

CURRICULUM VITAE for ALEXANDER A. MUSHTUKOV

Degrees

Ph.D. in Astrophysics

Nov 2015, University of Turku, Finland

Supervisors: Prof. Juri Poutanen

Opponent: Prof. Dong Lai (Cornell University)

Thesis title: *Radiation and matter interaction in strong magnetic fields of neutron stars*

Master of Science in Astronomy

Jun 2009, Saint-Peterburg State University (SPSU), Russia

Supervisor: Prof. Dmitrij I. Nagirner

Thesis title: *Compton scattering in a strong magnetic field*

Positions

Apr 2022 - now	UKRI Stephen Hawking Fellow, Uni. of Oxford, UK
Mar 2022 - Oct 2022	visiting NWO Veni Fellow, Leiden Uni., The Netherlands
Nov 2018 - Mar 2022	NWO Veni Fellow, Leiden Uni., The Netherlands
Nov 2015 - Oct 2018	PostDoc, Anton Pannekoek Institute for Astronomy, Uni. of Amsterdam, The Netherlands
Nov 2011 - Oct 2015	PhD student, Uni. of Oulu, University of Turku (since Jan 2014), Finland
Feb 2011-March 2012	CIMO Fellow, Uni. of Oulu, Finland
Sep 2009 - Oct 2015	research assistant, Pulkovo Observatory, Russia
Jul 2009 - Dec 2010	post-graduate studies, SPSU, Russia
Sep 2004 - Jun 2009	Undergraduate student, SPSU, Russia

Research Interests

Extreme Accretion & Physics of Compact Objects
Radiative Transfer Theory & Radiation Hydrodynamics
Computational Physics & Parallel Computing
Plasma physics
Binary Evolution & Gravitational Wave Astrophysics

Software/Programming

C/C++, Fortran, Julia, OpenMP, CUDA, Python (incl. TensorFlow)
AMUSE (Astrophysical Multipurpose Software Environment), PLUTO code
Maxima
Bash scripting, gnuplot

Publication Statistics

Total number of citations	2050
Total number of papers	64
Total number of refereed papers	62
Number of first-author papers	22
Number of second-author papers	7
Papers of citation count > 100:	5 (incl. 3 first-author and 2 second-author)
Papers with mentees:	8
Hirsch factor	26

Fellowships, Honors, Awards

- 2021: Stephen Hawking fellowship awarded by UK Research and Innovation
- 2018: Veni laureate, awarded by the Netherlands Organisation for Scientific Research
- 2017: award for Beatriu de Pinós fellowship
(respectfully declined due to acceptance of Veni fellowship)
- 2017: First runner-up for the nomination for the 2017 “Mike Revnivtsev Prize” which is sponsored by ESA, IAPS, INAF, and IKI, and awarded to a young scientist with excellent recent achievements in the field of X-ray and gamma-ray astronomy
- 2015: Award for the best thesis of year 2015 of the Doctoral Programme in Physical and Chemical Sciences of the Uni. of Turku, Finland
- 2012-2015: Three personal research grant from Magnus Ehrnrooth foundation awarding grant for researchers working in mathematics and the natural sciences
- 2011: CIMO (Centre for International Mobility) grant for research and study in Finland
- 2009: Award for the best master thesis in astronomy of year 2009 in St. Petersburg state Uni.

Research Grants (~ 650 k€ in total)

- Stephen Hawking fellowship awarded by UK Research and Innovation, 2021 (275 k£)
- Veni fellowship awarded by the Netherlands Organisation for Scientific Research, 2018 (250 k€)
- Participation in the RFBR-DFG Grant No. 19-52-12013, 2019
- Participation in the Russian Science Foundation Grant No. 18-72-10070, 2018
- Participation in the Russian Science Foundation Grant No. 14-12-01287, 2014-2018
- Three personal research grant from Magnus Ehrnrooth foundation, 2012-2015 (70 k€ in total)
- CIMO grant for research and study, 2011 (11 k€)

Personal Travel Grants (17 k€ in total)

