

# MARINA CUZMINSCHI

## RESEARCH INTERESTS

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Analytical modeling and numerical simulations in fields of continuous variables quantum information, quantum thermodynamics, electronic properties of nanostructures and advanced materials with applications in solar energy gathering, biosensors, quantum computing and quantum communication.

## WORK EXPERIENCE

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PERIOD	<b>October 2016 — Present</b>
EMPLOYER	<b>Theoretical Physics Department, Horia Hulubei National Institute of Physics and Nuclear Engineering</b> Magurele, Romania
JOB TITLE	<b>Scientific Research Assistant</b> Study of continuous variables quantum teleportation and quantum correlations; quantum szilard engine functionality, numerical simulations of Josephson junctions arrays.
PERIOD	<b>February 2021 — December 2023</b>
EMPLOYER	<b>Computational Physics and Information Technologies Department, Horia Hulubei National Institute of Physics and Nuclear Engineering</b> Magurele, Romania
JOB TITLE	<b>Scientific Research Assistant</b> Ab initio and molecular dynamics simulations for perovskite solar cell design.

## EDUCATION

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	<b>University of Bucharest</b> Bucharest, Romania
PERIOD	<b>October 2020 — present</b>
DEGREE	<b>Phd in Physics</b>
RESEARCH AREA	Continuous variables quantum information and quantum thermodynamics
PERIOD	<b>October 2018 — June 2020</b>
DEGREE	<b>Master in Physics</b>
SECTION	Theoretical and Computational Physics
RESEARCH AREA	Continuous variables quantum teleportation and quantum correlations
PERIOD	<b>October 2015 — June 2018</b>
DEGREE	<b>Bachelor in Physics</b>
SECTION	Physics and informatics
RESEARCH AREA	Electronic properties of Josephson junctions arrays; Continuous fluid dynamics with applications in solar air heater design

## COMPUTER SKILLS

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<b>Programming</b>	Fortran, C++, Python
<b>Mathematical programs</b>	Wolfram Mathematica
<b>Operating System</b>	Debian/Ubuntu Linux
<b>Fluid dynamics simulations</b>	Open FOAM, FLASH
<b>Ab initio</b>	Siesta
<b>Experimental data analysis</b>	Fytik (Raman, FTIR)
<b>Molecular dynamics</b>	Orca
<b>Data visualization</b>	GNUPlot, ParaView, Origin
<b>Office</b>	LaTeX, LibreOffice/Microsoft-Office

## LANGUAGES

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<b>Romanian</b>	Native speaker
<b>Russian</b>	Native speaker
<b>English</b>	Fluent Speaker

## PROJECTS

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**Perla**  
**Romania-JINR collaboration**  
**PN (Core project)**

## ARTICLES AND BOOKS

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### Quantum information theory

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| <b>AUTHORS</b> | A. Zubarev, <b>M. Cuzminschi</b> , A. Isar   |
| <b>TITLE</b>   | Continuous variable quantum teleportation of a thermal state in a thermal environment<br>Results in Physics <b>39</b> ,105700 (2022)         |
| <b>AUTHORS</b> | <b>M. Cuzminschi</b> , A. Isar   |
| <b>TITLE</b>   | Quantum steering of two bosonic modes in the two reservoir model.<br>Romanian Reports in Physics <b>73</b> , 110 (2021)                      |
| <b>AUTHORS</b> | <b>M. Cuzminschi</b> , A. Zubarev, A. Isar   |
| <b>TITLE</b>   | Dynamics of the fidelity of teleportation in a Gaussian noisy channel.<br>Romanian Journal of Physics <b>65</b> , 118 (2020)                 |
| <b>AUTHORS</b> | <b>M. Cuzminschi</b> , A. Isar   |
| <b>TITLE</b>   | Quantum entanglement and quantum steering of two bosonic modes in noisy environments.<br>Romanian Journal of Physics <b>66</b> , 112 (2021)  |
| <b>AUTHORS</b> | <b>M. Cuzminschi</b> , A. Zubarev, A. Isar   |
| <b>TITLE</b>   | Quantum Fidelity of Two-Mode Gaussian States in a Thermal Reservoir.<br>Proceedings of the Romanian Academy, Series A <b>20</b> , 251 (2019) |

AUTHORS A. Zubarev, **M. Cuzminschi**, A. Isar  
TITLE Optimal Fidelity of Teleportation Using Two-Mode Gaussian States in a Thermal Bath as a Resource.  
Romanian Journal of Physics **64**, 108 (2019)

#### Quantum thermodynamics

AUTHORS **M. Cuzminschi**, A. Zubarev, S.M. Iordache, A. Isar  
TITLE Influence of the seed of measurement on the work extracted in a quantum Szilard engine  
iScience **26**, 108563 (2023)

AUTHORS **M. Cuzminschi**, A. Zubarev, A. Isar  
TITLE Extractable quantum work from a two-mode Gaussian state in a noisy channel.  
Scientific reports **11**, 1-10 (2021)

#### Solar energy

AUTHORS **M. Cuzminschi**, R. Gherasim, V. Girleanu, A. Zubarev, I. Stamatina  
TITLE Innovative thermo-solar air heater  
Energy and Buildings **158**, 964 (2018)

AUTHORS T.L.Mitran, et al.  
TITLE "Ab initio studies on perovskites."  
Elsevier, (book) 153-185 (2023)

#### Biosensors

AUTHORS A. Zubarev, **M. Cuzminschi**, A.M. Iordache, S.M. Iordache, C. Rizea, C.E. Grigorescu, and C. Giuglea  
TITLE Graphene-Based Sensor for the Detection of Cortisol for Stress Level Monitoring and Diagnostics.  
Diagnostics **12**, 2593 (2022)

#### Josephson junctions

AUTHORS **M. Cuzminschi**, A. Zubarev  
TITLE Charging of Superconducting Layers in Arrays of Coupled Josephson Junctions for Overcritical Currents.  
Crystals Volume **9**, 327 (2019)

AUTHORS **M. Cuzminschi**, A. Zubarev  
TITLE Chaotic behavior of a stack of intrinsic Josephson junctions at the transition to branching for overcritical currents.  
Chinese Journal of Physics **71**, 634 (2021)

#### Plasma Laser Interaction

AUTHORS J. F. Ong, A. Zubarev, A.C. Berceanu, **M. Cuzminschi**, O. Tesileanu, O.  
TITLE Nanowire implosion under laser amplified spontaneous emission pedestal irradiation.  
Scientific Reports **13**, 20699 (2023)