Nikita Blinov

Curriculum Vitae

Fermi National Accelerator Laboratory
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Batavia, IL 60510

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Employment

Fermi National Accelerator Laboratory, Batavia, IL — 10/2018 - Present
Research associate, Theoretical Physics and Particle Astrophysics Departments

University of Chicago, Chicago, IL — 10/2018 - Present
Associate fellow, Kavli Institute for Cosmological Physics

SLAC National Accelerator Laboratory, Menlo Park, CA — 10/2015 - 09/2018
Research associate, Theory Group

University of California, Santa Cruz, CA — 10/2014 - 01/2015
Graduate research assistant, Santa Cruz Institute for Particle Physics

TRIUMF, Vancouver, BC — 11/2010 - 08/2015
Graduate research assistant, Theory Department

Supervisory Experience

Margaret Wynne (undergrad) — 06/2021 - 08/2021
Project: Gluon-Coupled Axion-like Particles at the DarkQuest Experiment

Elizabeth Kowalczyk (undergrad) — 06/2020 - 08/2020
Project: Photon-Coupled Axion-like Particles at the DarkQuest Experiment

Teaching Experience

Guest Lecturer, Stanford University — 02/2017 - 02/2017
PHYS331 "Quantum Field Theory II" (grad)

Guest Lecturer, Stanford University — 05/2016 - 05/2016
PHYS152 "Introduction to Elementary Particle Physics" (undergrad/grad)

Teaching assistant, University of British Columbia — 01/2013 - 04/2013
PHYS102 "Electricity, Light and Radiation" (undergrad)

Teaching assistant, University of British Columbia 09/2012 - 12/2012

PHYS526 "Quantum Electrodynamics" (grad)

Teaching assistant, University of British Columbia 09/2012 - 12/2012

PHYS312 "Introduction to Mathematical Physics" (undergrad)

Teaching assistant, University of British Columbia 01/2011 - 04/2011

PHYS102 "Electricity, Light and Radiation" (undergrad)

Teaching assistant, University of British Columbia 09/2010 - 12/2010

PHYS101 "Energy and Waves" (undergrad)

Tutor, University of Alberta 10/2009 - 12/2009

Third year electrodynamics (undergrad)

Education

PhD in Physics, University of British Columbia 09/2010 - 08/2015

Advisor: David Morrissey

Thesis: "Phase transitions: applications to physics beyond the Standard Model"

BSc (Honors) in Mathematical Physics, University of Alberta 09/2006 - 06/2010

Advisor: Andrzej Czarnecki

Thesis: "Dimensional scaling and the positronium ion"

Publications

[B1] G. Barenboim, N. Blinov and A. Stebbins, "Smallest Remnants of Early Matter Domination," arXiv:2107.10293 [astro-ph.CO].

[B2] N. Blinov and P. Draper, "Densities of States and the CKN Bound," arXiv:2107.03530 [hep-ph].

[B3] M. Acevedo, A. Blackburn, N. Blinov, B. Shuve and M. Stone, "Multi-track Displaced Vertices at B-Factories," arXiv:2105.12744 [hep-ph].

[B4] N. Blinov, M. J. Dolan, P. Draper and J. Shelton, "Dark Matter Microhalos From Simplified Models," Phys. Rev. D **103**, no. 10, 103514 (2021), arXiv:2102.05070 [astro-ph.CO].

[B5] N. Blinov, G. Krnjaic and D. Tuckler, "Characterizing Dark Matter Signals with Missing Momentum Experiments," Phys. Rev. D **103**, no. 3, 035030 (2021), arXiv:2010.03577 [hep-ph].

[B6] C. Keith, D. Hooper, N. Blinov and S. D. McDermott, "Constraints on Primordial Black Holes From Big Bang Nucleosynthesis Revisited," Phys. Rev. D **102**, no. 10, 103512 (2020), arXiv:2006.03608 [astro-ph.CO].