- PHAROS travel grant for Short Time Scientific Missions in October 2018 (2 k€)
- 3 LKBF (Leids Kerkhoven-Bosscha Fonds) conference fundings, 2016 - 2018 (3 k€ in total)
- 7 NewCompStar travel grants for Short Time Scientific Missions, 2013 - 2017 (12 k€ in total)

Student supervision

MSc students (4)

- 2023 - 2024 Snehit Panghal, Indian Institute of Science Education and Research Kolkata
Thesis: *Modification of Stokes parameters due to Compton scattering in a strong B-field*
- 2022 - 2023 Matteo Walls, Uni. of Oxford
Thesis: *Pulse and spectra formation under influence of outflows in ULX pulsars*
- 2019 - 2020 Alexander Batrakov, Leiden Uni./St.-Petersburg State Uni.
Thesis: *Numerical simulations of outbursts in X-ray pulsars
powered by accretion onto strongly magnetised neutron stars*
now PhD candidate at Max-Planck-Institut für Radioastronomie (Germany)
- 2017 - 2022 Ivan Markozov, St. Petersburg State Uni.
Thesis: *Features of extreme accretion onto strongly magnetised neutron stars*
now PhD candidate at the Ioffe Physical-Technical Institute (Russia)

BSc students (5)

- 2023 Sophia Novikova, St.Petersburg State Uni.
Thesis: *Electron-positron pair production in accretion columns of ULX pulsars
around stellar mass black holes*
- 2018 Koen Leegwater, Uni. of Amsterdam
Thesis: *Propagating fluctuations of the mass accretion rate in accretion discs
around stellar mass black holes*
- 2017 Boris Wolvers, Uni. of Amsterdam
Thesis: *Radiative transfer inside accretion column of neutron star
at extremely high mass accretion rate*
- 2016 Patrick Verhagen, Uni. of Amsterdam
Thesis: *Variability of Bright X-ray Pulsars*
- 2013 Denis Poliakov, St. Petersburg State Uni.
Thesis: *Relativistic effects in accretion on neutron stars*

High school students (15)

Assistance as an Examiner

- 2023 Nabil Brice, PhD Thesis
“Extreme accretion onto strongly magnetised neutron stars of non-dipole field structure”
University College London, UK
- 2022 Radoslava Bodnárová, Master Thesis
“Investigation of the physical origin of multiwavelength variability in accreting compact objects”
Pavol Jozef Šafárik University in Košice, Slovakia
- 2018 Vladislav Loktev, Master Thesis
“Polarised radiation of millisecond X-ray pulsars”
Saint Petersburg State University, Russia
- 2015 Vitaly Grigoriev, Master Thesis
“A 2D Model of Non-stationary Accretion onto a Magnetised Neutron Star”
Saint Petersburg State University, Russia

Teaching experience

- 2023 - 2024 Tutor, course in Astrophysics C1 (MPhys. Major), Uni. of Oxford
- 2022 - 2024 online course in Astrophysics of Black Holes, White Dwarfs and Neutron Stars for high school students (**6 runs**, 13^h lectures + 13^h TA sessions **each run**)
- 2023 - 2024 online course in Evolution of Isolated and Binary stars for high school students (**2 runs**, 13^h lectures + 13^h TA sessions **each run**)
- 2023 online course in High Energy Astrophysics for high school students (**3 runs**, 13^h lectures + 13^h TA sessions **each run**)
- 2022 Invited chapter on “Accreting strongly magnetised neutron stars” for the “Handbook of X-ray and Gamma-ray Astrophysics” (Eds. C. Bambi and A. Santangelo, Springer, 2022).
- 06-08.2019 The Leiden/ESA Astrophysics Program for Summer Students 2019
Supervision of a summer project
- 09.2017 course in Open Problems of Modern Astrophysics, Uni. of Amsterdam
Development of a part of the course related to extreme accretion in astrophysics
- 09.2016 course in Open Problems of Modern Astrophysics, Uni. of Amsterdam
Development of a part of the course related to accretion processes in astrophysics
- 2013 Teaching assistant, course in Time series analysis in astrophysics, Uni. of Oulu
- 2013 Teaching assistant, course in Theoretical astrophysics, Uni. of Oulu
- 2012 Teaching assistant, course in Relativistic astrophysics, Uni. of Oulu
- 2011 Teaching assistant, course in Stellar structure and evolution, Uni. of Oulu

