

Anastasia Sokolenko

Address: Kavli Institute for Cosmological Physics
University of Chicago
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PhD Date: September 20, 2019

Employment

Washington University in St. Louis

Jaynes fellow, July 2024 - present

University of Chicago and Fermilab

KICP fellow, October 2021 - June 2024

Institute of High Energy Physics, Austrian Academy of Sciences, Vienna

Postdoctoral Fellow, October 2019 - September 2021

Education

University of Oslo

Ph.D. in Theoretical Physics, October 2016 - September 2019

Thesis title: Enlightening the Dark

Supervisor: Prof. Torsten Bringmann

Leiden University

M.Sc. in Theoretical Physics, September 2014 - May 2016 (with honor)

Thesis title: Connection between diphoton and three boson channels

Supervisor: Prof. Alexey Boyarsky

National University of Kyiv

B.Sc. in High Energy Physics, September 2010 - June 2014

Thesis title: WZ background estimation in SUSY searches, CMS collaboration

Supervisor: Prof. Lesya Shchutska

Teaching Experience

“Introduction to dark matter”, Lecturer, winter school for graduate students, Oslo, Norway, 2020

“The Standard Model of Particle Physics”, Lecturer, summer school for first-year graduate students, National University of Kyiv, Ukraine, 2019, 2021

“Quantum Field Theory”, Teaching assistant, University of Oslo, Norway, Autumn 2018

“Advanced scientific courses for high-school students”:

“Scientific revolutions of the 20th century”, Lecturer, Kyiv, Ukraine, *online*, Autumn 2020, 2021

“What is Dark Matter and how do we observe it?”, Lecturer, Kyiv, Ukraine, *online*, Autumn 2020, 2021

“What is a neutrino and can it be Dark Matter?”, Lecturer, Kyiv, Ukraine, *online*, Winter 2021, 2022

“How was the Hot Big Bang Theory discovered?”, Lecturer, Kyiv, Ukraine, *online*, Spring 2021

Academic Service

TeV Particle Astrophysics (TeVPA): local organizing committee of a conference, University of Chicago, 2024

Exploring primordial magnetic fields: organizer of a workshop, Leiden University, 2023

Next-generation gamma-ray searches for dark matter: co-organizer, University of Chicago, 2023

KICP postdoc symposium: co-organizer, University of Chicago, 2022

KICP seminar: co-organizer, University of Chicago, 2022 - present

Fermilab journal club: co-organizer, Fermilab, 2022 - present

Postdoc advisory board: University of Chicago, 2021 - present

Fermilab Astro Seminar: co-organizer, Fermilab, 2021 - 2022

KICP journal club: co-organizer, University of Chicago, 2021 - 2022

ISAPP summer school: local organizing committee, Vienna, 2021

Peer-reviewer for grant applications of the National Research Foundation of Ukraine (NRFU), 2020

CTA journal club for the DM working group within the CTA collaboration, co-organizer, 2020 - 2021

Identification of Dark Matter (IDM) conference: local organizing committee, Vienna, 2020

Lorentz journal club: classical papers in physics, co-organizer, Leiden University, 2016

Awards and Scholarships

The International Grant Program for the University of Chicago and the University of Vienna, 2022

KICP Fellowship, University of Chicago, 2021

Erasmus+ training mobility grant, University of Oslo, 2017

Leiden Physics Scholarship, Leiden University, 2014-2016

Conference and colloquium talks

Colloquium, *invited talk*, University of Melbourne, Melbourne, Australia, 2023

Colloquium, *invited talk, online*, National University of Kyiv, Kyiv, Ukraine, 2023

TeV Particle Astrophysics (TeVPA), Napoli, Italy, 2023

Colloquium, *invited talk*, York University, Toronto, Canada, 2023

Colloquium, *invited talk*, New York University Abu Dhabi, Abu Dhabi, UAE, 2023

DM3 workshop, *invited talk, online*, 2022

TeV Particle Astrophysics (TeVPA), Kingston, Canada, 2022

IDM, Vienna, Austria, 2022

EuCAPT Symposium, CERN, *online*, 2022

Marcel Grossmann Meeting, *invited talk, online*, 2021

EuCAPT Symposium, CERN, *online*, 2021

ICTP-SAIFR South American Dark Matter Workshop, *online*, 2020

Kashiwa Dark Matter Symposium, *online*, 2020

STRONG-DM, *invited talk, Vienna, Austria*, 2019

TeV Particle Astropysics (TeVPA), *Berlin, Germany*, 2018

53rd Rencontres de Moriond, *La Thuile, Italy*, 2018, 2024

Relativistic Heavy Ion Collisions, Cosmology and Dark Matter, *invited talk, Oslo, Norway*, 2017

