

# Tomáš Plšek

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**Name:** Mgr. Tomáš Plšek  
**Email:** [plsek@physics.muni.cz](mailto:plsek@physics.muni.cz)  
**Website:** [tomasplsek.github.io](https://tomasplsek.github.io)  
**GitHub:** [github.com/tomasplsek](https://github.com/tomasplsek)  
**ORCID:** 0000-0001-6411-3651  
**Phone:** +420 725 923 048  
**Address:** Kotlářská 267/2, 60200 Brno, Czech Republic



## Scientific Education

since 2021	<b>PhD:</b> <i>Studying the physics of hot galactic atmospheres</i> (to be defended in May 2026), Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, CZ
2019 – 2021	<b>MSc:</b> <i>The relation between Bondi accretion rate and jet power in giant elliptical galaxies</i> , Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, CZ
2016 – 2019	<b>BSc:</b> <i>Dark matter modelling of galaxy clusters</i> , Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, CZ

## Work Experience

since 2021	<b>Researcher</b> at Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, CZ
2019 – 2020	<b>Researcher</b> at Department of Physical Electronics, Masaryk University, Brno, CZ
2017 – 2018	<b>Astronomical Demonstrator</b> at Vyškov Observatory, CZ

## Honors & Awards

2022 | **Dean's Award 2022**, Faculty of Science, Masaryk University, Brno

## Supervision & Co-supervision

since 2025	<b>Consultant:</b> <i>ML-powered detection of accretion shocks in IllustrisTNG simulation</i> , Master's thesis by Barbora Miklošová, Masaryk University, Brno
since 2024	<b>Consultant:</b> <i>Search for galaxy clusters in XMM data of the Euclid Fornax Deep Field</i> , Master's thesis by Martin Kolář, Masaryk University, Brno
2025	<b>Supervisor:</b> <i>Probing the radio-mechanical AGN feedback using multi-cavity systems</i> , Bachelor's thesis by Barbora Miklošová, Masaryk University, Brno
2024	<b>Consultant:</b> <i>X-ray spectroscopy of the cosmic web</i> , Bachelor's thesis by Martin Kolář, Masaryk University, Brno
2023	<b>Consultant:</b> <i>Machine learning enhanced search for transient events in light curves</i> , Master's thesis by Bc. Martin Chobola, Masaryk University, Brno
2023	<b>Consultant:</b> <i>Studying the brightest galaxies in the epoch of reionisation</i> , Master's thesis by Klaudia Protušová, Masaryk University, Brno
2023	<b>Consultant:</b> <i>Studying the heating/cooling balance in galaxy clusters with the Athena X-ray observatory</i> , Master's thesis by Eva Bařková, Masaryk University, Brno

## Teaching & Scientific Outreach

2024 – 2025	<b>Astronomical camp group leader</b> ( <i>Astronomická expedice</i> )
Jan 26 2022	<b>Guest speaker:</b> 'Talks about Cosmos' ( <i>Rozhovory o Vesmíru</i> )
2023 – 2026	<b>Teaching assistance:</b> F4500 Python for Physicists @MUNI
2024 – 2026	<b>Teaching assistance:</b> F6550 Structure and Evolution of the Universe @MUNI
2022 – 2024	<b>Teaching assistance:</b> F9888 High Energy Astrophysics @MUNI
2021 – 2024	<b>Teaching assistance:</b> F5611 Introduction to Machine Learning for Astronomers @MUNI

## Selected Conference Talks

Jun 27 2025	<b>Conference:</b> <i>Cavity Detection Tool (CADET)</i> , EAS 2025, Cork, Ireland
Jun 25 2025	<b>Conference:</b> <i>The Abundance Drop in the Core of the Centaurus cluster</i> , EAS 2025, Cork, Ireland
Oct 16 2024	<b>Seminar:</b> <i>Cavity Detection Tool, Virtual Astronomy Software Talks (VAST)</i>
Sep 19 2024	<b>Conference:</b> <i>Studying radio-mechanical AGN feedback with X-ray cavities</i> , GALCROSS, Brno, Czech Republic
Jun 4 2024	<b>Conference:</b> <i>Studying radio-mechanical AGN feedback with X-ray cavities</i> , Galactic Nuclei in the Cosmological Context, University of Szczecin, Poland
Jul 11 2023	<b>Seminar:</b> <i>Cavity Detection Tool (CADET)</i> , seminar of XOC group, Stanford University, USA
Jul 11 2023	<b>Seminar:</b> <i>The relation between accretion rate, black hole mass, and jet power in massive early-type galaxies</i> , KIPAC Tea Talk, Stanford University, USA
Jul 2 2023	<b>Workshop:</b> <i>Cavity Detection Tool (CADET)</i> , High Resolution X-ray Spectroscopy Workshop, MIT, Cambridge, USA
Mar 25 2023	<b>Workshop:</b> <i>Cavity Detection Tool (CADET)</i> , AHEAD2020 High Resolution X-ray Spectroscopy School, Alicante, Spain
Nov 22 2022	<b>Seminar:</b> <i>The relation between accretion rate, black hole mass, and jet power in massive early-type galaxies</i> , Institute of Physics, Silesian University, Opava, Czech Republic
Aug 15 2022	<b>Workshop:</b> <i>Cavity Detection Tool</i> , 6th ICM Theory and Computation Workshop, Niels Bohr Institute, Copenhagen, Denmark
Jun 3 2022	<b>Conference:</b> <i>Relation between accretion rate and jet power in early-type galaxies</i> , Cologne-Prague-Brno meeting, Brno, Czech Republic

## Conference organization

Aug 20-24 2026	<b>LOC:</b> 8th ICM Theory and Computation Workshop, Brno, Czech Republic
May 18-22 2026	<b>LOC:</b> IAU Symposium: Traversing the Galactic Center in Space and Time, Brno, Czech Republic
Sep 16-20 2024	<b>LOC:</b> Galaxies at Crossroads: Outflows and IMF in the VLT/ELT/ALMA/JWST Era, Brno, Czech Republic
Sep 6-8 2022	<b>LOC:</b> Monitoring the High-Energy Sky with Small Satellites, Brno, Czech Republic
Jun 1-3 2022	<b>LOC:</b> Cologne Prague Brno meeting, Brno, Czech Republic

## Involvement in the scientific community

- **Member of the XRISM Collaboration**

I am an external member of the Centaurus target team. I am involved in several XRISM Collaboration published or submitted publications, which utilise PV+GO Resolve observations of the core of the Centaurus cluster, where I was responsible for the complementary analysis of *Chandra* data.

I have actively participated in XRISM Science Team meetings (March 2024 Tokyo, Sep 2024 Tokyo, Feb 2025 Phoenix, Jul 2025 Leiden).

- **Member of the Athena collaboration**

I am involved in testing the capabilities of the *NewAthena/XIFU* detector for spatially mapping the cold gas and the heating/cooling balance of hot intracluster medium (ICM).

## Programming & Software Skills

- **Python:** Anaconda, Matplotlib, Numpy, Scipy, Astropy, Pandas, Jupyter
- **Machine learning:** Scikit-learn, Keras, Tensorflow, JAX
- **Bayesian analysis:** PyMC3, UltraNest
- **X-ray data analysis:** CIAO, HEASoft, SAOImageDS9
- **X-ray spectral fitting:** Xspec, SPEX, Sherpa, BXA
- **X-ray simulators:** PyXsim, SOXS, SIXTE, MARX
- **Cosmological simulations:** Gadget-2, IllustrisTNG data
- **Linux:** Bash scripting, SSH, git
- **Text & Web:**  $\text{\LaTeX}$ , Markdown, HTML