

# Curriculum vitae

## Vitaly GORELOV

*Researcher at CNRS*

*Condensed matter physics*

Laboratoire des Solides Irradiés (LSI)

Ecole polytechnique, Route de Saclay,

91128 Palaiseau cedex - France

vitaly.gorelov@polytechnique.edu

+33(0)7 69 43 77 63

<https://etsf.polytechnique.fr/people/vitaly>

<https://www.researchgate.net/profile/Vitaly-Gorelov>

- 10/2023 – now **CNRS Researcher** (Section 9) Laboratoire des Solides Irradiés, École Polytechnique, Palaiseau (France)
- 10/2020 – 10/2023 **Postdoctoral researcher** Laboratoire des Solides Irradiés, École Polytechnique, Palaiseau (France)  
Financed by the partnership EDF - Ecole Polytechnique "Chaire Energies Durables"
- 10/2017 – 09/2020 **PhD in physics** Université Paris-Saclay, Orsay, Maison de la Simulation CEA-Saclay, (France)  
Thesis: Quantum Monte Carlo methods for electronic structure calculations : application to hydrogen at extreme conditions  
Directors: Carlo PIERLEONI et Daniel BORGIS
- 09/2015 – 07/2017 **Master Erasmus Mundus** AtoSiM computational Physics, ENS de Lyon, University La Sapienza, University of Amsterdam
- 09/2010 – 06/2014 **Bachelor in Physics** Novosibirsk State University, Novosibirsk (Russie)

### Other professional activities

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- 2024 – now, Member of the Steering committee of the European Theoretical Spectroscopy Facility (ETSF)
- Referee: npj Computational Materials, SciPost Physics, The European Physical Journal B
- Referee for US Department of Energy
- Responsible for seminars in the laboratory

### Grants

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- 2024 – now Project MINOTAURE PEPR TASE, member
- 2020 – 2023 Bourse postdoctorale EDF - École Polytechnique
- 2017 – 2020 Bourse de thèse CEA - ANR
- 2015 – 2017 Erasmus Mundus AtoSiM Master grant (European Commission)

**Languages** :: English, French, Russian

## 1 Supervision of students

- Octobre 2024 – now Ilayda Ashgar, PhD student. Project: Efficient ab-initio calculations of dielectric properties in materials relevant to photovoltaics. (PEPR TASE)
- April 2024 – now Carlos Rodriguez Perez, PhD student + stage M2. Project: Quantum many-body effects in the design of materials for photovoltaics. (Energy4Climate center grant)

- April 2024 – now Jean Goossaert, PhD student + stage M2. Project: Energy levels and band offsets at interfaces from first-principles. (PEPR TASE, co-direction between the LSI and the Institut de Chimie de Rennes.)
- 2022 – 2024 Muhammed Güneş, École Polytechnique, France, PhD - track (phase M1 and M2). Project: Re-using model results to determine materials properties: connector theory approach (co-direction with Matteo Gatti and Licua Reining)

## 2 Publications (from 2022)

1. M.H.Güneş, A. Aouina, V. Gorelov, M. Gatti, L. Reining, Designing explicit functionals for the charge density in terms of a potential. arXiv:2605.02492 (2026)
2. L. Lacombe, L. Reining, V. Gorelov, Electron charge dynamics and charge separation: A response theory approach. SciPost Phys. 20, 035 (2026)
3. W. Qi, S. Ponzoni, G. Huitric, V. Gorelov, et. al., About Carrier's Self-Trapping and Dynamical Rashba Splitting in the 2D Hybrid Perovskite (BA)<sub>2</sub>(MA)<sub>2</sub>Pb<sub>3</sub>I<sub>10</sub>. Small (2026): e11410
4. V. Gorelov, D.M. Ceperley, M. Holzmann, C. Pierleoni, Electronic excitation spectra of molecular hydrogen in Phase I from Quantum Monte Carlo and Many-Body perturbation methods. Physical Review B 109, L241111 (2024)
5. V. Gorelov, Y. Yang, M. Ruggeri, D.M. Ceperley, C. Pierleoni, M. Holzmann, Neutral band gap of carbon by quantum Monte Carlo methods. Condensed Matter Physics, 26, 3 (2023)
6. V. Gorelov, L. Reining, W. Lambrecht, and M. Gatti, Robustness of electronic screening effects in electron spectroscopies: example of V<sub>2</sub>O<sub>5</sub>. Physical Review B 107, 075101 (2023)
7. V. Gorelov, L. Reining, M. Feneberg, R. Goldhahn, A. Schleife, W. Lambrecht, and M. Gatti, Delocalization of dark and bright strongly bound excitons in flat-band materials and the optical properties of V<sub>2</sub>O<sub>5</sub>, npj Comput Mater 8, 94 (2022)

## 3 Communications (from 2022)

- **Invited contribution** HANAMI Materials Science from First Principles workshop, Paris 2025, "Computing Observables with Quantum Monte Carlo from Excitations to One-Body Reduced Density Matrices"
- **Oral contribution** GDR NBODY general meeting, Nancy 2025, "Computing the one-body reduced density matrix with Quantum Monte Carlo"
- **Oral contribution** ETSF Times Workshop, Belfast 2025 "Electron charge dynamics and charge separation: A response theory approach."
- **Oral contribution** APS March Meeting 2025, "Electron charge dynamics and charge separation: A response theory approach."
- **Invited contribution** Institut national de l'énergie solaire (INES), Juin 2024. "Effets quantiques de plusieurs corps dans la conception de matériaux pour la photovoltaïque"
- **Invited contribution** 5th international workshop on electron dynamics, Maison Internationale de la Recherche, CYU Neuville, March 2022, "Delocalization of dark and bright excitons in flat-band materials and the optical properties of V<sub>2</sub>O<sub>5</sub>"
- **Oral contribution** APS March Meeting 2022, "Delocalization of dark and bright excitons in flat-band materials and the optical properties of V<sub>2</sub>O<sub>5</sub>"