[B7] N. Blinov, C. Keith and D. Hooper, "Warm Decaying Dark Matter and the Hubble Tension," JCAP **06**, 005, 2020, arXiv:2004.06114 [astro-ph.CO].

[B8] N. Blinov and G. Marques-Tavares, "Interacting radiation after Planck and its implications for the Hubble Tension," JCAP **09**, 029, 2020, arXiv:2003.08387 [astro-ph.CO].

[B9] N. Blinov, M. J. Dolan and P. Draper, "Imprints of the Early Universe on Axion Dark Matter Substructure," Phys. Rev. **D** 101, 035002, arXiv:1911.07853 [astro-ph.CO].

[B10] N. Blinov, K. J. Kelly, G. Z. Krnjaic and S. D. McDermott, "Constraining the Self-Interacting Neutrino Interpretation of the Hubble Tension," Phys. Rev. Lett. **123**, 191102, arXiv:1905.02727 [astro-ph.CO].

[B11] N. Blinov, M. J. Dolan, P. Draper and J. Kozaczuk, "Dark Matter Targets for Axion-like Particle Searches," Phys. Rev. **D** 100, 015049, arXiv:1905.06952 [hep-ph].

[B12] A. Berlin, N. Blinov and S. W. Li, "Dark Sector Equilibration During Nucleosynthesis," Phys. Rev. D **100**, 015038, arXiv:1904.04256 [hep-ph].

[B13] T. Åkesson, A. Berlin, N. Blinov *et al.*, "Light Dark Matter eXperiment (LDMX)," arXiv:1808.05219 [hep-ex].

[B14] N. Blinov, S. A. R. Ellis and A. Hook, "Consequences of Fine-Tuning for Fifth Force Searches," JHEP **1811**, 029 (2018), arXiv:1807.11508 [hep-ph].

[B15] A. Berlin and N. Blinov, "A Thermal Neutrino Portal to Sub-MeV Dark Matter," Phys. Rev. D **99**, 095030, arXiv:1807.04282 [hep-ph].

[B16] A. Berlin, N. Blinov, G. Krnjaic, P. Schuster and N. Toro, "Dark Matter, Millicharges, Axion and Scalar Particles, Gauge Bosons, and Other New Physics with LDMX," Phys. Rev. **D** 99, 075001 (2019), arXiv:1807.01730 [hep-ph].

[B17] A. Berlin, N. Blinov, S. Gori, P. Schuster and N. Toro, "Cosmology and Accelerator Tests of Strongly Interacting Dark Matter," Phys. Rev. D **97**, no. 5, 055033 (2018), arXiv:1801.05805 [hep-ph].

[B18] N. Blinov, E. Izaguirre and B. Shuve, "Rare Z Boson Decays to a Hidden Sector," Phys. Rev. D **97**, no. 1, 015009 (2018), arXiv:1710.07635 [hep-ph].

[B19] A. Berlin and N. Blinov, "Thermal Dark Matter Below an MeV," Phys. Rev. Lett **120**, no. 2, 021801 (2018), arXiv:1706.07046 [hep-ph].

[B20] N. Blinov and A. Hook, "Particle Asymmetries from Quantum Statistics," Phys. Rev. D **95**, no. 9, 095014 (2017), arXiv:1703.04759 [hep-ph].

[B21] N. Blinov and A. Hook, "Solving the Wrong Hierarchy Problem," JHEP **1606**, 176 (2016), arXiv:1605.03178 [hep-ph].

[B22] N. Blinov, J. Kozaczuk, D. E. Morrissey and A. de la Puente, "Compressing the Inert Doublet Model," Phys. Rev. D **93**, no. 3, 035020 (2016), arXiv:1510.08069 [hep-ph].

[B23] N. Blinov, S. Profumo and T. Stefaniak, "The Electroweak Phase Transition in the Inert Doublet Model," JCAP **1507**, no. 07, 028 (2015), arXiv:1504.05949 [hep-ph].

