24 November 2021: Online Lab Tour RIKEN Center for Quantum Computing

Invitation for Netherlands Audience, part of bilateral relation building for Quantum-Photonics-Nano
Please forward to relevant NL contacts

October 2021

Dear Sir / Madam

The rapid digital transition requires radical high-tech solutions to keep the global social systems running in terms of security, sustainability, economy, health and others. Important parts of these solutions lie in the area of quantum technology, photonics and nanotechnology. The Netherlands and Japan are forefront runners, both in terms of contents and in terms of industry-academia collaboration.

As follow-up of the Netherlands-Japan Launch Event on Quantum-Photonics-Nano that we organized last July 8, RIKEN kindly offers an **Online Lab Tour on November 24** to the new RIKEN Center for Quantum Computing (RQC). The Tour enables Dutch professionals on quantum, photonics and nanotechnology to deepen the understanding of areas and research at RQC, its international agenda and interest in relations with the Netherlands. Speakers include Dr. Yasunobu Nakamura, Dr. Erika Kawakami, Dr. Seiji Yunoki and Dr. Seigo Tarucha, leading researchers of the institute. The session will be opened by Prof. Ronald Hanson Chairman of the Supervisory Board of Quantum Delta NL, who will shortly introduce the relevance of quantum (computing) and NL-JP collaboration in this field.

The event is part of a series of bilateral events, with the purpose to deepen mutual understanding of strengths and ambitions in The Netherlands and Japan in the fields of Quantum-Photonics-Nanotechnology. Both countries have ambitions to strengthen their relations in these fields. To address the crossovers, we invite professionals from these three areas to all the events. The series of events paves the way to a (hopefully) physical Innovation Mission in 2022.

Series of bilateral online events

	Date	Topic	Presenter	Audience[1]
	16-19 Nov '21	Photonics	NTT IOWN Forum	Netherlands[2]
☑	**24 Nov '21**	Quantum	RIKEN	Netherlands
	25 Nov '21	Nano-photonics	- Photon Delta NL - PIB nano	Japan
	11 Jan '22	Quantum	Keio University	Netherlands
	Q1 '22	Quantum-Photonics	SIP Quantum-Photonics	Netherlands
	Q1 '22	Quantum	Quantum Delta NL	Japan
	Q1 '22	Optics	Dutch Optics Center	Japan
	Q3 '22 plan Physical Mission to Japan on Quantum-Photonics-Nano			

[1] Target audience for all events: professionals in field of Quantum-Photonics-Nano of the indicated country. [2] The IOWN Forum is open to other countries.

- Title: Online Lab Tour RIKEN Center for Quantum Computing
- Date/time: **Wednesday 24 November 2021**, 9:00-10:45NL / 17:00-18:45JP
- Venue: Webinar (link follows registration)
- Organizer: Netherlands Embassy in Tokyo in cooperation with RIKEN and NL Enterprise Agency (RVO)
- Agenda outline:
  - Opening by Embassy; Remarks by NL side
  - Introduction and Lab Tour by RIKEN
  - Q&A, discussion, looking ahead
- Target audience: Netherlands professionals from government, industry and knowledge institutes, working in cutting-edge forefront of quantum, photonics and nano
- Language: English
- Registration: Click this link to register. A few days before the event, we will send you a link to join online. If you cannot enter the link, contact below contact persons.
- Contact:
  - In Japan: Rob Stroeks, Netherlands Embassy, rob[@]hollandinnovation.jp, +81-(0)90-8642-3560
  - In the Netherlands: Tong Jiang, Netherlands Enterprise Agency RVO, Tong.Jiang[@]rvo.nl, +31-(0)6-1117-8711

Sincerely,

Eric van Kooij
Innovation Counsellor
Embassy of the Kingdom of the Netherlands

Concept Agenda

NL time / JP time

09:00 / 17:00 Opening by Moderators of the day
- Mr. Rob Stroeks, Senior Advisor Innovation, Netherlands Embassy in Tokyo
- Dr. Shinichi Yorozu, Deputy Director, RIKEN Center for Quantum Computing

09:05 / 17:05 Remarks by Netherlands side
- Prof. Ronald Hanson, Chairman of the Supervisory Board, Quantum Delta NL