Seminar talks

Seminar, Carleton University, *Ottawa, Canada*, 2023

Phenomenology seminar, University of Illinois Urbana-Champaign, *Urbana and Champaign, US*, 2023

Lifelong Learning talk, *Chicago, US*, 2022

Theory seminar, *Fermilab, US*, 2022

Astro Talk, *KICP, Chicago, US*, 2022

Cosmo Coffee, *online, CERN*, 2021

Theoretical particle physics seminar, *online, Graz, Austria*, 2021

Astroparticle seminar, *DESY, Zeuthen*, 2019, 2023

N-PACT meeting, *Stavanger, Norway*, 2018

Theory seminar, *Oslo, Norway*, 2016

Collaboration membership

CTA, SHiP

Computer skills

Python, Mathematica

Gammapy, *ctools* (data analysis and simulation packages for gamma-ray astronomy)

GALPROP (tool for cosmic-ray propagation and diffuse gamma-ray emission modeling)

LaTeX, Inkscape

References

Dr. Josef Pradler

Faculty of Physics

University of Vienna

Boltzmannngasse 5, 1090

Vienna, Austria

e-mail: josef.pradler@univie.ac.at

Prof. Alexey Boyarsky

Leiden University

Lorentz Institute

Niels Bohrweg 2, 2333 CA

Leiden, The Netherlands

e-mail: boyarsky@lorentz.leidenuniv.nl

Prof. Torsten Bringmann

University of Oslo

Department of Physics

Sem Sælands vei 24, 0371

Oslo, Norway

e-mail: torsten.bringmann@fys.uio.no

Dr. Gordan Krnjaic

University of Chicago

KICP

5640 South Ellis Avenue

Chicago, United States

e-mail: krnjaic@gmail.com

List of Publications

Total papers: 22 papers with less than ten authors, 1 collaboration paper where I was one of the leading authors, 13 collaboration papers. A full list of my publications can be found here: inspirehep.net

2024

- [38] D. Hooper, E. Pinetti, [A. Sokolenko](#) (*alphabetical*),
“Searching for Synchrotron Emission from the Geminga TeV Halo using the Planck Satellite”,
arXiv:2405.06739
- [37] Andres Aramburo-Garcia, Kyrylo Bondarenko, Alexey Boyarsky, Pavlo Kashko, Josef Pradler, [A. Sokolenko](#), Roi Kugel, Matthieu Schaller, Joop Schaye (*alphabetical*),
“Dark photon constraints from CMB temperature anisotropies”,
arXiv:2405.05104
- [36] Kyrylo Bondarenko, Alexey Boyarsky, [A. Sokolenko](#), Ievgen Vovk (*alphabetical*),
“Probing intergalactic intergalactic magnetic fields with LOFAR LoTSS DR2 data”,
arXiv:2404.17402

2023

- [35] D. Hooper, E. Pinetti, [A. Sokolenko](#) (*alphabetical*),
“Unraveling TeV Halos with the Cherenkov Telescope Array”,
arXiv:2312.10232
- [34] K. Bondarenko, A. Boyarsky, J. Pradler, [A. Sokolenko](#) (*alphabetical*),
“Best-case scenarios for neutrino capture experiments”
JCAP 10 (2023) 026 DOI: 10.1088/1475-7516/2023/10/026
- [33] M. Michailidis, L. Marafatto, D Malyshev, F. Iocco, G. Zaharijas, O. Sergijenko, M. Bernardos, C. Eckner, A. Boyarsky, [A. Sokolenko](#), A. Santangelo,
“Prospects for annihilating dark matter from M31 and M33 observations with the Cherenkov Telescope Array”
JCAP 08 (2023) 073 DOI: 10.1088/1475-7516/2023/08/073