[B24] N. Blinov, J. Kozaczuk, D. E. Morrissey and C. Tamarit, "Electroweak Baryogenesis from Exotic Electroweak Symmetry Breaking," Phys. Rev. D **92**, no. 3, 035012 (2015), arXiv:1504.05195 [hep-ph].

[B25] N. Blinov, J. Kozaczuk, A. Menon and D. E. Morrissey, "Confronting the moduli-induced lightest-superpartner problem," Phys. Rev. D **91**, no. 3, 035026 (2015), arXiv:1409.1222 [hep-ph].

[B26] N. Blinov and D. E. Morrissey, "Vacuum Stability and the MSSM Higgs Mass," JHEP **1403**, 106 (2014), arXiv:1310.4174 [hep-ph].

[B27] N. Blinov, D. E. Morrissey, K. Sigurdson and S. Tulin, "Dark Matter Antibaryons from a Supersymmetric Hidden Sector," Phys. Rev. D **86**, 095021 (2012), arXiv:1206.3304 [hep-ph].

[B28] N. Blinov and A. Czarnecki, "Binding energy of the positronium negative ion via dimensional scaling," Phys. Rev. A **85**, 012522 (2012), arXiv:1201.2226 [hep-ph].

Reports and Conference Proceedings

[W1] E. Kowalczyk and N. Blinov, "Searching for Axion-like Particles at DarkQuest," FERMILAB-FN-1105-T.

[W2] D. Curtin *et al.*, "Long-Lived Particles at the Energy Frontier: The MATHUSLA Physics Case," arXiv:1806.07396 [hep-ph].

[W3] M. Battaglieri *et al.*, "US Cosmic Visions: New Ideas in Dark Matter 2017: Community Report," arXiv:1707.04591 [hep-ph].

[W4] J. Alexander *et al.*, "Dark Sectors 2016 Workshop: Community Report," arXiv:1608.08632 [hep-ph].

[W5] N. Blinov and D. E. Morrissey, "Charge and Color Breaking Constraints in the Minimal Supersymmetric Standard Model," arXiv:1309.7397 [hep-ph].

Professional Activities

- Referee for the Monthly Notices of the Royal Astronomical Society (January 2021 - Present)
- Referee for the Journal of Cosmology and Astroparticle Physics (April 2020 - Present)
- Referee for the Journal of High Energy Physics (December 2019 - Present)
- Co-organizer of FNAL Cosmic Physics Center Seminars (May 2019 - May 2020)
- Co-organizer of "Hidden Sector Fixed Target Experiments at Fermilab" Symposium at FNAL (September 4, 2019)
- Organizer of the SLAC Theory Seminars (Sept - Dec 2016)
- Co-organizer of the TRIUMF Workshop on Discoveries at the Dawn of LHC Run 2 (October 2015)
- Co-organizer of the TRIUMF Workshop on Searches for New Phenomena at the Upgraded LHC (September 2014)
- Co-organizer of the TRIUMF Workshop on Cosmology at Colliders (December 2013)
- Organizer of the weekly TRIUMF/UBC Particle-Cosmology meetings (2012-2013)

Proposals and Grant Applications

- "Accelerator-based Dark Matter Initiatives at Fermilab", Fermilab Laboratory Directed Research and Development 2019. Co-Investigator. Funded.
- "Search for Dark Sectors with the DarkQuest Experiment at Fermilab", DOE Basic Research Needs: New Dark Matter Initiatives 2019. Co-Investigator.
- "LDMX, an electron missing momentum search for sub-GeV Dark Matter", DOE Basic Research Needs: New Dark Matter Initiatives 2019. Funded.

