

Petr Trávníček, Ph.D.

Research program leader

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PROFESSIONAL INTERESTS / RESEARCH EXPERTISE

My research topics cover in particular the composition of cosmic radiation of ultra-high energies and hadronic interactions in atmospheric showers of secondary cosmic rays. I am contributing to research at the Pierre Auger Observatory as well as participate in the preparation of Cherenkov Telescope Array Observatory that will measure high energy photons. In both cases, the aim is to ensure a useful and visible contribution of FZU to these international observatories.

As master student I worked for the DELPHI experiment at the LEP accelerator at CERN, Geneva. As a PhD student 2000-2004, partly from Prague, and during several long-term stays at CERN, I focused on analysis of cosmic ray data detected by the DELPHI experiment. During student fellowship I also participated in the design of COSMOLEP project in CERN. Since 2004 I have been working at the Pierre Auger Observatory. My scientific topics are composition of cosmic rays and the search for cosmic ray sources with respect to the type of primary particles. Later I became responsible for the organization of the Czech participation at the Observatory and since the year 2022 I became Czech country representative at the Observatory. In 2010 I was appointed as a head of the Department of Astroparticle Physics and I have served in this role since then. In 2012, our team joined the Cherenkov Telescope Array Observatory (CTA). I represent the Czech party in the CTA consortium board, in the CTAO Council and as expert also in the Board of Governmental Representatives. Together with colleagues from the Charles University and Palacky University we are working hard to build the largest observatory for the detection of high-energy cosmic photons. As the principal investigator, I have led and currently run several grant projects - GAČR post-doc project 2006-2008, post-doctoral project GAAV 2009-2011, EUPRO MEYS 2013-2016, INGO MEYS 2014-2016, INTER-EXCELENCE MEYS 2017-2022 and infrastructure project MEYS 2016-2019 and 2019-2022, as a co-investigator I successfully led the standard GAČR project 2014-2016. During the period 2018 – 2022 I served as Czech delegate to Physics and Engineering working group of European Strategy Forum for Research Infrastructures. In 2020-2021 I served as chair of subgroup dedicated to analysis of synergies among various large infrastructures. For period 2017-2019 I was elected as one of the representatives of FZU to Academic Assembly. For more than 15 years I have been teaching a course on particle physics at Palacky University in Olomouc, and a course on cosmic radiation detection techniques. I supervise Bachelor, Master and PhD students at the Czech Technical University, Palacky University and Charles University. I take care of high school students within the Open science project and appreciate participation in other outreach activities of our Institute.

EDUCATION

2000-2004 PhD. in Particle Physics, doctoral thesis: "Detection of high energy muons in cosmic ray showers.", Faculty of Mathematics and Physics, Charles University Prague; Advisor: Jan Řídký

Curriculum Vitae

1995-2000	MSc. in Particle physics, Faculty of Mathematics and Physics, Charles University Prague, MSc thesis: "The influence of hadronization and detectors on the determination of kinematic quantities of produced partons in e+ e- interactions"; Advisor: Jan Řídký
Further training	2001 - QCD CTEQ Summer school, Great Britain, 2001 - European school of High Energy Physics, Switzerland, 2002 - NATO Advanced Study Institute on Techniques and Methods of High Energy Physics, USA, 2004 - Corsika School, Germany

CURRENT POSITIONS

2008-now	Senior Researcher (permanent); Institute of Physics of the Czech Academy of Sciences (FZU), Czech Republic
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PREVIOUS POSITIONS

2004-2008	postdoctoral position at Institute of Physics, AS CR, Prague
2000-2004	doctoral student at Institute of Physics, Academy of Sciences, Prague
2000-2001	CERN student, member participation in CORAL experiment proposal, Geneva

PUBLICATIONS

***h*-index of 80 according to Inspire HEP database (*h*-index of 56 according to WOS), as of 1 Nov 2022**

I (co)authored a total of 237 journal articles and conference proceedings (according to WOS), most of them are papers by DEPLHI and Pierre Auger Collaborations. Of these, 73 have been articles published since 2016. work has so far gained over 15,614 citations (according to WOS).

Selected 5 most important articles:

- 1 Aab et al., Inferences on mass composition and tests of hadronic interactions from 0.3 to 100 EeV using the water-Cherenkov detectors of the Pierre Auger Observatory, *Phys. Rev. D* **96**,12, 122003 (2017) [**122 citations**].
- 2 A. Aab et al., Testing Hadronic Interactions at Ultrahigh Energies with Air Showers Measured by the Pierre Auger Observatory, *Phys. Rev. Lett.* **117**, 19, 192001 (2016) [**212 citations**].
- 3 A. Aab et al., Observation of a Large-scale Anisotropy in the Arrival Directions of Cosmic Rays above 8×10^{18} eV, *Science* **357**, 1266-1270 (2017) [**324 citations**].
- 4 A. Aab et al., Evidence for a mixed mass composition at the ankle in the cosmic-ray spectrum *Phys. Lett. B* **762**, 288 (2016) [**107 citations**].
- 5 A.Acharyya, et al., Monte Carlo studies for the optimisation of the Cherenkov Telescope Array layout, *Astropart.phys.*, 111, 35-53 }2019}. [**23 citations**].

