

Yuimaru Kubo

Ph.D., Research Scientist

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ResearcherID: I-6546-2013



Education

- March 2009 **Ph.D. in Engineering**, *Doctoral Program in Materials Science and Engineering, National Institute for Materials Science (NIMS) and University of Tsukuba, Japan.*
*Selected as an **honored Ph.D. student**.*
- March 2006 **M.Sc. in Engineering**, *Institute of Materials Science, University of Tsukuba, Japan.*
- March 2004 **B.Sc. in Engineering**, *College of Engineering Science, University of Tsukuba, Japan.*

Ph.D. Dissertation

- Title “*Macroscopic Quantum Phenomena in Intrinsic Josephson Junctions*”
- Supervisors Dr. Takahide YAMAGUCHI and Prof. Yoshihiko TAKANO
*Selected for an **excellent Ph.D. thesis prize**.*

Master Thesis

- Title “*Dynamics of Josephson Vortices in Mesoscopic $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ Single Crystals*”
- Supervisors Dr. Itsuhiro KAKEYA and Prof. Kazuo KADOWAKI

Research Experience

- May 2021–Present **Research Scientist**, *Science Technology Group, OIST, Japan*
“Quantum information technologies with impurity spins in gem crystals”
- Dec 2015–Apr 2021 **Group Leader**, *Quantum Dynamics Unit, OIST, Japan*
“Quantum transducer with impurity spins in diamond”
“Quantum technologies based on spins in gem crystals”
- July 2014–Dec 2015 **Research Engineer**, *Quantronics Group, SPEC (Department of Solid State Physics), CEA (Atomic Energy and Alternative Energies Commission) Saclay, France*
“Microwave Detection of a Single Spin with a Superconducting Resonator”
(Advised by Dr. Patrice BERTET and Prof. Daniel ESTEVE)
- 2012–July 2014 **JSPS Research Fellow**, *Quantronics Group, SPEC (Department of Solid State Physics), CEA (Atomic Energy and Alternative Energies Commission) Saclay, France*
“Hybrid Quantum Devices with Superconductors and Spins”
(Advised by Dr. Patrice BERTET and Prof. Daniel ESTEVE)
- 2009–2012 **Postdoctoral Researcher**, *Quantronics Group, SPEC, CEA Saclay, France*
“Hybrid Quantum Circuit with Superconducting Qubits and Spins”
(Advised by Dr. Patrice BERTET and Prof. Daniel ESTEVE)

- 2009 **Research Associate**, *Institute of Physics, University of Tsukuba, Japan*
 “Quantum Effects in Intrinsic Josephson Junction Stacks and Break Junctions”
 (Advised by Prof. Youiti OOTUKA)
- 2007–2009 **Ph.D. Researcher**, *Doctoral Program in Materials Science and Engineering, NIMS and University of Tsukuba, Japan*
 “Macroscopic Quantum Phenomena in Intrinsic Josephson Junction Stacks”
 (Advised by Dr. Takahide YAMAGUCHI and Prof. Yoshihiko TAKANO)
- 2004–2006 **Master Student**, *Institute of Materials Science, University of Tsukuba, Japan*
 “Study of Dynamical Josephson Vortex States in High-Tc Superconductor $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ ”
 (Advised by Dr. Itsuhiro KAKEYA and Prof. Kazuo KADOWAKI)
- 2003–2004 **Undergraduate Student**, *College of Engineering Science, University of Tsukuba, Japan*
 “Single Crystal Growth of High-Tc Superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10+\delta}$ ”
 (Advised by Prof. Kazuo KADOWAKI)

Research Interests

- Quantum information technologies
- Hybrid quantum systems
- Impurity spins in gem crystals
- Quantum state transfer among different quantum systems
- Cavity and circuit quantum electrodynamics
- Magnetic resonance
- Quantum optics