Colloquia, Seminars and Conference Presentations

- "The Early Universe as a Laboratory for Particle Physics" (colloquium)

  April 6, 2021, York University, Toronto, Ontario (virtual)
- "Multi-track Signals of Long-Lived Particles from an Effective Field Theory Perspective"

  March 23, 2021, BaBar Collaboration Meeting, SLAC, Menlo Park, California (virtual)

  December 11, 2020, Long-lived particles at Belle II, DESY, Hamburg, Germany (virtual)

- "Opportunities for Missing Momentum Experiments"

  November 5, 2020, Developing New Directions in Fundamental Physics, TRIUMF, Vancouver, Canada (virtual)

- "Light Dark Matter Targets for Accelerator Searches"

  October 6, 2020, Snowmass Community Planning Meeting (virtual)

- "The (Really) Small Scale Structure of Dark Matter"

  September 15, 2020, BSM PANDEMIC Seminar (virtual)

- "Cosmology of Light Hidden Sectors and the Hubble Tension"

  October 6, 2020, University of Notre Dame, Notre Dame, Indiana (virtual)

  June 26, 2020, MIT, Boston, Massachusetts (virtual)

  June 9, 2020, Perimeter Institute, Waterloo, Ontario (virtual)

  May 27, 2020, UC Berkeley/LBL, Berkeley, California (virtual)

  May 14, 2020, TH BSM Forum, CERN, Switzerland (virtual)

- "Exploring the Early Universe with Accelerators and Astrophysics" (colloquium)

  March 5, 2020, Carleton University, Ottawa, Ontario

- "Imprints of the Early Universe on Dark Matter Substructure"

  December 13, 2019, University of Chicago, Chicago, Illinois

  December 2, 2019, University of Maryland, College Park, Maryland

  November 26, 2019, University of Cincinnati, Cincinnati, Ohio

  November 20, 2019, Cornell University, Ithaca, New York

  November 1, 2019, TRIUMF, Vancouver, British Columbia

  October 23, 2019, University of Wisconsin-Madison, Madison, Wisconsin

  September 23, 2019, "Next Frontiers in the Search for Dark Matter" Workshop, Galileo Galilei Institute, Arcetri, Firenze, Italy

- "Freeze-in, Misalignment, and Non-Standard Thermal Histories"

  June 4, 2019, "New Directions in the Search for Light Dark Matter Particles" Workshop, Batavia, Illinois

- "Cosmology with Sub-MeV Thermal Relics"

  May 2, 2019, Fermilab National Laboratory, Batavia, Illinois

  April 16, 2019, Argonne National Laboratory, Lemont, Illinois

  December 5, 2018, University of Michigan, Ann Arbor, Michigan

  November 16, 2018, University of Illinois, Urbana-Champaign, Illinois

October 16, 2018, Harvard, Boston, Massachusetts

June 19, 2018, TRIUMF, Vancouver, British Columbia

- "Visible Signals at LDMX"

  May 7, 2018, LDMX Collaboration Meeting, SLAC, Menlo Park, California

- "Rare Z Decays to a Hidden Sector"

  October 31, 2017, SLAC, Menlo Park, California

- "Cosmology and Signals of Strongly Interacting Dark Sectors"

  November 21, 2017, Perimeter Institute, Waterloo, Ontario

  October 11, 2017, UC Berkeley, Berkeley, California

  June 14, 2017, BaBaR Collaboration Meeting, Menlo Park, California

  May 4, 2017, "New Lampposts for Dark Matter" Workshop, Eugene, Oregon

  April 5, 2017, HPS Collaboration Meeting (remote), Menlo Park, California

  April 4, 2017, University of Victoria, Victoria, British Columbia

  March 24, 2017, US Cosmic Visions, College Park, Maryland

  February 27, 2017, UC Davis Seminar, Davis, California

- "Solution to a Hierarchy Problem"

  October 6, 2016, York U., Toronto, Ontario

  June 23, 2016, DESY Seminar, Hamburg, Germany

  June 20, 2016, EPFL Seminar, Lausanne, Switzerland

  June 17, 2016, TH BSM Forum, CERN, Switzerland

- "Electroweak Phase Transition Beyond the Standard Model"

  June 3, 2016, MIAPP "More Matter" Program, Garching, Germany

  October 23, 2015, SITP Wine and Cheese, Stanford, California

  June 12, 2015, Theory Canada 10, Calgary, Alberta

- "Direct Detection of Non-Thermal Dark Matter", April 29, 2016, Dark Sectors 2016, SLAC National Accelerator Laboratory, California

