Postdoctoral Researcher in optomechanics with light-matter Bose-Einstein condensates (BECs)
Aalto University

Job Title	Postdoctoral Researcher in optomechanics with light-matter Bose-Einstein condensates (BECs)
Department	T304 Dept. Applied Physics
Institution	Aalto University , , Finland
Date Posted	Jun. 12, 2025
Application Deadline	Open until filled
Position Start Date	Available immediately
Job Categories	Graduate Student
Academic Field(s)	Physics - General
Job Website	https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Postdoctoral-Researcher-in-optomechanics-with-light-matter-Bose-Einstein-condensates--BECs-_R43518-4
Apply By Email	

Job Description

Aalto University is where science and art meet technology and business. We shape a sustainable future by making research breakthroughs in and across our disciplines, sparking the game changers of tomorrow and creating novel solutions to major global challenges. Our community is made up of 13 000 students, 400 professors and close to 4 500 other faculty and staff working on our dynamic campus in Espoo, Greater Helsinki, Finland. Diversity is part of who we are, and we actively work to ensure our community’s diversity and inclusiveness. This is why we warmly encourage qualified candidates from all backgrounds to join our community.

At the Department of Applied Physics, our pioneering research in physical sciences creates important industrial applications that hold great technological potential. Our research focuses on Materials

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physics, Quantum technology, Soft & living matter, and Advanced energy solutions. Topics extend from fundamental research to important applications. We educate future generations of research and development professionals, data specialists, technology experts, inventors, and scientists for industry and society.

The [url=https://www.aalto.fi/en/department-of-applied-physics/macroscopic-quantum-optics-mqo]Macroscopic Quantum Optics (MQO) Group at Aalto University invites applications for an experimental postdoctoral position in optomechanics with light-matter Bose-Einstein condensates (BECs).

Postdoctoral Researcher

Research focus:
We explore a novel regime of cavity quantum optomechanics that combines strong light-matter coupling with strong exciton-phonon interactions in a single system. The tri-partite exciton-phonon-photon interactions within a single high-Q cavity structure enable a mechanism for the controlled Bose-Einstein condensation at room temperature, with applications in all-optical computing [url=https://doi.org/10.1038/s41566-019-0392-8]Nature Photonics 13 378 (2019) and quantum sensing [url=https://doi.org/10.1038/s41586-021-03866-9]Nature 597, 493 (2021). We are building a new experiment in the optics lab to probe vibrational degrees of freedom within light-matter BEC and explore new optomechanical means for the parametric control over both the density and phase of the BEC. The experiment aims to pioneer in vibrational and phonon BEC [url=https://doi.org/10.1103/PhysRevLett.133.186903]Phys. Rev. Lett. 133, 186903 (2024) and establish a groundwork for the control methods over light-matter BEC in a telecom range [url=https://doi.org/10.1103/PhysRevB.110.134321]Phys. Rev. B 110, 134321 (2024)

Your role and goals
The successful candidate is expected to lead the experimental effort with a team of PhD and master’s students and collaborate closely with theorists in the group. They will collaborate with our academic and industry partners worldwide and will have the chance to contribute to other relevant projects beyond fundamental research, e.g., [url=https://www.vaikuttavuussaatio.fi/en/funded-projects/tandem-industry-academia-tia-seed-2024/]optical computing with BECs. They expected to lead preparation of research manuscripts for publications in top-tier journals, coordinate submissions, and taking the role of corresponding author. Besides the expertise in experimental quantum optics, the candidate will acquire excellent training in grant writing and research leadership provided by Aalto University and at the MQO group level by contributing to research management and funding applications within the team.

Your experience and ambitions * PhD in one of the following broader experimental areas: quantum

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optics, AMO physics, advanced laser spectroscopy and interferometry, including ultra-fast methods * Strong hands-on skills in experimental research (optics lab), including automation of data acquisition and data analysis * Proven track record of research publications in your field * Excellent communication skills (fluency in English) and strong collaboration abilities * Finnish language is not required * Highly motivated to conduct fundamental research * Alignment with [url=https://www.aalto.fi/en/our-strategy/our-purpose-values-and-way-of-working]our core values

What we offer
The MQO group is young but yet very ambitious research team exploring quantum phenomena in large scale and complex systems, from high-temperature Bose-Einstein condensates to trapped solid-state particles in ultra-high vacuum. We combine advanced quantum optics methods in both discrete and continuous variables with cutting-edge solid-state systems aimed at pushing the limits of fundamental research and applications such as optical computing and quantum sensing.
We are part of Finland’s major national quantum initiatives, including the [url=https://instituteq.fi/]InstituteQ and the [url=https://instituteq.fi/fqf/]Finnish Quantum Flagship (FQF), and benefit from access to world-class experimental infrastructure at Aalto’s Otaniemi campus - home to [url=https://www.aalto.fi/en/otanano]OtaNano, the largest cleanroom facility in the Nordics.

The position is full-time and initially funded for 2 years, with the possibility of extension. The starting salary is approximately 4130-4550?€/month, depending on experience, and includes occupational healthcare, research travel, and relocation support.

We value a healthy work-life balance and actively support personal and professional development. You will have opportunities to collaborate with leading academic and industry partners (IBM, Microsoft, the Vienna Center for Quantum Science and Technology etc) and contribute to exciting national and international research initiatives in quantum science and technology.

Join us!
Please submit your application including the attachments mentioned below as one single PDF document in English through our online recruitment system by using the link on Aalto University’s web page (click the "Apply Now” button).

(1) Letter of motivation
(2) CV including list of publications
(3) Contact details of at least two referees

Please note: Aalto University’s employees should apply for the position via our internal HR system Workday (Internal Jobs) by using their existing Workday user account (not via the external webpage for

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open positions). If you are a student or visitor at Aalto University, please apply with your personal email address (not aalto.fi) via [url=https://www.aalto.fi/en/careers-at-aalto]Aalto University open positions

The deadline for applications is June 30, 2025. We will go through applications, and we may invite suitable candidates to interview already during the application period. The positions will be filled as soon as suitable candidates are identified.

For additional information, contact Prof. Anton Zasedatelev, [url=mailto:anton.zasedatelev@aalto.fi]anton.zasedatelev@aalto.fi.

Aalto University reserves the right for justified reasons to leave the position open, to extend the application period, reopen the application process, and to consider candidates who have not submitted applications during the application period.

Want to know more about us and your future colleagues? You can watch these videos: [url=https://www.youtube.com/watch?v=i8zawpNMVG8]This is Aalto University! [url=https://www.youtube.com/watch?v=5k_og_6zUJQ]Aalto University - Towards a better world and [url=https://www.youtube.com/watch?v=ZK6pDWm1_CE]Shaping a Sustainable Future.

Read more about working at Aalto: [url=https://www.aalto.fi/en/careers-at-aalto]https://www.aalto.fi/en/careers-at-aalto
Check out our new virtual campus experience: [url=https://virtualtour.aalto.fi/]https://virtualtour.aalto.fi

About Finland
Finland is a great place for living with or without family - it is a safe, politically stable and well-organized Nordic society. Finland is consistently ranked high in quality of life and was listed again as the happiest country in the world: [url=https://worldhappiness.report/news/world-happiness-report-2025-people-are-much-kinder-than-we-expect-research-shows/]World Happiness Report 2025
For more information about living in Finland: [url=https://www.aalto.fi/en/careers-at-aalto/for-international-staff]Aalto Careers for International Staff.

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact

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Finland