



Markos Polkas

Post-doc Researcher

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Webpage

EDUCATION

September 2021 – December 2025

PhD in Physics

Donostia International Physics Center and University of Basque Country (UPV/EHU) San Sebastian, Spain

Title: *"The Disruption of Stars from Massive Black Holes in a Cosmological Context"*

Supervisor: Dr. Silvia Bonoli (DIPC)

October 2018 – October 2020

Master's degree in Physics

Department of Physics, National Kapodistrian University of Athens

- Specialization in Astrophysics
- Completed Courses: Cumulative Grade Point Average 9.33/10.00
- Graduate Diploma Thesis: *"Theoretical Study of Time-varying Multiwavelength Emission of Jets of Active Galaxies and Application at Observations"*
Supervisor: Prof. Apostolos Mastichiadis (National Kapodistrian University of Athens), Dr. Maria Petropoulou (Princeton University), Dr. George Vasilopoulos (Yale University)

October 2014 – October 2018

Bachelor's degree in Physics

Department of Physics, National Kapodistrian University of Athens

- Cumulative Grade Point Average 8.32/10.00
- Specialized in Astrophysics and Astronomy (Last 1.5 years)
- Undergraduate Diploma Thesis: *"Synchrotron Self-Absorption in Blazars"*
Supervisor: Professor Apostolos Mastichiadis

CONTRIBUTIONS

as of November 2025

Publications (of which main author) 4(3) journal article, 3 in submit- ted/preparation;

- MAGIC Collaboration and Petropoulou M. and **Polkas, M.**, *"Time-Dependent Modeling of the Sub-Hour Spectral Evolution During the 2013 Outburst of Mrk 421"*. date: dec 2025. In: A&A accepted, DOI: 10.48550/arXiv.2509.08686. arXiv: 2509.08686 [astro-ph.HE].
- **Polkas, M.** and Bonoli, S. and Bortolas, E. and Izquierdo-Villalba, D. and Sesana, A. and Broggi, L. and Hoyer, N. and Spinoso, D., *"Demographics of tidal disruption events with L-Galaxies: I. Volumetric TDE rates and the abundance of nuclear star clusters"*. date: sept 2024. In: A&A Volume 689, A204. DOI: 10.1051/0004-6361/202449470. arXiv: 2312.13242 [astro-ph.HE].
- **Polkas, M.** and Petropoulou, M. and Vasilopoulos, G. and Mastichiadis, A. and Urry, C. M. and Coppi, P. and Bailyn, C. , *"A numerical study of long-term multiwavelength blazar variability"*. date: aug 2021. In: MNRAS Volume 505, pp. 6103-6120. DOI: 10.1093/mnras/stab1618. arXiv: 2105.07030 [astro-ph.HE].
- Papachristou, M. and Dasyra, K. M. and Fernández-Ontiveros, J. A. and Audibert, A. and Ruffa, I. and Combes, F. and **Polkas, M.** and Gkogkou, A., 2023, *"A plausible link between dynamically unsettled molecular gas and the radio jet in NGC 6328"*.date: nov 2023. In: A&A Volume 679, DOI:10.1051/0004-6361/202346464, arXiv: 2310.02033 (Nov. 2023). arXiv: 2310.02033 [astro-ph.GA].

- October 2025 **L-Galaxies Annual Meeting 2025**
Nuclear Transients with L-Galaxies
Max-Planck Institute of Astrophysics, *Berlin, Germany*
- September 2025 **Loss-Cones in Como 2025**
Tidal Disruption Event Rates in a cosmological context
Insubria University, *Como, Italy*
- June 2025 **EAS Meeting 2025**
Tidal Disruption Events informing the modelling of Nuclear Star Clusters
University of Cork, *Cork, Ireland*
X-ray Nuclear Transients
TDE-stream and disk interactions
ESAC, *Madrid, Spain*
- September 2024 **Tidal Disruption Events and Nuclear Transients**
Demographics of Tidal Disruption Events with semi-analytic models of galaxy formation
Heraklion, *Crete, Greece*
- August 2024 **UoB Colloquium**
Demographics of Tidal Disruption Events with L-Galaxies-BH Is massive black hole growth from stars a thing?
UoB, *Birmingham, England*
- June 2024 **Clouds, Star Clusters and Black Holes 2024**
All-star Massive Black Holes: Tidal Disruption Events and star-fed growth
Alpbach, *Alpbach, Austria*
- January 2024 **L-Galaxies Meeting 2024**
Explaining Tidal disruption event rates with L-Galaxies-BH
DIPC, *Donostia/San Sebastian, Spain*
- December 2023 **Black Holes on Broadway**
Tidal disruption events used for constraining seeding scenarios
Simon Foundation, *New York, USA*
- November 2023 **DIPC-ICE collaboration meeting 2023**
Tidal disruption events in a cosmological context: the role of Nuclear Star Clusters and massive black hole growth (seminar on TDEs at ICE)
ICE-CSIS, *Barcelona, Spain*
- July 2023 **European Astronomical Society Conference 2023**
-TDE and where to find them; realistic rates of Tidal Disruption Events with semi-analytical model of galaxy-evolution (Contributed talk)
-Quasi-Periodic Oscillations as probes of circumbinary disks of the most massive SMBH binaries (poster)
-Nuclear Star Clusters as Black Hole hosts in L-Galaxies-BH semi-analytic model of galaxy evolution (Contributed talk)
ICE, *Krakow, Poland*
Visit at Max-Planck for Extraterrestrial Science 2023
Tidal disruption events with L-Galaxies-BH (invited talk for the e-ROSITA group)
MPE, *Munich, Germany*
- June 2023 **Transient Universe 2023**
Tidal disruption events with L-Galaxies-BH (talk)
Carguense Center of Astrophysics, *Corsica, France*

