

# Vsevolod Orekhov, Ph.D.



## Summary

Who I am ■ Ph.D. in Astroparticle physics with a focus on neutrino physics, data analysis, data visualization, development of analysis tools with C++ and Python, simulations, and model development.

## Professional experience and research work




- 2018 – 2024 ■ **Ph.D. at JGU Mainz.**  
– Development of data analysis tools. Simulations and data analysis of supernova neutrino signals using C++ and Python.  
– Development of the high-quality models to describe neutrino spectra behaviour. Accurate predictions and estimation of the astrophysical parameters of the supernova. Visualizing and presenting the results.
- 2013 – 2018 ■ **Research engineer at the NRC Kurchatov Institute.**  
– Work on  $^8\text{B}$  solar neutrino analysis within Borexino collaboration.  
– Development of a new algorithm for vessel shape reconstruction of the Borexino detector. Optimization of this method using Monte Carlo simulation data. Implementation of the algorithm.  
– Analysis of Monte Carlo data for an external calibration campaign for Borexino detector.
- 2013 – 2015 ■ **Working on the master's thesis.**  
– Borexino detector data analysis. Searching for the proton decay with Borexino.  
– Development of the energy reconstruction algorithm and implementation in the FADC software. Analysis of real and Monte Carlo data.

## Skills

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| IT-Skills               | <span style="color: red;">■</span> Data analysis of large data sets with C++ and Python, simulations, model development, and data visualization. Databases and SQL for data science with Python. |
| Programming languages   | <span style="color: red;">■</span> C/C++, Python, SQL, Fortran, LabView, $\text{\LaTeX}$ .   |
| Data analysis framework | <span style="color: red;">■</span> Jupiter Notebook, MySQL, ROOT, geant4, MS Excel.  |
| Physics Software        | <span style="color: red;">■</span> SNOWGLOBES, Pythia, MadGraph 5, Comphep, Calchep, Herwig.   |
| Cloud Data banks        | <span style="color: red;">■</span> IBM DB2.  |
| OS                      | <span style="color: red;">■</span> Linux, Windows, macOS.  |
| Misc.                   | <span style="color: red;">■</span> Academic research, teaching, development work.  |
| Soft Skills             | <span style="color: red;">■</span> Curiosity and thirst for knowledge, patience, analytical skills, openness to new things, ability to work in a team, ability to accept criticism.              |





## Education

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- 2018 – 2024     **Ph.D., JGU Mainz .**  
Thesis: *Development of comprehensive analysis tools for Supernova neutrino detection in multiple experiments.*
- 2015– 2016     **Studies in Gran Sasso Science Institute**
- 2009 – 2015     **B.Sc + M.Sc. National Research Nuclear University MEPhI. Faculty of theoretical and experimental physics, Department of particle physics.** Thesis: *Development of new approaches to the search for proton decay via the channel  $p \rightarrow K + \nu$  in the Borexino experiment.*



## Languages

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- Russian     Mothertongue
- Englisch     Fluent (C1)
- Deutsch     Fluent (C1)
- Italienisch     Advanced (B2-C1)


## Interests and hobbies

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- Professional interests     Data analysis, programming, simulations, particle physics, neutrino physics, cosmology.
- Other     Traveling, dancing, playing chess, learning languages.

## Additional commitment

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-  – "Data Analysis with Python", March-April 2025, Coursera
- "Databases and SQL for Data Science with Python", January-February 2025, Coursera
- "Latin Dance Education" - die private Tanzlehrer Ausbildung in "Ritmovida" Tanzschule in Mainz, Oktober 2023 - September 2024
- School for Astroparticle physics (5-13 October, 2022, Obertrubach-Bärnfels)
- ISAPP Valencia, Neutrino Physics, Astrophysics and Cosmology (July 21-30th, 2021)
- INFN SoUP 2021, School on Underground physics (June 28 - July 2, 2021)
- Workshop: SN neutrinos at the crossroads: astrophysics, oscillations, and detection (13 May 2019 - Friday, 17 May 2019, Trento)
- Borexino general meetings (2015-2019)