2022

- [32] G. Krnjaic, D. Rocha, [A. Sokolenko](#) (*alphabetical*),
“Freezing In Vector Dark Matter Through Magnetic Dipole Interactions”
Phys.Rev.D 108 (2023) 3, 035047 DOI: 10.1103/PhysRevD.108.035047
- [31] A. Aramburo-Garcia, K. Bondarenko, A. Boyarsky, A. Neronov, A. Scaife, [A. Sokolenko](#) (*alphabetical*),
“The contribution of magnetized galactic outflows to extragalactic Faraday rotation”
Mon.Not.Roy.Astron.Soc. 519 (2023) 3, 4030-4035 DOI: 10.1093/mnras/stac3728
- [30] A. Aramburo-Garcia, K. Bondarenko, A. Boyarsky, A. Neronov, A. Scaife, [A. Sokolenko](#) (*alphabetical*),
“Revision of Faraday rotation measure constraint on primordial magnetic field based on results of IllustrisTNG simulation”
Mon.Not.Roy.Astron.Soc. 515 (2022) 4, 5673-5681 DOI: 10.1093/mnras/stac2058
- [29] K. Bondarenko, A. Boyarsky, J. Pradler, [A. Sokolenko](#) (*alphabetical*),
“Neutron stars as photon double-lenses: constraining resonant conversion into ALPs”
Phys.Lett.B 846 (2023) 138238, 5673-5681 DOI: 10.1016/j.physletb.2023.138238

2021

- [28] SHiP Collaboration,
“Track reconstruction and matching between emulsion and silicon pixel detectors for the SHiP-charm experiment”,
JINST 17 (2022) 03, P03013, DOI: 10.1088/1748-0221/17/03/P03013

- [27] SHiP Collaboration,
“The SHiP experiment at the proposed CERN SPS Beam Dump Facility”,
Eur.Phys.J.C 82 (2022) 5, 486 DOI: 10.1140/epjc/s10052-022-10346-5
- [26] K. Bondarenko, A. Boyarsky, A. Korochkin, A. Neronov, D. Semikoz, A. Sokolenko (*alphabetical*),
“Account of baryonic feedback effect in the γ -ray measurements of intergalactic magnetic fields”
Astron.Astrophys., 660 (2022) A80, DOI: 10.1051/0004-6361/202141595
- [25] A. Aramburo-Garcia, K. Bondarenko, A. Boyarsky, D. Nelson, A. Pillepich, A. Sokolenko (*alphabetical*),
“Ultra-high energy cosmic rays deflection by the Intergalactic Magnetic Field”,
Phys.Rev.D 104 (2021) 8, 083017, DOI: 10.1103/PhysRevD.104.083017

2020

- [24] K. Bondarenko, A. Boyarsky, M. Nikolic, J. Pradler, A. Sokolenko (*alphabetical*),
“Probing sub-eV Dark Matter decays with PTOLEMY”,
JCAP 03 (2021) 089, DOI: 10.1088/1475-7516/2021/03/089,
- [23] A. Aramburo-Garcia, K. Bondarenko, A. Boyarsky, D. Nelson, A. Pillepich, and A. Sokolenko (*alphabetical*),
“Magnetization of the intergalactic medium in the IllustrisTNG simulations: the importance of extended, outflow-driven bubbles”,
Mon.Not.Roy.Astron.Soc. 505 (2021) 4, 5038-5057, DOI: 10.1093/mnras/stab1632
- [22] SHiP Collaboration,
“Sensitivity of the SHiP experiment to dark photons decaying to a pair of charged particles”,
The European Physical Journal C 81 (2021) 5, 451, DOI: 10.1140/epjc/s10052-021-09224-3
- [21] SHiP Collaboration,
“Sensitivity of the SHiP experiment to light dark matter”,
JHEP 04 (2021) 199, DOI: 10.1007/JHEP04(2021)199
- [20] CTA Collaboration,
“Sensitivity of the Cherenkov Telescope Array for probing cosmology and fundamental physics with gamma-ray propagation”,
JCAP 02 (2021) 048, DOI: 10.1088/1475-7516/2021/02/048
- [19] SHiP Collaboration,
“Measurement of the muon flux from 400 GeV/c protons interacting in a thick molybdenum/tungsten target”,
The European Physical Journal C (2020) 284, DOI: 10.1140/epjc/s10052-020-7788-y
- [18] CTA Collaboration (one of the leading authors),
“Pre-construction estimates of the Cherenkov Telescope Array sensitivity to a dark matter signal from the Galactic centre”,
JCAP 01 (2021) 057, DOI: 10.1088/1475-7516/2021/01/057
- [17] K. Bondarenko, A. Sokolenko, A. Boyarsky, A. Robertson, D. Harvey, Y. Revaz,
“From dwarf galaxies to galaxy clusters: Self-Interacting Dark Matter over 7 orders of magnitude in halo mass”,
JCAP 01 (2021) 043, DOI: 10.1088/1475-7516/2021/01/043
- [16] A. Aramburo-Garcia, K. Bondarenko, S. Ploekinger, J. Pradler, A. Sokolenko (*alphabetical*),
“Effective photon mass and (dark) photon conversion in the inhomogeneous Universe”,
JCAP 10 (2020) 011 DOI:10.1088/1475-7516/2020/10/011
- [15] K. Bondarenko, J. Pradler, A. Sokolenko (*alphabetical*),
“Constraining dark photons and their connection to 21 cm cosmology with CMB data”,
Physics Letters B 805 (2020) 135420, DOI: 10.1016/j.physletb.2020.135420

