAGIC*
   submitted to A&A
2. K. Abe, S. Abe, J. Abhir, . . . , **Bronzini, E.**, et al.
   *Characterization of Markarian 421 during its most violent year: Multiwavelength variability and correlations*
   submitted to A&A
3. MAGIC Collaboration: S. Abe, J. Abhir, . . . , **Bronzini, E.**, et al.
   *Time-dependent modelling of short-term variability in the TeV-blazar VER J0521+211 during the major flare in 2020*
   submitted to A&A
4. MAGIC Collaboration: S. Abe, J. Abhir, . . . , **Bronzini, E.**, et al.
   *Insights from the first flaring activity of a TeV blazar with simultaneous X-ray polarization and VHE gamma rays*
   submitted to A&A
5. Cherenkov Telescope Array Consortium T., :, Abe K., Abe S., . . . , **Bronzini, E.**, et al.
   *Galactic transient sources with the Cherenkov Telescope Array*
   submitted to MNRAS

6. Cherenkov Telescope Array Consortium T., :, Abe K., Abe S., ..., **Bronzini, E.**, et al.
   *Prospects for $\gamma$-ray observations of the Perseus galaxy cluster with the Cherenkov Telescope Array.*
   submitted to A&A

**To be submitted**

1. *MAGIC observations of the first TeV-emitting low-luminosity AGN NGC 4278*, MAGIC collaboration et al. (corresponding author: **Bronzini E.**, in preparation for A&A);
2. *Radiative Cooling Blob in the TeV-Emitting Radio Galaxy 3C 264: a Multiwavelength Time-Dependent Modeling*, MAGIC collaboration et al. (corresponding author: **Bronzini E.**, in preparation for A&A).

Proceedings:
Co-author of several proceedings in

- **International Cosmic Ray Conference (ICRC) 2023**, 26/07-03/08/2023, *Nagoya, Japan*;

**WORKSHOPS and CONFERENCES**

Contribution: *LOC*

- **CTAO Construction Meeting**, 04-07/11/2024, *Bologna, Italy*;
- **Bologna&Friends: workshop on radio galaxies**, 01-02/03/2023, *Bologna, Italy*.

Contribution: *talk*

- **V Gravi-Gamma-Nu Workshop, 09-11/10/2024**, *Bari, Italy*;
- **11th International Fermi Symposium**, 08-12/09/2024, *College Park, USA*;
- **8th Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy**, 02-06/09/2024, *Milan, Italy*;
- **TeVPA 2024**, 26-30/08/2024, *Chicago, USA*;
- **MAGIC General Meeting**, 08-12/07/2024, *Łódź, Poland*;
- **1st VHEGAM meeting**, 15-17/01/2024, *Bologna, Italy*;
- *Fermi*-**LAT collaboration meeting**, 25-29/09/2023, *Virtual*;
- **TeVPA 2023**, 11-15/09/2023, *Naples, Italy*;
- **MAGIC F2F Meeting of Physics Working Groups**, 13-17/02/2023, *Rijeka, Croatia*;
- **Bologna&Friends: workshop on radio galaxies**, 01-02/03/2023, *Bologna, Italy*.

Contribution: *poster*

- **2nd CTAO Symposium**, 15-18/04/2024, *Bologna, Italy*;
- **Active Galactic Nuclei XIV: The Renaissance of Black Holes and Galaxies**, 23-27/05/2023, *Florence, Italy*.

Contribution: *participant*

- **European Astronomical Society Annual Meeting**, 01-05/07/2024, *Padua, Italy*;
- **AVENGe - Advances in Very High-Energy Astrophysics with Next-Generation Cherenkov Telescopes**, 29-31/05/2023, *Rome, Italy*;
- **CTAO/CTAC General Meeting Granada**, 24-28/04/2023, *Virtual*;
- **ASTRI and LHAASO Workshop**, 07-08/03/2023, *Milan, Italy*;

- **9th MAGIC Stereo Analysis Workshop**, 20-24/02/2023, *Rijeka, Croatia*;
- **6th workshop on "Compact Steep Spectrum and GHz-Peaked Spectrum Radio Sources"**, 10-14/05/2021, *Virtual*.

**PhD schools**

- **2nd LST Analysis school**, 05-09/02/2024, *Virtual*;
- **4th Italian Astrostatistics School**, 16-20/10/2023, *Milan, Italy*;
- **9th MAGIC Stereo Analysis Workshop**, 20-24/02/2023, *Rijeka, Croatia*;
- **PHYSTAT Gamma 2022**, 27-30/09/2022, *Virtual*.

**OTHER RELEVANT EXPERIENCES**

**Observation shift periods**
29/11-23/12/2023
Place: *MAGIC telescopes, Roque de los Muchachos Observatory, La Palma, Spain*
Role: *operator*

**Visiting**
16-18/09/2024
Place: *Goddard Space Flight Center - NASA, USA*
Role: *visiting scientist*