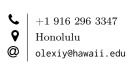
OLEXIY DVORNIKOV

☐ alexdvornikov.github.io





EDUCATION

2023 **PhD** · **Physics**

University of Hawai'i at Mānoa

Advisor: Jelena Maričić

Dissertation: Low energy physics in liquid argon time projection chambers

2017 MS · Physics

San Diego State University Advisor: Chad Kishimoto Thesis: Quantum Kinetics and the Zeno Ansatz: Sterile Neutrino Dark Matter in the Early Universe

2014 BS · Astrohysics

University of California, San Diego

Advisor: Avi Yagil Topic: Top quark decays

ABOUT

A PhD candidate at the University of Hawai'i researching terrestrial and extraterrestrial neutrinos and dark matter with wired and pixelated liquid argon time projection chambers (LArTPCs). Splitting time between software and hardware; experiment and theory. Interested in future neutrino and dark matter observatories and broad avenues to learn, apply, and share physics.

LANGUAGES

Computer | Python (including scikit & TensorFlow),

C/C++, Mathematica, ROOT, Bash, SSH, Slurm, HTML, Git, LATEX

Human | English, Ukrainian, Russian

German, French

COMPUTATIONAL SKILLS

- Data & Image Analysis (of particles traversing Time Projection Chambers)
- Geant4 (Simulation of particles passing through and interacting with matter)
- NuWro (Monte Carlo Neutrino Event Generator)
- LArSoft (Simulation & Reconstruction Software for Liquid Argon Time Projection Chambers)
- Pandora (Pattern Recognition Software)

SCHOOLS ATTENDED

2022 October AEPSHEP

Asia-Europe-Pacific School of

High Energy Physics
Pyeongchang, South Korea

2019 August SSI

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Stanford Linear Accelerator Center

Summer Institute Menlo Park, California

SELECTED PUBLICATIONS

- [1] **O. Dvornikov** et al., Searching for solar KDAR with DUNE, JCAP10(2021)065 (2021), arXiv:2107.09109 [hep-ex].
- [2] C. Kishimoto, H. Hodlin, O. Dvornikov, Quantum Kinetic Equilibrium, arXiv:2011.11237 [hep-ph].

COLLABORATIONS

DUNE | Deep Underground Neutrino Experiment

RESEARCH HIGHLIGHTS

- Led an analysis that set limits on KDAR (kaon decay-at-rest) neutrino and dark matter sensitivities in DUNE.
- Developed an original imaging algorithm to calibrate LArTPCs to the energies relevant for solar and supernova neutrinos. The algorithm identified and used low-energy electrons (delta-rays) for MeV level calibrations.
- Wrote a stand-alone simulation to optimize a photoelectron laser calibration system for the DUNE Near Detector.
- Worked on the fabrication, commissioning, and testing of a 7m dynamic temperature profiler in ProtoDUNE-SP.

SNOWMASS PUBLICATIONS

- [1] D. Caratelli et al. (incl. **O. Dvornikov**), Low-Energy Physics in Neutrino LArTPCs, arXiv:2203.00740 [physics.ins-det].
- [2] A. Ankowski et al. (incl. O. Dvornikov), Electron Scattering and Neutrino Physics, arXiv:2203.06853 [hep-ex].
- [3] A. Abed Abud et al. (incl. O. Dvornikov), A Gaseous Argon-Based Near Detector to Enhance the Physics Capabilities of DUNE, arXiv:2203.06281 [hep-ex].
- [4] DUNE Collaboration (incl. O. Dvornikov), Snowmass Neutrino Frontier: DUNE Physics Summary, arXiv (2021), arXiv:2203.06100 [hep-ex].

DUNE COLLABORATION PUBLICATIONS

- [1] Identification and reconstruction of low-energy electrons in the ProtoDUNE-SP detector, Submitted to PRD, arXiv:2211.01166 [hep-ex].
- [2] DUNE Offline Computing Conceptual Design Report, arXiv:2210.15665 [physics.data-an].
- [3] Separation of track and shower like energy deposits in ProtoDUNE-SP using a convolutional neural network, Eur. Phys. J. C 82, 903 (2022), arXiv:2203.17053 [physics.ins-det].
- [4] Scintillation light detection in the 6m drift-length ProtoDUNE Dual Phase liquid argon TPC, Eur.