- [14] K. Bondarenko, A. Boyarsky, T. Bringmann, M. Hufnagel, K. Schmidt-Hoberg, [A. Sokolenko](#) (*alphabetical*),
“Direct detection and complementary constraints for sub-GeV dark matter”,
JHEP 03 (2020) 118, DOI: 10.1007/JHEP03(2020)118
- [13] I. Boviarska, K. Bondarenko, A. Boyarsky, M. Ovchynnikov, O. Ruchayskiy, [A. Sokolenko](#) (*alphabetical*),
“Light scalar production from Higgs bosons and FASER 2”,
JHEP 05 (2020) 049, DOI: 10.1007/JHEP05(2020)049
- [12] SHiP Collaboration,
“SND@LHC”,
arXiv:2002.08722
- [11] SHiP Collaboration,
“Measurement of the muon flux for the SHiP experiment”,
Eur.Phys.J.C 80 (2020) 3, 284 DOI: 10.1140/epjc/s10052-020-7788-y

2019

- [10] I. Boviarska, K. Bondarenko, A. Boyarsky, V. Gorkavenko, M. Ovchynnikov, [A. Sokolenko](#) (*alphabetical*),
“Phenomenology of GeV-scale scalar portal”,
JHEP 11 (2019) 162, DOI: 10.1007/JHEP11(2019)162
- [9] [A. Sokolenko](#),
“Enlightening the Dark”,
PhD thesis
- [8] SHiP Collaboration,
“Fast simulation of muons produced at the SHiP experiment using Generative Adversarial Networks”,
JINST 14 (2019) P11028, DOI: 10.1088/1748-0221/14/11/P11028
- [7] SHiP Collaboration,
“Sensitivity of the SHiP experiment to Heavy Neutral Leptons”,
JHEP 04 (2019) 077, DOI: 10.1007/JHEP04(2019)077
- [6] SHiP Collaboration,
“The experimental facility for the Search for Hidden Particles at the CERN SPS”,
JINST 14 (2019) 03, P03025, DOI: 10.1088/1748-0221/14/03/P03025

2018

- [5] [A. Sokolenko](#), K. Bondarenko, T. Brinckmann, J. Zavala, M. Vogelsberger, T. Bringmann, A. Boyarsky,
“Towards an improved model of self-interacting dark matter haloes”,
JCAP 1812 (2018) no.12, 038, DOI: 10.1088/1475-7516/2018/12/038
- [4] [A. Sokolenko](#), K. Bondarenko, A. Boyarsky, L. Shchutska,
“Connection between diphoton and triboson channels in new physics searches”,
Physics Letters B, DOI: 10.1016/j.physletb.2018.08.067
- [3] K. Bondarenko, A. Boyarsky, T. Bringmann, [A. Sokolenko](#) (*alphabetical*),
“Constraining self-interacting dark matter with scaling laws of observed halo surface densities”,
JCAP 1804 (2018) no.04, 049, DOI: 10.1088/1475-7516/2018/04/049
- [2] [A. Sokolenko](#),
“Constraining self-interacting dark matter with scaling laws of observed halo surface densities”,
Proceedings, 53rd Rencontres de Moriond on Cosmology: La Thuile, Italy, March 17-24, 2018

2017

- [1] SHiP Collaboration,
“The active muon shield in the SHiP experiment”,
JINST 12 (2017) no.05, P05011, DOI: 10.1088/1748-0221/12/05/P05011