Research Skills

- Microwave engineering: Proficient in using vector network analyzers and spectrum analyzers, designing and assembling custom microwave circuits with various components (e.g., IQ mixers, couplers, circulators, amplifiers), and cable assembly in cryogenic environments.
- Optics: Experienced with confocal microscopy and optical cavities (Fabry-P'erot).
- EM analysis and simulations: Skilled in using SONNET, COMSOL, CST, and SPICE for electromagnetic analysis and simulations.
- Ultra low-noise DC transport measurements: Expertise in measuring the switching currents of Josephson junctions at sub-Kelvin temperatures.
- Nanofabrication: Proficient in optical lithography, electron beam lithography, metal evaporation and sputtering, focused ion beam etching, argon ion milling, reactive ion etching, and wet etching.
- Analog electronics: Experienced in assembling pre-amplifiers and current-ramp generators, and designing customized feedback circuits for measuring switching currents of Josephson junctions.
- Scientific software: Skilled in using Igor Pro, MATLAB, LabVIEW, Mathematica, AutoCAD, SolidWorks, and OriginPro.
- Cryogenic operations: Experienced with $^4\text{He}/^3\text{He}$ dilution refrigerators, ^4He or ^3He refrigerators, superconducting magnets, and PID temperature control systems.
- Single-crystal growth using an image furnace: Proficient in growing high-Tc cuprates (Bi-Sr-Ca-Cu-O and La-Sr-Ca-O) and transition metal oxides (e.g., TiO_2 , Al_2O_3).

Computer Skills

- Programming: Python, C++, Java Scripts
- Desktop Publishing: Adobe Illustrator, Adobe Photoshop, Adobe Flash
- Documentation: L^AT_EX, Microsoft Word
- General Software: Microsoft Office, Open Office, Apple iWorks

Grants, Fellowships, and Awards

- 2020 – 2026 **MoonShot R&D Program**, “Networking superconducting quantum computers”, by JST, 314 Million JPY
- 2023 – 2025 **Research Encouragement Grants**, “Ultra-low noise microwave amplifier for quantum technologies”, by the Asahi Glass Foundation, 3 Million JPY
- 2022 – 2023 **International Scientific Research Grant**, “Ultra-wideband spin resonance spectroscopy using Josephson junctions”, by the Heiwa-Nakajima Foundation, 4.6 Million JPY
- 2020 – 2024 **JSPS Bilateral Program (with Bar-Ilan University, Israel)**, “Spin-sensing using second harmonic driving”, by JSPS, 5 Million JPY
- 2020 – 2022 **The Science Research Promotion Fund**, “Spin-based ultra-low noise microwave amplifier at ultra-low temperature”, by The Promotion and Mutual Aid Corporation for Private Schools of Japan (PMAC), 6.7 Million JPY
- 2019 – 2022 **OIST Proof-Of-Concept, Phase ITR**, “Ultra-low noise microwave amplifier for quantum technologies”, by OIST TDIC, 24 Million JPY
- 2020 – 2021 **Basic Science Research Grant**, “Developing an optical cavity including a bulk diamond crystal for a quantum transducer”, by the Sumitomo Foundation, 2.2 Million JPY
- 2018 – 2021 **Grants-in-Aid for Scientific Research B (KAKENHI KIBAN-B)**, “Ultra-sensitive electron spin resonance based on superconducting quantum technologies”, by JSPS, 18 Million JPY
- 2018 – 2020 **Grant-in-Aid for Scientific Research on Innovative Areas (KAKENHI Shin-Gakujutsu) “Science of Hybrid Quantum Systems”**, “Three-dimensional hybrid quantum system with superconductors and diamonds”, by JSPS, 9 Million JPY
- 2018 – 2019 **Research Support for Young Scientists**, “Quantum information transducer with spins in diamond”, by The Nakajima Foundation, 2 Million JPY
- 2016 – 2019 **PRESTO (Precursory Research for Embryonic Science and Technology)**, “Coherent bidirectional conversion between optical-microwave photons with electron spins in solids”, by JST (Japan Science and Technology Agency), 43 Million JPY
- 2012 – 2014 **JSPS Research Fellowship**, “Building a Hybrid Quantum Circuit with Superconductors and Spins”, by JSPS (Japan Society for the Promotion of Science)
- July 2009 **Fuji-Television Award**, High-Technology Paper Awards by Fuji-Sankei Business i Group, Tokyo, Japan
- March 2009 **Ph.D. Thesis Award**, Graduate School of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Japan
- July 2008 **Best Presentation Award**, The 5th NIMS/MANA - IRC - UCLA/CNSI Nanotechnology Students’ Summer School, Tsukuba, Japan
<http://www.nims.go.jp/mana/news/2008/t363dl00000005xn.html>
- March 2007 **Best Poster Prize**, Poster session in the 4th FIMS International Symposium, Tsukuba, Japan

February 2007 **Best Presentation Award**, *The 3rd Young Power Symposium by "Promotion of Creative Interdisciplinary Materials Science for Novel Functions"*, Tsukuba, Japan

Supervision and Mentorship

- 2021–Present **Research Scientist**, *Science Technology Group, OIST, Japan*
Mentored and supervised five postdoctoral researchers (two in the past, three ongoing), three Ph.D. students (ongoing), and five internship students (three in the past and two ongoing).
- 2016–2021 **Group Leader**, *Quantum Dynamics Unit, OIST, Japan*
Mentored and supervised one postdoctoral researcher, one Ph.D. student, and five internship students.