- Phys. J. C **82**, 618 (2022), arXiv:2203.16134 [physics.ins-det].
- [5] Reconstruction of interactions in the ProtoDUNE-SP detector with Pandora, Submitted to EPJC (2022), arXiv:2206.14521 [hep-ex].
- [6] Low exposure long-baseline neutrino oscillation sensitivity of the DUNE experiment, Phys. Rev. D 105, 072006 (2022), arXiv:2109.01304 [hep-ex].
- [7] Design, construction and operation of the ProtoDUNE-SP Liquid Argon TPC, JINST 17 P01005 (2021), arXiv:2108.01902 [physics.insdet].
- [8] Supernova neutrino burst detection with the Deep Underground Neutrino Experiment, Eur. Phys. J. C 81, 423 (2021), arXiv:2008.06647 [hep-ex].
- [9] Prospects for beyond the Standard Model physics searches at the Deep Underground Neutrino Experiment, Eur. Phys. J. C 81, 322 (2021), arXiv:2008.12769 [hep-ex].
- [10] Deep Underground Neutrino Experiment (DUNE) Near Detector Conceptual Design Report, Instruments 5, no. 4: 31 (2021), arXiv:2103.13910 [physics.ins-det].
- [11] Experiment Simulation Configurations Approximating DUNE TDR, arXiv:2103.04797 [hep-ex].
- [12] First results on ProtoDUNE-SP liquid argon time projection chamber performance from a beam test at the CERN Neutrino Platform, JINST 15 P12004 (2020), arXiv:2007.06722 [physics.ins-det].
- [13] Neutrino interaction classification with a convolutional neural network in the DUNE far detector, Phys. Rev. D **102**, 092003 (2020), arXiv:2006.15052 [physics.ins-det].
- [14] Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume I, JINST 15 T08008 (2020), arXiv:2002.02967 [physics.ins-det].
- [15] Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume II, arXiv:2002.03005 [hep-ex].
- [16] Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume III, JINST 15 T08009 (2020), arXiv:2002.03008 [physics.ins-det].
- [17] Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume IV, JINST 15 T08010 (2020), arXiv:2002.03010 [physics.ins-det].

TALKS

REFERENCES

Prof.Jelena Maričić **DUNE CM** P5 Panel Member 2022 September Department of Physics & Astronomy Deep Underground University of Hawai'i Neutrino Experiment Collaboration Meeting jelena@phys.hawaii.edu Manchester, England Prof.Jason Kumar Department of Physics & Astronomy 2021 August **SUSY** University of Hawai'i Conference on Supersymmetry and Unification of Fundamental jkumar@hawaii.edu Interactions Carsten Rott Prof.VirtualDepartment of Physics & Astronomy DUNE CM University of Utah 2021 May Virtualrott@physics.utah.edu Sven Vahsen 2021 April APS Prof. Department of Physics & Astronomy American Physical Society University of Hawai'i Virtualsevahsen@hawaii.edu 2021 February NuTel Tom Junk Neutrino Telescopes Workshop Dr.Scientist & Software Coordinator VirtualFermilab 2020 September **DUNE CM** trj@fnal.gov VirtualKendall Mahn Prof. 2020 January **DUNE CM** P5 Panel Member CERN, Switzerland Department of Physics & Astronomy $2019\ August$ SSI Michigan State University Stanford Linear Accelerator Center mahn@msu.edu

Dr.

Dr.

Yifan Chen

Neutrino Group

Dan Douglas

Neutrino Group

cyifan@slac.stanford.edu

dougl215@slac.stanford.edu

SLAC National Accelerator Laboratory

SLAC National Accelerator Laboratory

OUTREACH

Summer Institute

Menlo Park, California

2018-Now	University of Hawai'i Physics Olympics Organizer of high school physics competitions	TEACHING	G
$2018 ext{-}Now$	Open House University of Hawai'i	2021	Instructor • E & M and Optics
	Organizer of physics & astronomy exhibits for of all ages	2018-Now	Substitute lecturer · Quantum Mechanics
$2022\ October$	ASC Conference		· QM, Relativity, Optics
	Applied Superconductivity Conference Honolulu, Hawai'i Outreach volunteer	2014-2018	Teaching assistant • E & M, Optics, Atoms labs • Mechanics labs
2020 January	AAS Conference American Astronomical Society Honolulu, Hawai'i Outreach volunteer	2017-2018	Tutor University physics & math K-12 math/reading/writing