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Anyonic, cosmic, and chaotic: three faces of Majorana fermions

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Curriculum Vitæ

I was born on the 30th of September 1994 in Uzhgorod, Ukraine. When I was four, my family moved to Kyiv where I attended the primary and middle school in Lyceum 157. For the high school I went to Kyiv Natural Science Lyceum 145. During the last two years there I participated in various Ukrainian competitions in physics and math.

In 2012 I entered the Faculty of Physics of the Taras Shevchenko National University of Kyiv and in 2014 I was assigned to the Department of Quantum Field Theory. There, I completed my bachelor degree in 2016 under the supervision of Viktor Reshetnyak. After one year on the master program at the same university, I moved to Göttingen where I completed my master degree in physics (2017-2018) in the University of Göttingen under the supervision of Stefan Kehrein. During my master degree, I was a teaching assistant for the Introduction to Solid State Physics course at the same university.

In October 2017 I started my Ph.D. studies in The Netherlands, as a part of a joint project with Carlo Beenakker (Leiden University) and Anton Akhmerov (Delft University of Technology). I investigated how Andreev bound states can mimic topologically protected Majorana zero modes in various observables. Second direction of my research was the study of the signatures of the non-Fermi liquid phase of the SYK model. The third direction of my research was studying the role of the many-body phenomena in the experimental setup for the relic neutrino detection.

During my Ph.D. studies, I presented my research in The Netherlands, Germany, Italy and France. I was a teaching assistant for the Theory of Condensed Matter course and for the Advanced Theory Track program for bachelor students. I have also actively participated in scientific outreach by being a co-organizer and lecturer of the popular science courses for high-school pupils from Ukraine “Scientific revolutions of the beginning of XXth century”, co-organizer and mentor of the KAU BITP winter school "Frontiers in the condensed matter physics".

List of Publications

- [1] V. Ohanesjan, Y. Cheipesh, N. V. Gnezdilov, A. I. Pavlov, K. Schalm *Energy dynamics, information and heat flow in quenched cooling and the crossover from quantum to classical thermodynamics.* [preprint arXiv:2204.12411](#), (2022).
- [2] PTOLEMY collaboration *Heisenberg's uncertainty principle in the PTOLEMY project: a theory update.* [preprint arXiv:2203.11228](#), (2022).
- [3] N. V. Gnezdilov, A. I. Pavlov, V. Ohanesjan, Y. Cheipesh, K. Schalm *Ultrafast dynamics of cold Fermi gas after a local quench .* [preprint arXiv:2108.12031](#), (2022).
- [4] Y.Cheipesh, V. Cheianov, A. Boyarsky *Navigating the pitfalls of relic neutrino detection.* [Physical Review D **104**, 11 \(2021\)](#) [Chapter 6].
- [5] O. Mikulenko, Y. Cheipesh, V. Cheianov, A. Boyarsky *Can we use heavy nuclei to detect relic neutrinos?* [preprint arXiv:2111.09292](#), (2021) [Chapter 7].
- [6] Y. Cheipesh, A. I. Pavlov, V. Ohanesjan, K. Schalm, N. V. Gnezdilov *Quantum tunneling dynamics in a complex-valued Sachdev-Ye-Kitaev model quench-coupled to a cool bath.* [Physical Review B **104**, 11 \(2021\)](#) [Chapter 5].
- [7] D. O. Oriekhov, Y. Cheipesh, C. W. J. Beenakker *Voltage staircase in a current-biased quantum-dot Josephson junction.* [Physical Review B **103**, 9 \(2021\)](#).
- [8] Y. Cheipesh, L. Cevolani, S. Kehrein *Entanglement correction due to local interactions in many-body systems.* [preprint arXiv:2007.15908](#), (2020).

- [9] A. Grabsch, Y. Cheipesh, C. W. J. Beenakker *Dynamical Signatures of Ground-State Degeneracy to Discriminate against Andreev Levels in a Majorana Fusion Experiment*. [Advanced Quantum Technologies](#) **3**, 1 (2020) [Chapter 3].
- [10] Y. Cheipesh, A. I. Pavlov, V. Scopelliti, J. Tworzydło and N. V. Gnezdilov, *Reentrant superconductivity in a quantum dot coupled to a Sachdev-Ye-Kitaev metal*. [Physical Review B](#) **100**, 22 (2019) [Chapter 4].
- [11] A. Grabsch, Y. Cheipesh, C. W. J. Beenakker, *Pfaffian formula for fermion parity fluctuations in a superconductor and application to Majorana fusion detection*. [Annalen der Physik](#) **531**, 10 (2019) [Chapter 2].
- [12] Y. Cheipesh, L. Cevolani, S. Kehrein, *Exact description of the boundary theory of the Kitaev Toric Code with open boundary conditions*. [Physical Review B](#) **99**, 2 (2019)
- [13] Y. Hsiao, Ch. Su, Z. Yang, Y. Cheypesh, Jh. Yang, V. Reshetnyak, K. Chen, W. Lee, *Electrically active nanoantenna array enabled by varying the molecular orientation of an interfaced liquid crystal*. [RSC advances](#) **6**, 87 (2016)