

Michael (Misha, Mykhailo) Rashkovetskyi

PhD candidate in astrophysics (cosmology)
Ofc P-302, 60 Garden St, Cambridge, MA, 02138

November 22, 2024
mrashkovetskyi@cfa.harvard.edu
<https://rashkovetskyi.im>

Fields of interest

Large-scale structure: galaxy clustering; cosmic microwave background; Hubble tension; nature of dark energy; primordial Universe

Education

Harvard University

Cambridge, MA, USA

- *Ph.D. in Astronomy* 2020 – 2025
M.A. in Astronomy and Astrophysics, in passing 2022
 - Thesis: *Enhancing the analysis of the large-scale structure of the Universe for cutting-edge cosmological surveys with two-point correlation function and beyond* (expected May 2025)
 - Advisor: Prof. Daniel Eisenstein
 - Center for Astrophysics | Harvard & Smithsonian

Tel Aviv University

Tel Aviv-Yafo, Israel

- *B.Sc. in Physics, Summa Cum Laude (GPA: 98/100)* 2019 – 2020
 - Raymond & Beverly Sackler School of Physics & Astronomy
 - Advisor: Dr. Omer Bromberg

Moscow Institute of Physics and Technology

Dolgoprudny, Russia

- *B.Sc. in Applied Mathematics and Physics, unfinished* 2015 – 2018
 - Department of General and Applied Physics
 - Advisor: Prof. Vasily Beskin

Richelieu Lyceum

Odesa, Ukraine

- *High school, specialization in physics* 2010 – 2015

Research topics and publications

- Extracting more information from DESI galaxy clustering using moderate thermal Sunyaev-Zeldovich detections
 - M. Rashkovetskyi, D. J. Eisenstein, *et al.*, “Clustering of DESI Luminous Red Galaxies selected by thermal Sunyaev-Zeldovich effect detection level from ACT+Planck y map”, *in preparation*, 2024a
- Semi-analytical, semi-empirical covariance matrices for DESI with RASCALC code
 - M. Rashkovetskyi, D. Forero-Sánchez, A. de Mattia, D. J. Eisenstein, N. Padmanabhan, H. Seo, A. J. Ross, *et al.*, “Semi-analytical covariance matrices for two-point correlation function for DESI 2024 data”, 2024b, [arXiv:2404.03007](https://arxiv.org/abs/2404.03007)