Teaching Experience

- 2024 October **Colloquium for undergraduate students**, *University of the Ryukyus*
"Quantum information and technologies"
- 2023 **Intensive course**, *Hokkaido University*
September "Basics and applications of quantum information"
- 2022 **Intensive course**, *Hokkaido University*
September "Basics and applications of quantum information"
- 2021 **Online Course**, *Quantum Education for Future Technologies (QEd by Q-LEAP)*, (in Japanese)
"Hybrid Quantum Systems (with Quantum Defects)"
- 2021 **Online Course**, *Quantum Education for Future Technologies (QEd by Q-LEAP)*, (in Japanese)
"Quantum Defect Centers in Solids (II)"
- 2019 **Intensive course**, *Hokkaido University*
September "Basics and applications of quantum information"
- 2017 **Colloquium for undergraduate students**, *University of the Ryukyus*
November "Quantum information and technologies with hybrid systems"
- 2016 **Invited Lecture**, *Kyoto University*
November "Quantum information and technologies with hybrid systems"
- 2016 March **OIST Skill Pills**, *Okinawa Institute of Science and Technologies (OIST)*
"CAD with SOLIDWORKS"
- 2006–2007 **Teaching Assistant**, *College of Engineering Science, University of Tsukuba*
"Single crystal growth of oxides with an image furnace"
- 2005–2006 **Teaching Assistant**, *College of Engineering Science, University of Tsukuba*
"Logic circuit"
- 2004–2005 **Teaching Assistant**, *College of Engineering Science, University of Tsukuba*
"Fundamentals of C++ programming"
- 2004 **Personal Tutor**, *International Student Center, University of Tsukuba*
Mentor and tutor for newly-arrived international students

Academic Societies and Activities

Affiliations **The Physical Society of Japan, The Japan Society of Applied Physics, The American Physical Society**

Academic Activities **Quantum Information Technology Committee (QIT) Member. IEEE Electron Device Society, Quantum Technology Committee Member (Chair: Prof. Anthony Sigillito, Pennsylvania State University)**

Outreach Activities

- 2023/11 **OIST Science Festa, Demo: "Fluorescence from Diamond"**
- 2022/11 **OIST Science Festa, Online Lab Tour**
- 2021/11 **Podcast, Online**
"Bilingual News Special Edition"
- 2021/5 **New Technology Presentation, Online**
"Ultra-low Noise Spin Maser Amplifier for Quantum Technologies"
- 2017/11 **OIST Science Talks by Okinawan Scientists vol.3, Junkudo Naha Store, Naha, Okinawa**
"Quantum Technologies Essential for the AI Era"
- 2017/8 **Osaka University Cadet Program Interactive Exchange Meeting, Urban Shiga, Otsu, Shiga**
"Quantum Information and Technologies with Hybrid Systems"
- 2016/8 **Science Project for Ryukyu Girls Science Camp, Okinawa Institute of Science and Technology, Onna, Okinawa**
"Nano Fabrication"

