Deniz Adigüzel

A second semester physics-Master student at University of Heidelberg, currently on an Erasmus exchange in University of Copenhagen (KU), interested in Quantum Optics, X-ray Quantum Dynamics, Mathematical Physics

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—— Last revised on 25.02.2025

EDUCATION

University of Copenhagen Copenhagen, Denmark
M.Sc. in Physics 2024 – Present

- Relevant coursework: Scientific Computing, Condensed Matter Theory, Experimental X-ray Physics, Quantum Field Theory.

University of Heidelberg Heidelberg, Germany
M.Sc. in Physics 2024 – Present

- Currently studying in Copenhagen as part of an Erasmus exchange program.
- Participant in the EFEQT network under the DigiQ program, a complementary master's program in quantum technologies.
- Relevant coursework: Theoretical Quantum Optics, Advanced Quantum Theory.

University of Heidelberg Heidelberg, Germany
BSc in physics 2020 - 2024

- Grade: 2.2
- BSc Thesis: Effects of non-linear excitation on the propagation of light through ensembles of nuclear two-level systems [1], Thesis Grade: 1.1
- Courses: Theoretical physics 1-4, Experimental physics 1-5, Linear Algebra 1 and 2, Analysis 1,2 and 3 (Measure theory), Introduction to Quantum science and technology, Methods of matematical physics 1, Nonlinear dynamics and pattern formation, Ordinary differential equations, Lab Courses (+40 Experiments) with protocols

Deutsche Schule Istanbul Istanbul, Turkey
High school 2015 - 2020

- Specialization in physics, mathematics and biology
- graduated with german highschool certificate (Abitur) with grade: 2,2

SKILLS

Python · Latex · Julia
Linux · MS Office

English · proficient
German · proficient
Turkish · native
Spanish · beginner

ACHIEVEMENTS

2019 Augmented Mechanics Course at Kadir Has University by Prof Nihat Berker

Thüringen physics olympiade

GRANTS

2024 WE-Heraeus-Förderprogramm for participation in SAMOP24
2024 Heidelberg University for participation in summer school "quantum information and many body dynamics"
2024 Erasmus Exchange to Uni of Copenhagen

INTERNSHIPS

Niels Bohr Institute Copenhagen, Denmark
Research Internship 01.09.2024 - 26.01.2025

- Grade: 1.0
- Internship Title: *Analyzing Properties in Microwave-Resonator Integrated Quantum Photonics*
- Conducted experimental research on the impact of microwave resonators on photonic circuits, focusing on propagation loss and the Franz-Keldysh effect.
- Gained hands-on experience in laboratory settings, including the design and assembling of optical circuits.

Max Planck Institute Heidelberg, Germany
Bachelor Internship 09.10.2023 - 01.02.2024

- Internship Title: *Numerical Approach to X-ray Propagation through Mössbauer Nuclei for Applications in X-ray Quantum Optics*
- Conducted research on quantum dynamics in the X-ray regime under the supervision of Prof. Jörg Evers.
- Solved the optical Maxwell-Bloch equations to model light propagation through Mössbauer nuclei.
- Utilized the Method of Lines to numerically solve the Maxwell-Bloch PDEs and performed analytical calculations to complement the numerical models.

Lima Industrial Computer Istanbul Turkey
Electronics Internship 2019 (6 weeks)

Compass Kreuzfahrten Bonn, Germany
Student Intern 2017 (3 weeks)

Talks and Posters

Max Planck theory division seminar Heidelberg, Germany
18.06.2024

- Given Talk with the title "Effects of non-linear excitation on the propagation of light through nuclear ensembles". Introduced results which are obtained from my bachelors thesis

Bachelor Seminar Talk Heidelberg, Germany
26.05.2023

- Given Talk with the title "Moderne Detektoren für den Nachweis von Neutronen", Modern Detectors for the detection of Neutrons. Theoretical Background from [3]. Concepts and methods are introduced, such as CRSN (Cosmis Ray Neutron Scattering)[5] and Neutron Tomography[4].

OTHER INTERESTS

MUSIC	Playing Double Bass at University Orchester
SPORT	Running

DPG Poster Session Freiburg, Germany
12.03.2024

- Poster Presentation[2], about the results and methods gained from the Internship at the Max Planck Institute.

Conferences and Events

Quantum Ideas Factory Jena, Germany
Conference Participation 20-23.02.2025

- Participated in the Quantum Ideas Factory, a conference under the DigiQ program.
- Worked on the challenge: *Pulse Shaping and Optimal Control for Quantum Sensors Based on Atom Interferometry*.
- Focused on analytical calculations for a two-level system driven by a laser field.
- Derived the wave function of a two-level system in a three-pulse atom interferometry setup.

Quantum Information and Quantum Many-Body Theory summer school Copenhagen, Denmark
24-28.06.2024

- Participated in a summer school about quantum many body theory and quantum information, given talks in diverse fields, such as quantum encryption protocols, hermitian/non-hermitian dissipative systems, mathematical physics...

ETH Quantum Hackathon Zürich, Switzerland
3-5.05.2024

- worked on Qilimanjaro's challenge about adiabatic quantum computing and generating a cost hamiltonian for the Process management Problem.

DPG SAMOP 2024 Freiburg, Germany
10-15.03.2024

- Participation in German Physical Society (DPG) Conference in Freiburg about Atomic, Molecular and Optical physics.

37th Chaos Communication Congress (CCC) Hamburg, Germany
27-30.12.2023

- organized by the chaos computer club. Diverse topics such as data protection, politics, science etc.

References

[1] D. Adigüzel. Effects of non-linear excitation on the propagation of light through ensembles of nuclear two-level systems, 2024. **Avail-**

able at: https://pure.mpg.de/rest/items/item35942851/component/file3594286/content,.

[2] D. Adigüzel. Effects of phase scrambling and non-linear excitation on the propagation of light through ensembles of two-level systems. 2024. **Available at:** https://drive.google.com/file/d/1Tcbv3jyAIYrx8PIGWjHfiducRm9chMn/view?usp=sharing, **dpg contribution page:** https://www.dpg-verhandlungen.de/year/2024/conference/freiburg/part/q/session/23/contribution/47?lang=en.

[3] M. O. Klein. *Experimente zur Quantenmechanik mit ultrakalten Neutronen und Entwicklung eines neuen Detektors zum ortsaufgelösten Nachweis von thermischen Neutronen auf großen Flächen*. PhD thesis, 2000.

[4] C. Tötzke, N. Kardjilov, N. Lenoir, I. Manke, S. E. Oswald, and A. Tengattini. What comes NeXT? - high-speed neutron tomography at ILL. *Opt. Express*, 27(20):28640–28648, Sept. 2019.

[5] J. Weimar, M. Köhli, C. Budach, and U. Schmidt. Large-scale boron-lined neutron detection systems as a 3he alternative for cosmic ray neutron sensing. *Front. Water*, 2, Sept. 2020.