APPLICATION RESULTS AND SOFTWARE DEVELOPMENT

- 1 Investigation of the best site, infrastructure preparation and housing for the FAST telescope prototype in Argentina, contractual research 2019, Kyoto University, Japan – project coordinator

RESEARCH GRANTS

Since 2013, I was primary investigator for major research grants on international cooperation of Czech research institutions with Cherenkov Telescope Array Observatory. The total acquired amount is about 6 million Euro (147 million CZK). For the Czech contribution to the Pierre Auger Observatory I have served in

Curriculum Vitae

the role of project coordinator and the total amount of has reached similar level as in the case of Cherenkov telescope Array.

Co-PI	12000 EUR	2014-2016	14-17501S, Properties of high energy cosmic rays	GACR, standard project	Czech
PI	342000 EUR	2013-2016	LE13007, Ensuring Czech participation in the CTA project	MEYS, program EUPRO	Czech
PI	184000 EUR	2014-2016	LG14019, Czech participation in CTA management	MEYS, program INGO	Czech
PI	2.3 mil EUR	2016-2019	LM2015046, Cherenkov Telescope Array – participation of the Czech Republic	MEYS, program of large research infrastructures	Czech
PI	2.4 mil EUR	2019-2022	LM2018105, Cherenkov Telescope Array – participation of the Czech Republic	MEYS, program of large research infrastructures	Czech

INVITED TALKS AT INTERNATIONAL CONFERENCES

I have given over 20 invited talks of which 7 have been at international conferences and workshops (including talks on major conferences of our field Rencontres du Moriond, International Symposium on Multiparticle Dynamics, Epiphany Conference). List since Jan 2016:

Sep 2022 *31st Texas Symposium on Relativistic Astrophysics, Prague, Czech Republic.*

AWARDS and FELLOWSHIPS

2008 Otto Wichterle Prize, awarded by the Czech Academy of Sciences

PUBLIC OUTREACH

Regular presentations at *Open days of Academy of Sciences, Festival of Science and Science Fair.*

Organization of the contributions of the department of Astroparticle physics in student summer camps, public lectures, open science projects, etc.

SUPERVISION OF GRADUATE STUDENTS and POSTDOCTORAL FELLOWS

MSc
Michal Nyklíček (Czech Technical University)
Jakub Vícha (Czech Technical University)
Šimon Novák (Czech Technical University)
Jan Tomaščík (Palacky University in Olomouc)
Zuzana Svozilíková (Palacky University in Olomouc)
Jiří Blažek (Palacký University in Olomouc)

PhD
2010-2016 Jakub Vícha, Czech Technical University, Works at FZU as senior scientists. Very well recognized by the Pierre Auger Collaboration, he is currently SWGO country representative
2015- Jiří Blažek, Charles University, ongoing thesis

2018 - Alena Bakalová, Czech Technical University, ongoing thesis close to finalisation
2021- Zuzana Svozilíková, Palacky University in Olomouc, ongoing thesis

TEACHING ACTIVITIES

Since 2008: Guaranteeing Lectures on: Experimental High-energy Physics at UP in Olomouc.

Since 2010: Guaranteeing Lectures on: Cosmic Rays and Detection Techniques at UP in Olomouc.

Since 2013: Leading high-schools student in the project Open Science of the Czech Academy of Sciences.

MAJOR COLLABORATIONS

2012- Cherenkov Telescope Array Observatory (CTAO), Representative in the CTAO council, Resource board, Board of Governmental Representatives

2017- FAST collaboration: team member

2004- Pierre Auger Collaboration, project member, sine 2022 country representative

2000- DELPHI collaboration, CERN, collaboration member

2000-2001 participation in CORAL experiment proposal, CERN

2000-2000 collaboration with LHCb/CERN

ORGANIZATION OF INTERNATIONAL SCIENTIFIC MEETINGS

2008 AUGER GRID meeting, Prague — founding meeting of AUGER GRID community, main organization

2012 Pierre Auger Collaboration analysis meeting — member and coordinator of the organizing committee

2020 Member of organization committee of ICHEP

2022 IDPASC summer school in Olomouc, main organizer

2022 SST-1M meeting in Ondřejov

INSTITUTIONAL RESPONSIBILITIES

2010- Head of Astroparticle Physics department, FZU

2019- Deputy head of division of elementary particles, FZU

COMMISSIONS OF TRUST AND SERVING SCIENTIFIC COMMUNITY

2007- Coordinator of Czech involvement in the Pierre Auger Observatory

2012- PI of various projects related to Czech participation in CTA

2018-2021 Member of Physics and engineering working group for ESFRI

2018- Council member of International Doctorate Network in Particle Physics, Astrophysics and Cosmology (IDPASC)