09:10 / 17:10 Introduction of RQC and activity of Nakamura Lab by Dr. Yasunobu Nakamura
Superconducting Quantum Electronics Research Team

09:25 / 17:25 Introduction of activity of Kawakami Lab by Dr. Erika Kawakami
Floating-Electron-Based Quantum Information RIKEN Hakubi Research Team

09:40 / 17:40 Introduction of activity of Yunoki Lab by Dr. Seiji Yunoki
Quantum Computational Science Research Team

09:55 / 17:55 Introduction of activity of Tarucha Lab by Dr. Seigo Tarucha
Semiconductor Quantum Information Device Research Team

10:10 / 18:10 *Online lab-tour* (Nakamura Lab. and Tarucha Lab.)

10:30 / 18:30 Q&A and rap-up discussion

10:45 / 18:45 Closure

Opening remarks from Netherlands side

Prof. Ronald Hanson

Quantum Delta NL

Chairman of the Supervisory Board

Ronald Hanson (1976) is Distinguished Professor at Delft University of Technology and principal investigator at QuTech. He is one of the four founding professors of QuTech (2014), serving as its Scientific Director in 2016-2020. Ronald currently chairs the steering board of Quantum Delta NL, the foundation responsible for the National Agenda Quantum Technology.
Ronald's research centers on exploring and controlling quantum-entangled states with the long-term goal of exploiting these in future quantum technologies such as quantum computing and quantum internet. His work combines quantum optics, solid-state physics, nuclear magnetic resonance, quantum information theory and nanofabrication. In 2014 his group made headlines by teleporting quantum data between electrons on distant solid-state chips. In 2015 he ended a decades-long scientific quest by performing the first loo phole-free Bell test. In 2018 his group achieved the important milestone of generating quantum entanglement faster than it got lost. In the coming years he aims to build on these results to demonstrate the fundamentals of a future quantum internet, with a rudimentary network planned between several cities in the Netherlands. Ronald has received several awards for his work, among which the Nicholas Kurti European Science Prize (2012), the Huibregtsen Award for Excellence in Science and Society (2016) and the John Stewart Bell Prize (2017). In 2019 he received the Spinoza Prize, the highest scientific award in the Netherlands. He was elected as member of the Royal Holland Society of Sciences and Humanities (KHMW) and of the Dutch Royal Academy of Sciences (KNAW), and Fellow of the American Physical Society. In 2020 he was appointed as the university's 6th Distinguished Professor.

About Organization

Quantum Delta NL

Quantum Delta NL is the public-private partnership of tech companies, government agencies, and all major quantum research centers in the Netherlands. The mission of Quantum Delta NL is to further strengthen the thriving Dutch quantum ecosystem into the most relevant for Europe.

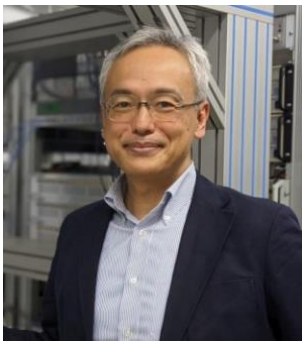
National Growth Fund awarded Quantum Delta NL €615 million

On 9 April 2021, the National Growth Fund awarded Quantum Delta NL with a €615 million euros investment for the further development of Quantum Technology. Incredible news for the entire Netherlands' quantum ecosystem! Through the National Growth Fund, the Dutch government invests €20 billion over the next five years, in 'projects that foster economic growth in the long term'.