- M. Rashkovetskyi, D. J. Eisenstein, *et al.*, “Validation of semi-analytical, semi-empirical covariance matrices for two-point correlation function for early DESI data”, MNRAS **524** (2023), no. 3, 3894–3911, [arXiv:2306.06320](#)
- Contributions to DESI BAO analysis and clustering catalogs
 - J. Moon, D. Valcin, M. Rashkovetskyi, C. Saulder, *et al.*, “First detection of the BAO signal from early DESI data”, MNRAS **525** (2023), no. 4, 5406–5422, [arXiv:2304.08427](#)
 - D. Forero-Sánchez, M. Rashkovetskyi, O. Alves, A. de Mattia, S. Nadathur, P. Zarrouk, H. Gil-Marín, Z. Ding, J. Yu, U. Andrade, X. Chen, C. Garcia-Quintero, J. Mena-Fernández, *et al.*, “Analytical and EZmock covariance validation for the DESI 2024 results”, 2024, [arXiv:2411.12027](#)
 - DESI Collaboration *et al.*, “DESI 2024 III: Baryon Acoustic Oscillations from Galaxies and Quasars”, 2024a, [arXiv:2404.03000](#)
 - DESI Collaboration *et al.*, “DESI 2024 II: Sample Definitions, Characteristics, and Two-point Clustering Statistics”, 2024b, [arXiv:2411.12020](#)
 - DESI Collaboration *et al.*, “DESI 2024 V: Full-Shape Galaxy Clustering from Galaxies and Quasars”, 2024c, [arXiv:2411.12021](#)
 - DESI Collaboration *et al.*, “DESI 2024 VI: Cosmological Constraints from the Measurements of Baryon Acoustic Oscillations”, 2024d, [arXiv:2404.03002](#)
 - DESI Collaboration *et al.*, “DESI 2024 VII: Cosmological Constraints from the Full-Shape Modeling of Clustering Measurements”, 2024e, [arXiv:2411.12022](#)
 - DESI Collaboration *et al.*, “DESI 2024 IV: Baryon Acoustic Oscillations from the Lyman Alpha Forest”, 2024f, [arXiv:2404.03001](#)
 - DESI Collaboration *et al.*, “Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument”, AJ **167** (2024)g, no. 2, 62, [arXiv:2306.06307](#)
 - DESI Collaboration *et al.*, “The Early Data Release of the Dark Energy Spectroscopic Instrument”, AJ **168** (2024)h, no. 2, 58, [arXiv:2306.06308](#)
 - J. Mena-Fernández, C. Garcia-Quintero, S. Yuan, B. Hadzhiyska, O. Alves, M. Rashkovetskyi, H. Seo, N. Padmanabhan, S. Nadathur, C. Howlett, S. Alam, A. Rocher, A. J. Ross, E. Sanchez, M. Ishak, *et al.*, “HOD-Dependent Systematics for Luminous Red Galaxies in the DESI 2024 BAO Analysis”, 2024, [arXiv:2404.03008](#)
 - C. Garcia-Quintero, J. Mena-Fernández, A. Rocher, S. Yuan, B. Hadzhiyska, O. Alves, M. Rashkovetskyi, H. Seo, N. Padmanabhan, S. Nadathur, C. Howlett, M. Ishak, L. Medina-Varela, P. McDonald, A. J. Ross, Y. Xie, X. Chen, A. Bera, *et al.*, “HOD-Dependent Systematics in Emission Line Galaxies for the DESI 2024 BAO analysis”, 2024, [arXiv:2404.03009](#)
 - U. Andrade, J. Mena-Fernández, H. Awan, A. J. Ross, S. Brieden, J. Pan, A. de Mattia, *et al.*, “Validating the Galaxy and Quasar Catalog-Level Blinding Scheme for the DESI 2024 analysis”, 2024, [arXiv:2404.07282](#)
 - E. Paillas, Z. Ding, X. Chen, H. Seo, N. Padmanabhan, A. de Mattia, A. J. Ross, S. Nadathur, C. Howlett, *et al.*, “Optimal Reconstruction of Baryon Acoustic Oscillations for DESI 2024”, 2024, [arXiv:2404.03005](#)
 - J. Yu, A. J. Ross, A. Rocher, O. Alves, A. de Mattia, D. Forero-Sánchez, J.-P. Kneib, A. Krolewski, T. Lan, M. Rashkovetskyi, *et al.*, “ELG Spectroscopic Systematics Analysis of the DESI Data Release 1”, 2024, [arXiv:2405.16657](#)
 - A. Pérez-Fernández, L. Medina-Varela, R. Ruggeri, M. Vargas-Magaña, H. Seo, N. Padmanabhan, M. Ishak, *et al.*, “Fiducial-Cosmology-dependent systematics for the DESI 2024 BAO Analysis”, 2024, [arXiv:2406.06085](#)

- S. F. Chen, C. Howlett, M. White, P. McDonald, A. J. Ross, H. J. Seo, N. Padmanabhan, *et al.*, “Baryon acoustic oscillation theory and modelling systematics for the DESI 2024 results”, MNRAS **534** (2024), no. 1, 544–574, [arXiv:2402.14070](#)
- Inhomogeneous recombination relieving Hubble tension
 - M. Rashkovetskyi, J. B. Muñoz, D. J. Eisenstein, and C. Dvorkin, “Small-scale clumping at recombination and the Hubble tension”, Phys. Rev. D **104** (2021), no. 10, 103517, [arXiv:2108.02747](#)
- The dynamics of highly magnetized jets propagating in the medium
- Orthogonal radiopulsars and their statistics
 - E. M. Novoselov, V. S. Beskin, A. K. Galishnikova, M. M. Rashkovetskyi, and A. V. Biryukov, “Orthogonal pulsars as a key test for pulsar evolution”, MNRAS **494** (2020), no. 3, 3899–3911, [arXiv:2004.03211](#)
- Pulsar losses mechanisms
 - V. S. Beskin, A. K. Galishnikova, E. M. Novoselov, A. A. Philippov, and M. M. Rashkovetskyi, “So how do radio pulsars slow-down?”, in “Journal of Physics Conference Series”, vol. 932, p. 012012. 2017