May 2023 **L-Galaxies seminar series**
massive black holes with L-Galaxies-BH: application tidal disruption events (talk)
online

January 2023 **BH Slippery Slope 2023**
Early growth of massive black holes due to capture and disruption of stars (talk)
Sesto, Italy

October 2022 **Young AGN**
Quasi-Periodic Oscillations as probes of circumbinary disks of the most massive SMBH binaries (5 min talk)
DIPC, Donostia/San-Sebastian, Spain

October 2022 **L-Galaxies Workshop**
Tidal Disruption events in L-Galaxies (talk)
Hertfordshire, London, England

July 2021 **International Cosmic Ray Conference**
Poster; Modelling blazar variability with leptonic models
MPIA Heidelberg, online

June 2021 **Hellenic Astronomical Society Meeting**
Poster; Bayesian SED fitting with Markov Chain Monte Carlo
15th HelAS Conference, online

SCHOOLS

June 2023 **Transient Universe 2023**
Carguese Center of Astrophysics, Corsica, France

February 2020 **JWST Master Class Workshop**
NKUA & IA - FORTH, Athens, Greece

January 2020 **COST WG1 Milky Way Gaia School**
ICCUB -IEEC, Barcelona, Spain

June 2019 **Summer School for Astrostatistics in Crete**
University of Crete, Crete, Greece

WORK AND OTHER RELEVANT EXPERIENCE

as of August 2024

Co-supervision

-Daniel Gardenas Argunov (Master's student, Universidad Complutense de Madrid 2024);
The properties of halos hosting JWST galaxies
-George Mathioudakis (Bachelor student, University of Athens 2020), Physical Mechanisms powering Fast Radio Bursts

October 2020 – February 2021 **Teaching Assistant in National Kapodistrian University of Athens**

-Volunteering in offering complimentary courses on High Energy Astrophysics under the supervision of A. Mastichiadis & M. Petropoulou
-Help in developing material for course on extragalactic astronomy

December 2020 – October 2021 **Research Associate in National Observatory of Athens**

Data analysis and training on software tools under the supervision of Kalliopi Dasyra on the project with title: «Do massive winds induced by black hole jets alter galaxy evolution? Evidence from the ALMA Radio Source Catalog (ARC)»

- Experience in Hubble Space Telescope Phase 1, use of APT (74 orbits) (P.I. Kalliopi Dasyra): "Follow-up of CO-ARC sample of 120 radio galaxies, very successful in detecting or constraining their H₂ gas masses"
- SED-fitting (CIGALE + radio jet fit) and prediction of flux (P.I. Francoise Combes): "Mrk3: a prototypical case of jet-ISM interaction"

PUBLIC OUTREACH AND OTHER EXPERIENCE

September 2021-

Contributions in online journal 2'science (Greek Language)

<https://2science.gr/questions/magnetic-fileds/>

<https://2science.gr/nuclear-star-clusters/>

March 2024

Public Talk

CFM-DIPC PhD-seminar Series; The diet of Massive Black Holes

June 2023

Public Outreach

Palo de Eratosthenes; talk with an astrophysicist (in Spanish)

October 2018 – January 2019

Trainee Museum Guide at *National Observatory of Athens*

Part-time activity, offering opportunity for public outreach

October 2019

Public Outreach

Space Week 2019; Zooniverse workshop at University of Athens

June 2014 – August 2014

International Olympiad Of Astronomy and Astrophysics

Participation in 8th IOAA – Suceava, Romania

- Distinction in National Competition
- 2 week preparation on undergraduate level Astrophysics, Data Analysis and Observational Methods

SKILLS

Programming

Programming Languages

- Bash/awk
- C (familiar with C++)
- Fortran—77
- Matlab
- Python [Best Preference]
- Julia (not applied)

Software

- Linux, Windows
- $\LaTeX$
- Microsoft Office (Cambridge ECDL)
- Familiar with software used on Astrophysics/Astronomy: Athena++, CIGALE, PLUTO, PKDGRAV3 [Dark Matter Simulations], Mathematica, L-Galaxies, SSDC Tools, Astronomer's Proposal Tool (APT)

Languages

English

- Proficiency in English, C2 Michigan
- TOEFL iBT (November 2018)

Spanish

- Level B1 (speaking fluently)

ADDITIONAL INFORMATION

Scientific Interests

High Energy Astrophysics: Active Galactic Nuclei, Relativistic Jets, Tidal Disruption Events.

Extragalactic Astronomy & Cosmology: semi-analytics models of galaxy formation, N-Body Simulations, supermassive black hole formation and evolution, AGN feedback

Interests

Amateur Astronomy, Swimming, Cycling, Football, Philosophy and Classic Literature