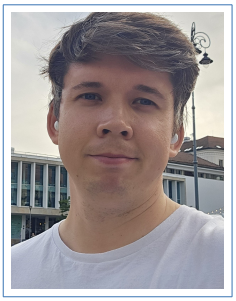
Alexandr Prozorov

Experimental Particle Physicist

alexandr.a.prozorov@gmail.com
aprozo
0000-0001-8368-8290
GQB-3509-2022



Research profile

Experimental particle physicist with experience in heavy-ion collisions, electromagnetic/hadronic calorimetry, detector calibration, simulations, data acquisition, and data analysis using C++, ROOT, Python, containers and Linux-based workflows. Current work includes jet physics and AI-assisted analysis in the STAR collaboration, as well as detector simulation and design studies for ePIC at the Electron-Ion Collider.

Professional experience

2025 **Research stay**, *Yale University*, New Haven, Connecticut, USA
Research stay focused on jet physics.

2025 **Research stay**, *Brookhaven National Laboratory*, Upton, New York, USA
Research stay focused on the development of an AI assistant for RHIC, including work related to SciBot.

2023–present **Researcher**, *Czech Technical University*, Prague, Czech Republic
Research in experimental nuclear and particle physics, including jet measurements in STAR, AI-assisted data-analysis tools, and detector simulation and design studies for the ePIC experiment at the EIC.

2017–2023 **Researcher**, *Nuclear Physics Institute, Czech Academy of Sciences*, Řež, Czech Republic
Research within the HADES collaboration, with a focus on electromagnetic calorimetry, detector calibration, detector operations, and analysis of heavy-ion collision data.

2019–2023 **Researcher / collaboration appointment**, *GSI/FAIR*, Darmstadt, Germany
Detector and analysis work for the HADES experiment, including ECAL calibration, beam-time shifts, detector assembly, and collaboration service.

2017 **Diploma internship**, *Czech Academy of Sciences*, Prague, Czech Republic
Simulation study of detector granularity effects on particle-flow observables derived from experimental data in relativistic heavy-ion collisions.

2016 **Summer internship**, *National Nuclear Center*, Kurchatov, Kazakhstan
Modeling of a gamma spectrometer using MCNP5.

2015–2016 **Exchange semester**, *Czech Technical University*, Prague, Czech Republic, GPA: 5.0/5.0

Education

2017–2023 **Ph.D. in Nuclear Physics**, *Charles University*, Prague, Czech Republic
Doctoral thesis: *Neutral Meson Production in Ag+Ag Collisions at 1.58 A GeV with HADES Electromagnetic Calorimeter*
Supervisor: RNDr. Andrej Kugler, CSc.

2012–2017 **Ing. (equivalent to M.Sc.) in Electronics and Automation of Physical Plants**, *Tomsk Polytechnic University*, Tomsk, Russia, GPA: 5.0/5.0

Current research

STAR D^0-tagged jet studies using the AI-based unfolding tool OmniFold; inclusive jet cross-section measurements in Au+Au and p+p collisions at $\sqrt{s_{NN}} = 200$ GeV; development and implementation of AI tools for collaboration use.

ePIC / EIC Simulation and design studies for the backward HCal (hadronic calorimeter); contributions to user support, onboarding, and learning activities within the collaboration.

Honors and awards

2025 **Early Career Award**, *STAR Collaboration*
For implementing an AI assistant for the collaboration.

Scientific leadership and service

2026–present **User Learning Convener**, *ePIC experiment, Electron-Ion Collider (EIC)*

2025–present **STAR Juniors Representative**, *STAR Collaboration*

Open-source and software contributions

Nov 2024 **Contributor**, *CERN ROOT Hackathon*
Contribution to ROOT 6.36.

Conference and workshop organization

May 2025 **Organizer**, *STAR regional workshop in Prague*

2023-2026 **Co-organizer**, *Particle Physics Users Workshop: From STAR to EIC*

Jul 2020 **Organizing team member**, *ICHEP 2020*

Dec 2019 **Local organizer**, *HADES Analysis Meeting*

Collaboration service and detector operations

2022–2023 **Calibration of electromagnetic calorimeter**, *HADES / GSI-FAIR*
Calibration for pp collisions at $\sqrt{s_{NN}} = 3.6$ GeV.