Prof. Yasunobu Nakamura

RIKEN Center for Quantum Computing

Director



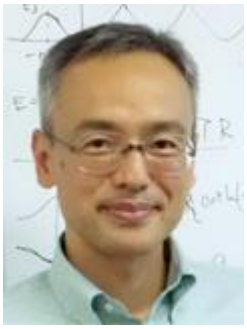
Yasu Nakamura started his research career in NEC Fundamental Research Laboratories in 1992, where he demonstrated the first coherent manipulation of a superconducting qubit in 1999 and met quantum information science. He spent a fruitful year as a Visiting Researcher in Prof. Hans Mooij's group in TU Delft from Sep 2001 to Aug 2002. Since 2012, he has been a Professor in Research Center for Advanced Science and Technology (RCAST) of the University of Tokyo. He has also been running his team in RIKEN since 2014. He is currently the Director of RQC as well as the Project Leader of the MEXT Q-LEAP Flagship project on Superconducting Quantum Computing.
His current research interests are quantum information processing using superconducting circuits, microwave quantum optics, and hybrid quantum systems. For his pioneering work on superconducting quantum electronics, he has received Sir Martin Wood Prize and Nishina Memorial Prize in 1999, Agilent Technologies Europhysics Prize in 2004, Simon Memorial Prize in 2008, Leo Esaki Prize in 2014, Japan Society of Applied Physics Outstanding Achievement Award in 2019, and Asahi Prize 2021. In 2020 he was elected as a Fellow of American Physical Society.

About Organization

RIKEN Center for Quantum Computing (RQC) was established in April 2021. It consists of 14 research teams, which explore the frontier of quantum technologies through the research and development of quantum computers as innovative information processing units based on the principles of quantum mechanics. RIKEN is also serving as the head quarter of Quantum Technology Innovation Hubs, which involves 8 research hubs on quantum technologies in Japan.

Presenters

Superconducting Quantum Electronics Research Team



Team Leader: Yasunobu Nakamura (Ph.D.)

Research Summary

We study quantum information physics and engineering in superconducting circuits. The targets of our research include quantum information processing and ultra-sensitive measurement based on quantum mechanical properties of the circuits. Superconducting quantum circuits offer excellent tools for the purposes thanks to their low dissipation and large nonlinearity.

Main Research Fields

- Inter disciplinary Science & Engineering

Related Research Fields

- Mathematical & Physical Sciences

Keywords

- Superconductivity
- Quantum mechanics
- Quantum optics
- Quantum information

Floating-Electron-Based Quantum Information RIKEN Hakubi Research Team

RIKEN Hakubi Team Leader: Erika Kawakami (Ph.D.)

Research Summary

Our team is working on the application of electrons floating on liquid helium to quantum information. This physical system has a high potential for providing an ideal platform on which to realize a quantum computer, due to the fact that it is free of impurities and defects. We are also working on the technological development required for large-scale quantum computation.

Main Research Fields

- Engineering

Related Research Fields

- Interdisciplinary Science & Engineering
- Mathematical & Physical Sciences
- Applied physics
- Nano/Micro science
- Electrical and electronic engineering

Keywords

- low-temperature physics
- quantum computer
- quantum bit
- two-dimensional electron system
- helium

Quantum Computational Science Research Team

Team Leader: Seiji Yunoki (D.Eng.)

Research Summary

Our main interest is to propose quantum-classical hybrid algorithms for simulating quantum many-body systems. We also analyze quantum dynamics of quantum computing based on quantum information. For these purposes, we develop quantum simulations for quantum computing using classical computers. We are also interested in quantum-classical hybrid systems for future high performance computing.

Main Research Fields

- Mathematical & Physical Sciences

Related Research Fields

- Informatics
- Interdisciplinary Science & Engineering
- Computational science
- Mathematical physics/Condensed matter physics
- High performance computing

Keywords

- Quantum many-body systems
- Quantum dynamics
- Quantum information physics
- Tensor network
- Quantum entanglement

Semiconductor Quantum Information Device Research Team

Team Leader: Seigo Tarucha (D.Eng.)

Research Summary

We perform research and development to apply semiconductor electron (or hole) spins to quantum computing. Study on semiconductor quantum computing has been motivated by advantages of compatibility with existing semiconductor device integration technology and capability of high-temperature (> 1 Kelvin) operation. We demonstrate that coherent manipulation of semiconductor spin qubits in semiconductor nanostructures and superconducting nano-scale junctions is useful as elemental technology of information processing and develop relevant quantum logic calculation methods, advanced quantum architectures, qubit devices that have compatibility with semiconductor device integration technology.

Main Research Fields

- Engineering

Related Research Fields

- Interdisciplinary Science & Engineering
- Mathematical & Physical Sciences
- Condensed matter physics I
- Nanostructural physics
- Computational science

Keywords

- Quantum computer
- Qubit
- Quantum dots
- Quantum devices
- Spin control