Selected Publications

- ¹T. Hamamoto, A. Bhunia, R. K. Bhattacharya, H. Takahashi, and Y. Kubo, "Dielectric microwave resonator with large optical apertures for spin-based quantum devices", *Applied Physics Letters* **124**, 234001 (2024).
- ²Y. Kubo, "Hybrid quantum systems with spins in diamond crystals and superconducting circuits", in *Hybrid quantum systems*, edited by Y. Hirayama, K. Ishibashi, and K. Nemoto (Springer Singapore, Singapore, 2021), pp. 119–142.
- ³Y. Kubo, "Quantum limit of electron spin resonance", in (S&T Publishing, 2021).
- ⁴J. F. da Silva Barbosa, M. Lee, P. Campagne-Ibarcq, P. Jamonneau, Y. Kubo, S. Pezzagna, J. Meijer, T. Teraji, D. Vion, D. Esteve, R. W. Heeres, and P. Bertet, "Determining the position of a single spin relative to a metallic nanowire", *Journal of Applied Physics* **129**, 144301 (2021).
- ⁵Y. Kubo, *Spinning gems for quantum technologies*, (2020) <https://www.ingentaconnect.com/content/sil/impact/2020/00002020/00000001/art00018> (visited on 03/09/2020).
- ⁶J. R. Ball, Y. Yamashiro, H. Sumiya, S. Onoda, T. Ohshima, J. Isoya, D. Konstantinov, and Y. Kubo, "Loop-gap microwave resonator for hybrid quantum systems", *Applied Physics Letters* **112**, 204102 (2018).
- ⁷P. Haikka, Y. Kubo, A. Bienfait, P. Bertet, and K. Mølmer, "Proposal for detecting a single electron spin in a microwave resonator", *Physical Review A* **95**, 022306 (2017).
- ⁸A. Bienfait, J. J. Pla, Y. Kubo, M. Stern, X. Zhou, C. C. Lo, C. D. Weis, T. Schenkel, M. L. W. Thewalt, D. Vion, D. Esteve, B. Julsgaard, K. Mølmer, J. J. L. Morton, and P. Bertet, "Reaching the quantum limit of sensitivity in electron spin resonance", *Nature Nanotechnology* **11**, 253–257 (2016).
- ⁹A. Bienfait, J. J. Pla, Y. Kubo, X. Zhou, M. Stern, C. C. Lo, C. D. Weis, T. Schenkel, D. Vion, D. Esteve, J. J. L. Morton, and P. Bertet, "Controlling spin relaxation with a cavity", *Nature* **531**, 74–77 (2016).