2021–2022 **Final ECAL sector assembly**, *HADES / GSI-FAIR*
Participation in the final ECAL sector assembly over a total period of one month.

Sep 2020–Jan 2021 **Erasmus+ program**, *GET_INvolved at GSI/FAIR*

2019–2020 **ECAL installation and PMT shielding**, *HADES / GSI-FAIR*
Participation in ECAL sector installation and photomultiplier shielding during two months.

2019–2023 **Calibration of electromagnetic calorimeter**, *HADES / GSI-FAIR*
Calibration for Ag+Ag collisions at $\sqrt{s_{NN}} = 2.42$ GeV.

2019, 2022 **Shift leader and Detector operator**, *HADES / GSI-FAIR*
Three weeks of data-taking shifts as DAQ/ECAL/TOF detector operator for Ag+Ag collisions at $\sqrt{s_{NN}} = 2.42$ GeV.

Mar 2018 **Detector installation**, *HADES / GSI-FAIR*
Installation of cables for the ECAL detector.

Aug 2018 **Detector maintenance**, *HADES / GSI-FAIR*
Control checks and repair of the TOF detector.

2017–2018 **DAQ and detector support**, *HADES / GSI-FAIR*
Contribution to DAQ-related work through FPGA programming and support for ECAL installation.

Selected conference presentations

Mar 2026 **Contributed talk**, *Rencontres de Moriond QCD and High Energy Interactions*, La Thuile, Italy

Oct 2025 **Contributed talk**, *DNP 2025 Meeting of the APS Division of Nuclear Physics*, Chicago, Illinois, USA

Sep 2024 **Poster**, *Hard Probes 2024*, Nagasaki, Japan

Jun 2023 **Contributed talk**, *MESON 2023 – 17th International Workshop on Meson Physics*, Krakow, Poland

Jan 2023 **Contributed talk**, *59th International Winter Meeting on Nuclear Physics*, Bormio, Italy

May 2022 **Contributed talk**, *FAIR Next Generation Scientists – 7th Edition Workshop*, Paralia, Greece

Apr 2022 **Poster**, *Quark Matter 2022*, Krakow, Poland

Jun 2021 **Contributed talk**, *MESON 2021 – 16th International Workshop on Meson Physics*, Krakow, Poland

May 2019 **Contributed talk**, *FAIR Next Generation Scientists – 6th Edition Workshop*, Arenzano, Italy

Dec 2018 **Contributed talk**, *The Zimányi School and Analytic Hydrodynamics in High Energy Physics*, Budapest, Hungary

Selected publications

2025 M. Atif, V. Garonne, E. Lancon, J. Lauret, **A. Prozorov**, and M. Vranovsky, "AI-Powered Assistant for Long-Term Access to RHIC Knowledge," *arXiv:2509.09688* (2025).

2024 **A. Prozorov** for the HADES Collaboration, "Neutral meson production in Ag+Ag at $\sqrt{s_{NN}} = 2.55$ GeV," *EPJ Web of Conferences* **291**, 04001 (2024).

2023 **A. Prozorov** for the HADES Collaboration, "Neutral mesons flow and yields in AgAg@1.58 AGeV at HADES," *PoS(FAIRness2022)* 048 (2023).

Full publication lists and identifiers are available via ORCID, INSPIRE, and ResearcherID

Technical skills

Programming	C++, Python, ROOT, Bash/Linux, LaTeX, REST API development
Computing	Linux, Docker, Jupyter, Git, CI/CD, WSL, PostgreSQL, scientific data-analysis workflows, batch processing
Web	Jekyll web pages; star-juniors.github.io, eic.github.io
AI and LLM tools	TensorFlow, MCP, vector databases, retrieval-augmented generation (RAG), Ollama, agent-based workflows, CLI-based tools including Codex, Claude, and GitHub Copilot
Instrumentation	MCNP5, detector simulations, DAQ-related work, FPGA programming, calorimeter design
Research	Heavy-ion collisions, jet physics, calorimetry, detector calibration, and AI tools