Memberships and Other academic activities

IXPE Science Team Participant, **group leader**

THESEUS Science Team Participant
Referee for Monthly Notice of the Royal Astronomical Society (since Feb 2015)
Referee for Astronomy and Astrophysics (since Dec 2016)
Referee for Nature Astronomy (since Jul 2019)
Referee for UK Research and Innovation STFC Astronomy Research Grant (2020)
Referee for Astrophysical Bulletin (since Aug 2020)
Referee for Astronomy Reports (since Feb 2021)
Referee for Publications of the Astronomical Society of Japan (since Oct 2021)
Referee for Universe (since Nov 2021)
Referee for New Astronomy Reviews (since Apr 2022)
Referee for National Science Centre Poland (2023)

Organization of scientific meetings

2022 - 2024 Hosting for 2 Collaborative Short Term Scientific Missions at the Uni. of Oxford
2020 **Chair** of Symposium on “Extremes in Accretion onto Strongly Magnetised Neutron stars”
at EAS 2020, Leiden, The Netherlands
2019 - 2021 Hosting for 6 Collaborative Short Term Scientific Missions at Leiden Uni.
2018 SOC of Conference ”Stars, planets and their magnetic fields”, Saint-Petersburg, Russia
2016 - 2018 Hosting for 4 Collaborative Short Term Scientific Mission at the Uni. of Amsterdam
2009-2011 Organisation of weekly astronomical seminar for students and Ph.D. students,
Saint Petersburg State Uni.

Seminars (*41 seminars and colloquia*)

Participation in the conferences (*26 talks including 9 invited talks*)

Research visits

Tsung-Dao Lee Institute at Shanghai Jiao Tong University, China, Jul 2024
Leiden Uni., The Netherlands, Oct 2023
Uni. of Turku, Finland, Feb 2023
Leiden Uni., the Netherlands, Jan 2023
Uni. of Turku, Finland, Sep 2019
Department of Physics, Uni. of Oxford, Oxford, UK, Oct 2018
Institute for Astronomy and Astrophysics in Tübingen, Germany, Sep 2017
NORDITA, Stockholm, Sweden, Feb 2017
The Ioffe Physical-Technical Institute in Saint Petersburg, Russia, Dec 2016
Tuorla observatory, Uni. of Turku, Finland, Aug 2016
Institute for Astronomy and Astrophysics in Tübingen, Germany, Mar 2016
Institute for Astronomy and Astrophysics in Tübingen, Germany, Sep 2014
Institute for Astronomy and Astrophysics in Tübingen, Germany, Sep 2013
Uni. of Oulu, Finland, Feb-Apr 2011
Uni. of Oulu, Finland, Nov-Dec 2010

Institute for Astronomy and Astrophysics in Tübingen, Germany, Apr 2009

Participation in the schools and training programs

“Personal Leadership in an academic context”, Uni. of Amsterdam, 2019
NORDITA Winter School, Sweden, Jan 2013
Summer School on Instruments and Detection Techniques in High-Energy Astrophysics, Finland, Aug 2012
Heidelberg Summer School 2010, Germany, Sep 2010
6th School of Modern Astrophysics, Moscow, Russia, Jul 2010
5th School of Modern Astrophysics, Moscow, Russia, Jul 2009
4th School of Modern Astrophysics, Moscow, Russia, Jul 2008

Public engagement

2022 - 2024 supervisor in 15 research projects for high school students
2023 - 2024 online course in Evolution of Isolated and Binary stars for high school students
(**2 runs**, 13 lectures + 13 TA sessions **each run**)
2023 a series of popular lectures on Astrophysics of compact objects in Bicester Library
(Oxfordshire, UK)
2023 online course in High Energy Astrophysics for high school students
(**3 runs**, 13 lectures + 13 TA sessions **each run**)
2022 - 2024 online course in Astrophysics of Black Holes, White Dwarfs and Neutron Stars
for high school students (**6 runs**, 13 lectures + 13 TA sessions **each run**)
2022 two popular science papers in a newspaper ”Troitskiy Variant”.