- ¹⁰C. Grezes, Y. Kubo, B. Julsgaard, T. Umeda, J. Isoya, H. Sumiya, H. Abe, S. Onoda, T. Ohshima, K. Nakamura, I. Diniz, A. Auffeves, V. Jacques, J.-F. Roch, D. Vion, D. Esteve, K. Moelmer, and P. Bertet, "Towards a spin-ensemble quantum memory for superconducting qubits", *Comptes Rendus Physique, Quantum microwaves / Micro-ondes quantiques* **17**, 693–704 (2016).
- ¹¹P. Jamonneau, M. Lesik, J. P. Tetienne, I. Alvizu, L. Mayer, A. Dréau, S. Kosen, J.-F. Roch, S. Pezzagna, J. Meijer, T. Teraji, Y. Kubo, P. Bertet, J. R. Maze, and V. Jacques, "Competition between electric field and magnetic field noise in the decoherence of a single spin in diamond", *Physical Review B* **93**, 024305 (2016).
- ¹²Y. Kubo, "Quantum engineering: turn to the dark side", *Nature Physics* **12**, 21–22 (2016).
- ¹³C. Grezes, B. Julsgaard, Y. Kubo, W. L. Ma, M. Stern, A. Bienfait, K. Nakamura, J. Isoya, S. Onoda, T. Ohshima, V. Jacques, D. Vion, D. Esteve, R. B. Liu, K. Mølmer, and P. Bertet, "Storage and retrieval of microwave fields at the single-photon level in a spin ensemble", *Physical Review A* **92**, 020301 (2015).
- ¹⁴G. Kurizki, P. Bertet, Y. Kubo, K. Mølmer, D. Petrosyan, P. Rabl, and J. Schmiedmayer, "Quantum technologies with hybrid systems", *Proceedings of the National Academy of Sciences* **112**, 3866–3873 (2015).
- ¹⁵C. Grezes, B. Julsgaard, Y. Kubo, M. Stern, T. Umeda, J. Isoya, H. Sumiya, H. Abe, S. Onoda, T. Ohshima, V. Jacques, J. Esteve, D. Vion, D. Esteve, K. Mølmer, and P. Bertet, "Multimode storage and retrieval of microwave fields in a spin ensemble", *Physical Review X* **4**, 021049 (2014).
- ¹⁶M. Stern, G. Catelani, Y. Kubo, C. Grezes, A. Bienfait, D. Vion, D. Esteve, and P. Bertet, "Flux qubits with long coherence times for hybrid quantum circuits", *Physical Review Letters* **113**, 123601 (2014).
- ¹⁷Y. Kubo, I. Diniz, A. Dewes, V. Jacques, A. Dréau, J.-F. Roch, A. Auffeves, D. Vion, D. Esteve, and P. Bertet, "Storage and retrieval of a microwave field in a spin ensemble", *Physical Review A* **85**, 10.1103/PhysRevA.85.012333 (2012).
- ¹⁸Y. Kubo, I. Diniz, C. Grezes, T. Umeda, J. Isoya, H. Sumiya, T. Yamamoto, H. Abe, S. Onoda, T. Ohshima, V. Jacques, A. Dréau, J.-F. Roch, A. Auffeves, D. Vion, D. Esteve, and P. Bertet, "Electron spin resonance detected by a superconducting qubit", *Physical Review B* **86**, 064514 (2012).
- ¹⁹Y. Kubo, A. O. Sboychakov, F. Nori, Y. Takahide, S. Ueda, I. Tanaka, A. T. M. N. Islam, and Y. Takano, "Macroscopic quantum tunneling and phase diffusion in a $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ intrinsic josephson junction stack", *Physical Review B* **86**, 144532 (2012).
- ²⁰Y. Kubo, C. Grezes, A. Dewes, T. Umeda, J. Isoya, H. Sumiya, N. Morishita, H. Abe, S. Onoda, T. Ohshima, V. Jacques, A. Dréau, J.-F. Roch, I. Diniz, A. Auffeves, D. Vion, D. Esteve, and P. Bertet, "Hybrid quantum circuit with a superconducting qubit coupled to a spin ensemble", *Physical Review Letters* **107**, 220501 (2011).
- ²¹Y. Kubo, "Strong coupling of a spin ensemble to a superconducting resonator : towards superconductor-spin ensemble hybrid quantum circuits(current topics)", *Butsuri* **66**, 439–443 (2011).
- ²²Y. Kubo, Y. Takahide, T. Tanaka, S. Ueda, S. Ishii, S. Tsuda, A. N. Islam, I. Tanaka, and Y. Takano, "Fabrication of submicron $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ intrinsic josephson junction stacks", *Journal of Applied Physics* **109**, 033912 (2011).
- ²³Y. Kubo, F. R. Ong, P. Bertet, D. Vion, V. Jacques, D. Zheng, A. Dréau, J.-F. Roch, A. Auffeves, F. Jelezko, J. Wrachtrup, M. F. Barthe, P. Bergonzo, and D. Esteve, "Strong coupling of a spin ensemble to a superconducting resonator", *Physical Review Letters* **105**, 140502 (2010).
- ²⁴Y. Kubo, Y. Takahide, S. Ueda, Y. Takano, and Y. Ootuka, "Macroscopic quantum tunneling in a $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ single crystalline whisker", *Applied Physics Express* **3**, 063104 (2010).

²⁵Y. Kubo, T. Tanaka, S. Ueda, S. Ishii, S. Tsuda, Y. Takahide, A. N. Islam, I. Tanaka, and Y. Takano, "Observation of macroscopic quantum tunneling in $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ intrinsic Josephson junctions", *Journal of Physics: Conference Series* **150**, 052132 (2009).

Invited Talks

1. "Development of a spin ensemble-based quantum transducer"
Invited talk at the Quantum Innovation 2024, Sola City Conference Center, Tokyo, 2024/10/22
2. "Quantum Technologies with Hybrid Systems"
Invited talk at the 5th KMI school (KMI school 2024), Nagoya University, 2024/3/7
3. "Ultra-low noise microwave amplification by spin maser"
Invited talk at The 2023 Hong Kong Summer Workshop on Spin-based Quantum Science, The Chinese University of Hong Kong, 2023/8/11
4. "Towards Thermally Driven Maser Oscillation"
Invited talk at NanoFrontier Materials Conference 2022 (NFM2022), NIMS Tsukuba, 2022/12/28
5. "A "masing" Spin Ensemble: Maser for Quantum Information Technologies"
Online Colloquium at City University of Hong Kong, Online, October 19, 2022.
6. "A "masing" Spin Ensemble: Maser for Quantum Information Technologies"
Invited seminar series at Centre for Quantum Technology, University of Glasgow, Online, February 25, 2022.
7. "Broadband Pulse Electron Spin Resonance Spectroscopy using a Superconducting Waveguide"
MRM2021 (Materials Research Meetings), Pacifico Yokohama, December 15, 2021.
8. "Quantum information and technology with maser"
OIST Mini-Symposium "Quantum Sensors of Magnetic and Inertial Forces", Online, February 2021.
9. "Spin-based quantum information and technologies"
JSAP Workshop in Quantum Electronics Division, Online, November 2020.
10. "Quantum information technologies with maser"
International Workshop for Young Researchers on the Future of Quantum Science and Technology (FQST2020), Tokyo, Japan, February 2020.
11. "Quantum information and technologies with hybrid systems"
The 40th Quantum Information Technology Workshop (QIT40), Fukuoka, Japan, May 2019.
12. "Ultra-sensitive spin resonance using superconducting quantum technologies"
The 66th Japan Society of Applied Physics (JSAP) Spring Meeting, Tokyo, Japan, March 2019.
13. "Quantum information and technologies with hybrid systems"
The 3rd Photonics Workshop, JSAP Photonics Division, OIST, Japan, December 2018.

