



FRANCISCO RODRÍGUEZ CANDÓN

PhD Student in Astroparticle Physics

✉ francandon@unizar.es

🆔 0009-0002-3199-9278

🏠 Department of Physics, TU Dortmund, Dortmund, Germany

Research Profile

PhD student in Astroparticle Physics working on phenomenology and astrophysical searches for weakly interacting slim particles (**WISPs**), with a focus on **axion** and **axion-like particle** signatures in X-ray and gamma-ray observations. My research combines theoretical modeling with data analysis of observations from instruments such as **NuSTAR** and **Fermi-LAT**, targeting stellar environments and supernovae.

Research Interests

Axions and axion-like particles; stellar and supernova probes; X-ray/gamma-ray data analysis; statistical inference.

EDUCATION

- Sep 2024 - present • **PhD in Astroparticle Physics | TU Dortmund & University of Zaragoza**
 - Thesis: X-ray Telescope Technology for Light DarkMatter Searches
 - Advisors: Prof. Maurizio Giannotti & Prof. Julia Katharina Vogel
- Jul 2024 • **Master of Science in Physics of the Universe, Universidad de Zaragoza**
- Jul 2022 • **Bachelor of Science in Physics, Universidad de Salamanca**

RESEARCH EXPERIENCE

- Jun 2025 - present • **PhD Researcher | TU Dortmund University | Dortmund, Germany**
 - Data-driven searches for axions/ALPs in X-ray and gamma-ray observations.
 - Development of X-ray Optics for the IAXO experiment
- May 2023 - Jun 2025 • **Predoctoral Researcher | Centro de Astropartículas y Física de Altas Energías (CAPA), Universidad de Zaragoza.**
 - Database development for the IAXO group in Zaragoza.
 - NuSTAR data analysis for axion searches.
- May 2023 - Jun 2023 • **Research Intern | DTU Space | Copenhagen, Denmark**
 - Study of the NuSTAR inventory of glass optics for the IAXO experiment
- Feb 2022 - Jun 2022 • **Research Intern | CIEMAT (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas) | Madrid, Spain**
 - Synoptic circulation classification of the Iberian Peninsula.
 - Regionalization of meteorological variables and atmospheric pollutants.

SELECTED PUBLICATIONS

1. **F.R. Candón**, D.F.G. Fiorillo, G. Lucente, E. Vitagliano, J.K. Vogel, "*NuSTAR bounds on radiatively decaying particles from M82*", Phys. Rev. Lett. 134, 171004 (2024). DOI:10.1103/PhysRevLett.134.171004.
2. J. Ruz, E. Todarello, J.K. Vogel, **F.R. Candón**, M. Giannotti et al., "*NuSTAR as Axion Helioscope*", Phys. Rev. Lett. 135 (2025). DOI: <https://doi.org/10.1103/18sn-hxtb>.
3. **F.R. Candón**, P. Casaseca, M. Giannotti, M. Kaltschmidt, J. Ruz, J.K. Vogel, "*Probing the axion-nucleon coupling with supergiant stars*", Phys. Rev. D 112 (2025). DOI: <https://doi.org/10.1103/xv5c-j2rv>.
4. **F.R. Candón**, D.F.G. Fiorillo, A.G. Muyor, H.T. Janka, E. Vitagliano, G.G. Raffelt, "*Stripped-Envelope Supernovae for QCD Axion Detection*", arXiv:2511.13815 (PRL submitted).
5. **F.R. Candón** et al. (IAXO Collaboration), "*An accurate solar axion ray-tracing response of BabyIAXO*", JHEP 02 (2025) 159. DOI: 10.1007/JHEP02(2025)159.

CONFERENCE PRESENTATIONS

Invited talk, COST Action CW 3rd General Meeting, Sofia, Bulgaria (Jul 2024)

- Title: X-ray Searches for Axions: The M82 and Betelgeuse Case Studies

Talk, 22nd Multidark Meeting, Salamanca, Spain (Apr 2024)

- Title: Axion Searches Using X-ray Telescopes

Talk, 2nd UNDARK School: The multi-messenger non-thermal universe, Benasque, Spain (May 2025)

- Title: X-ray Searches for Axions

Talk, COST Action Cosmic WISPer CW3 training school, LAPTh, Annecy, France (Sep 2025)

- Title: Axion searches using X-ray telescopes

Invited talk, COST Action Cosmic WISPer WG3 monthly meeting (Nov 2025)

- Title: Small Progenitors, Large Couplings

Opening talk, Saturnalia 2025 Workshop, Zaragoza, Spain (Dec 2025)

- Title: Stripped-Envelope Supernovae for QCD axion detection

Poster, Physics School 'Unifying view on cosmic interacting matter', Bad Honnef, Germany (Jan 2026)

- Title: Poster presentation ([Best poster award](#))

AWARDS AND TRAINING

- Best poster award, Physics School 'Unifying view on cosmic interacting matter' (Bad Honnef, 2026).
- CERN course: First Steps with Geant4 (May 2025).

OUTREACH

Social media manager at CAPA (@CAPAUnizar). Led CAPA's social media content team and coordinated multiple outreach activities, overseeing end-to-end production (video recording, scriptwriting, and editing).