- "Light Moduli: Applications to Dark Matter and Baryogenesis"

  November 28, 2014, Perimeter Institute, Waterloo, Ontario

  October 20, 2014, UC Santa Cruz, Santa Cruz, California

  August 26, 2014, COSMO 2014, Chicago, Illinois

  May 5 2014, PHENO2014, Pittsburgh, Pennsylvania

- "Charge and Colour Breaking Constraints in the MSSM"

August 15 2013, APS DPF 2013 Meeting, Santa Cruz, California

June 20 2013, TASI 2013, Boulder, Colorado

- "Dark Matter Antibaryons in a Supersymmetric Hidden Sector",

  October 19 2012, APS Northwest Section Meeting, Vancouver, British Columbia

  August 10 2012, poster, TRIUMF Summer Institute, Vancouver, British Columbia

  February 25 2012, 49th Winter Nuclear and Particle Physics Conference, Mont Tremblant, Québec

Outreach

- Superheroes in STEM 2021 High School Conference, May 1, 2021, Fermilab (virtual)

Conferences and Workshops Attended

- Long-lived particles at Belle II, December 10-11, 2020, DESY, Hamburg, Germany (virtual)
- Developing New Directions in Fundamental Physics, November 4-6, 2020, TRIUMF, Vancouver, Canada (virtual)
- Snowmass Community Planning Meeting, October 5-8, 2020 (virtual)
- Topics in Cosmic Neutrino Physics, October 9-11, 2019, Batavia, Illinois
- Cosmic Controversies, October 5-8, 2019, Chicago, Illinois
- Next Frontiers in the Search for Dark Matter, September 16-29, 2019, Arcetri, Firenze, Italy
- New Directions in the Search for Light Dark Matter Particles, June 4-7, 2019, Batavia, Illinois
- Nu Physics in the CMB, November 7-9, 2018, San Diego, California
- High Energy Physics at the Sensitivity Frontier, March 26-April 20, 2018, Santa Barbara, California
- Developing New Tools for Dark Matter Searches, September 3-17, 2017, Aspen, Colorado
- Beyond WIMPs: from Theory to Detection, March 27-29, 2017, Stony Brook, New York
- US Cosmic Visions: New Ideas in Dark Matter, March 23-25, 2017, College Park, Maryland

- MIAPP Workshop "Why is there more matter than antimatter in the Universe?", May 30 - June 11 2016, Garching, Germany
- Dark Sectors Workshop 2016, April 28-30 2016, SLAC National Accelerator Laboratory, California
- TRIUMF Workshop on Discoveries at the Dawn of LHC Run 2, October 28-30 2015, Vancouver, British Columbia
- Theory Canada 10, June 11-13 2015, Calgary, Alberta
- TRIUMF Workshop on Searches for New Phenomena at the Upgraded LHC, September 8-10 2014, Vancouver, British Columbia
- COSMO 2014, August 25-29 2014, Chicago, Illinois
- US ATLAS Physics Workshop 2014 Open Day, August 4 2014, Seattle, Washington
- Phenomenology 2014 Symposium, May 5-7 2014, Pittsburgh, Pennsylvania
- TRIUMF Workshop on Cosmology at Colliders, December 9-11 2013, Vancouver, British Columbia
- APS Division of Particles and Fields 2013 Meeting, August 13-17 2013, Santa Cruz, California
- TRIUMF Workshop on Neutrinos and New Physics, November 12-14 2012, Vancouver, British Columbia
- APS Northwest Section Meeting, October 18-20 2012, Vancouver, British Columbia
- Physics at LHC, June 4-9 2012, Vancouver, British Columbia
- 49th Winter Nuclear and Particle Physics Conference, February 23-26 2012, Mont Tremblant, Québec
- TRIUMF Workshop on LHC Results, December 14-16 2011, Vancouver, British Columbia