Teaching experience

- **Astronomy 200: Radiative Processes in Astrophysics** Harvard University
Teaching Fellow Fall 2023
- **Astronomy 201: Astrophysical Fluids & Plasmas** Harvard University
Teaching Fellow Spring 2023
- **Astronomy 130: Introduction to Cosmology** Harvard College
Teaching Fellow Fall 2022

Public presentations

- **APS April meeting (contributed talk)** Minneapolis, MN, USA
First Detection of the BAO Signal from Early DESI Data April 18, 2023
- **Cosmology from Home 2023 (contributed talk co-presenter)** online
First Detection of the BAO Signal from Early DESI Data (on YouTube) July 4, 2023
- **ITC Luncheon (talk)** Cambridge, MA, USA
Semi-analytic covariance matrices for 2PCF of DESI galaxies (on YouTube) September 28, 2023
- **Frontiers in Cosmology and Gravitational Physics (poster)** Portsmouth, UK
Fast semi-analytical covariance matrices for 2PCF of galaxies and quasars May 20-23, 2024
- **VIII Essential Cosmology for the Next Generation (poster)** Playa del Carmen, Mexico
RascalC: Empirical 2PCF Covariance Matrices without Mocks Nov 30 - Dec 3, 2022
- **CMB-S4 Summer Meeting (poster)** online
Small-scale Clumping at Recombination and the Hubble Tension August 9-13, 2021
- **CMB-S4 Spring Meeting (poster)** online
Hubble Tension with Small-Scale Clumping March 8-12, 2021

- **Physics of Neutron Stars - 2017 (poster)**
On the light-curve anomalies of radio pulsars

Saint-Petersburg, Russia
July 10-14, 2017

Other conferences and schools

- **DESI July**
DESI Collaboration Marseille, France
July 9-12, 2024
- **Fundamental Physics from Future Spectroscopic Surveys**
Lawrence Berkeley National Laboratory Berkeley, CA, USA
May 6-8, 2024
- **DESI December**
DESI Collaboration Waikoloa, HI, USA
December 11-14, 2023
- **DESI July**
DESI Collaboration Durham, UK
July 17-21, 2023
- **Michigan Cosmology Summer School**
University of Michigan Ann Arbor, MI, USA
June 5-9, 2023
- **DESI December**
DESI Collaboration Cancun, Mexico
December 5-9, 2022
- **DESI June**
DESI Collaboration Berkeley, CA, USA
June 21-24, 2022
- **15th School of Modern Astrophysics**
Moscow Institute of Physics and Technology Dolgoprudny, Russia
July 1-12, 2019
- **13th School of Modern Astrophysics**
Moscow Institute of Physics and Technology Dolgoprudny, Russia
July 3-21, 2017
- **International School of Subnuclear Physics - 2017**
"Ettore Majorana" Foundation and Centre for Scientific Culture Erice, Italy
June 14-23, 2017
- **International school on particles, fields and strings**
National Research University "High School of Economics" Moscow, Russia
April 17-24, 2017
- **Astronomical practice**
Special Astrophysical Observatory Nizhniy Arkhyz, Russia
June 25 – July 2, 2016

Awards, grants and honors

Dean's Certificate in Recognition of Outstanding Academic Achievements (TAU) 2019–2020
 Stipend for excellent students of MIPT in the name of A.Abramov 2016–2017
 International Physics Olympiad, bronze medal Mumbai, 2015
 International Physics Olympiad, silver medal Astana, 2014

Selected open source contributions (<https://github.com/misharash>)

- **RASCALC** C++ & Python
Fast semi-analytic covariance matrices library/program 2022-2024
- **RASCALC scripts** Python
DESI covariance matrix pipeline for 2-point correlation function (scripts) 2024

- PYCORR
Library for 2-point correlation function estimation

Python
2024

Languages

- Russian: native
- Ukrainian: fluent
- English: advanced
- Hebrew: advanced
- German: intermediate