14. "Magnetic Resonance at the Quantum Limit
73st The Japan Physical Society (JPS) Annual Meeting, Noda, Japan, March 2018.
15. "Hybrid quantum systems with spins and superconductors (and photons)"
7th Summer School on Semiconductor/Superconducting Quantum Coherence Effect and Quantum Information, Shuzenji, Japan, August 2017.
16. "Reaching the quantum limit of sensitivity in electron spin resonance"
JSAP international workshop, National Institute of Information (NII), Tokyo, March 2017.
17. "Magnetic Resonance at the Quantum Limit
The Society of Electron Spin Science and Technology (SEST), Osaka, Japan, November, 2016.
18. "Circuit-QED and Spins"
63th The Japan Society of Applied Physics (JSAP) Spring Meeting, Tokyo, Japan, March 2016.
19. "Hybrid Quantum Systems with Superconductors and NV centers in Diamond"
71st The Japan Physical Society (JPS) Annual Meeting, Sendai, Japan, March 2016.
20. "Magnetic Resonance at the Quantum Limit
The International Symposium on Nanoscale Transport and Technology (ISNTT2015), Atsugi, Japan, November, 2015.
21. "Electron Spin Resonance Detected by a Superconducting Qubit"
Workshop for Quantum Simulations of Open Quantum Systems, Freiburg, Germany, November, 2013.
22. "Hybrid Quantum Circuit with a Superconducting Qubit and an Electron Spin Ensemble"
iQIT workshop, Corfu, Greece, September, 2013.
23. "Hybrid Quantum Circuit with a Superconducting Qubit coupled to an Electron Spin Ensemble"
Coherent Control in Complex Quantum Systems, OIST, Okinawa, Japan, May 2013.
24. "Hybrid Quantum Circuit with a Superconducting Qubit coupled to an Electron Spin Ensemble"
DPG Spring Meeting, Regensburg, Germany, March 2013.
25. "Hybrid Quantum Circuit with a Superconducting Qubit coupled to an Electron Spin Ensemble"
GDR, Physique Quantique Mesoscopique, Aussois, France, December 2011.
26. "Strong Coupling of a Spin Ensemble to a Superconducting Resonator: Towards Superconducting Hybrid Quantum Circuits"
GDR Information Quantique, Nice, France, March 2011.
27. "Strong Coupling of a Spin Ensemble to a Superconducting Resonator"
Hasselt Diamond Workshop 2011 (SBDD XVI), Hasselt, Belgium, February 2011.

Patents

- [1] "Ultra-low noise cryogenic microwave amplification"
Yuimaru Kubo, Jason Ball, Petr Moroshkin, Denis Konstantinov,
US Patent, US11677206B2.

- [2] “Ultra-low noise spin maser cryogenic amplifier”
Yuimaru Kubo, Jason Ball, Petr Moroshkin, Denis Konstantinov,
Japan Patent, JP 7504422.

Reference Persons

- **Patrice Bertet**
Research Director in the Quantronics Group
SPEC (Service de Physique de l'État Condensé), CEA (Commissariat à l'Énergie Atomique
et aux Énergies Alternatives) Saclay, France
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Faculty of Computer and Information Sciences, Hosei University, Japan
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- **Daniel Estève (Retired)**
Former Research Director and Group Leader in the Quantronics Group
SPEC (Service de Physique de l'État Condensé), CEA (Commissariat à l'Énergie Atomique
et aux Énergies Alternatives) Saclay, France
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