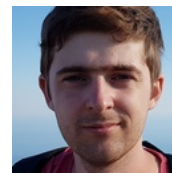


# Maksim Velikanov

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## Employment

- 2022 – ... 📌 Researcher at **Technology Innovation Institute**, Abu Dhabi
- 2020 – 2022 📌 Junior researcher and PhD student at **Skoltech**, Moscow
- 2017 – 2020 📌 Junior research scientist at **Russian Quantum Center**, Moscow

## Education

- 2022 – ... 📌 Doctoral student at **Ecole Polytechnique**, Hadamard Doctoral School of Mathematics
- 2020 – 2022 📌 PhD student at **Skoltech**, Center for Artificial Intelligence Technology
- 2018 – 2020 📌 **M.Sc.** in Physics, **Skoltech** + **MIPT**, Center for Photonics and quantum materials + Department of General and Applied Physics
- 2013 – 2018 📌 **BSc.** in Physics, **MIPT**, Department of General and Applied Physics

## Machine Learning

### Publications





- ICLR 📌 **M. Velikanov**, D. Kuznedelev and D Yarotsky, “A view of mini-batch SGD via generating functions: conditions of convergence, phase transitions, benefit from negative momenta”, 2023, 🔗 [arXiv:2206.11124](https://arxiv.org/abs/2206.11124)
- NeurIPS 📌 **M. Velikanov** and D Yarotsky, “Explicit loss asymptotics in the gradient descent training of neural networks”, 2021, 🔗 [arXiv:2105.00507](https://arxiv.org/abs/2105.00507)
- AISTATS 📌 **M. Velikanov**, R. Kail, I. Anokhin, R. Vashurin, M. Panov, A. Zaytsev, D. Yarotsky, “Embedded Ensembles: Infinite Width Limit and Operating Regimes”, 2022, 🔗 [arXiv:2202.12297](https://arxiv.org/abs/2202.12297)
- arXiv 📌 **M. Velikanov** and D Yarotsky, “Convergence Rate Bounds for Optimization Under Power Law Spectral Conditions”, 2022, 🔗 [arXiv:2202.00992](https://arxiv.org/abs/2202.00992)

### Invited Talks



- December 2022 📌 ML workshop at **Huawei**. Title: *Spectral approach to mini-batch SGD*.
- February 2022 📌 joint **Max Planck Institute** + **University of California** seminar “Mathematical Machine learning”, 🔗 <https://www.mis.mpg.de/montufar/seminars/>  
Title: *Spectral properties of wide neural networks and their implications to the convergence speed of different Gradient Descent algorithms*.
- December 2021 📌 **Chebyshev Laboratory** seminar “Industrial Mathematics”, Saint-Petersburg, 🔗 <https://sites.google.com/view/industrial-math-seminar/>  
Title: *Infinitely wide neural networks*.
- October 2021 📌 **SAMPLE** conference, Gelendzhik, 🔗 <https://cs.hse.ru/hdilab/sample/>  
Title: *Explicit loss asymptotics in the GD training of neural networks*.

# Quantum Physics








## Publications

- NJP  **M. Velikanov**, A. N. Rubtsov, B. Krippa, “Proton fraction in neutron star matter: dynamical mean-field approach”, **2021**,  doi:10.1088/1367-2630/abe481
- Phys. Rev. B  V. Kuznetsov, L. Kulik, **M. Velikanov**, A. Zhuravlev, A. Gorbunov, S. Schmult, I. Kukushkin, “Three-particle electron-hole complexes in two-dimensional electron systems”, **2018**,  doi:10.1103/PhysRevB.98.205303

## Conferences



- ICQT 2019  Poster “Mapping of neutron matter on correlated lattice fermions”  
 <https://conference2019.rqc.ru/>

## Awards and Achievements


- 2022  Ilya Segalovich Award for young researchers,  <https://yandex.com/scholarships/>
- 2013  Gold medal at the International Physics Olympiad, Copenhagen Denmark,  
 <http://www.ipho2013.dk/ipho2013-results-gold>
- 2019  Silver medal in mathematics at all-Russian olympiad “I-Profi”, season 2.
- 2019  Silver medal in physics at all-Russian olympiad “I-Prof”, season 2.
- 2014 – 2016  Abramov Scholarship (top ~ 15% DGAP students).

## Work Experience




### Skoltech

- 2020  Joint Huawei – Skoltech project: CNN Expressiveness.
- 2020 – 2021  Constructing math exam problems for Skoltech MS admission campaign.

### Russian Quantum Center

- 2017 – 2020  Modeling of strongly-correlated quantum systems.
- 2019 – 2020  Developing of information post-processing methods for quantum cryptography.

### Teaching

- 2020, 2021  Teaching assistant at Skoltech course *Theoretical Methods of Deep Learning*.
- 2013 – 2015  Teaching school students at physics olympiads summer schools.
- 2015  Jury member at International Experimental Physics Olympiad, Sochi.