DIM QUANTIP

Annual activity report

2024

Domaine de Recherche et d'Innovation Majeur

Région îledeFrance

Foreword

QuanTiP is the research and innovation network funded since 2022 by Paris Region in the field of quantum technologies. It builds on the strong academic community around quantum technologies in the region, deeply connected with a very dynamic industry ecosystem featuring both startups founded by its members and large companies showing an increasing interest in the field.

The present document gives an overview on the various actions led by QuanTiP in 2024 with its annual budget, stable with respect to 2023. You will find here a general presentation of the network with its key figures and its research axes, and a summary of its animation and communication actions towards the scientific community, its industry partners as well as the general public. The report also features an overview of the projects funded in 2023 and 2024, as well as a scientific mid-term report for the 2023 projects.

QuanTiP is supported by a very dynamic community, deeply involved in its many actions. This is particularly relevant this year, as we celebrate the International Year of Quantum Science and Technology, that has been launched officially in Paris at the UNESCO headquarters in February. We look forward the many events in Paris Region and beyond organized to celebrate this very special year!

Hélène Perrin, Coordinator

Outline

DIM QuanTiP

Activity report

2023 Project reports

DIM QuanTiP

Objectives

In 2022, the project QuanTiP (Quantum Technologies in Paris Region) was selected for 5-year funding by the Paris Region as one of the major research and innovation networks (DIM). Managed by the CNRS (Centre National de la Recherche Scientifique), the DIM QuanTiP aims to support, structure, and promote research and innovation efforts in the competitive field of quantum technologies.

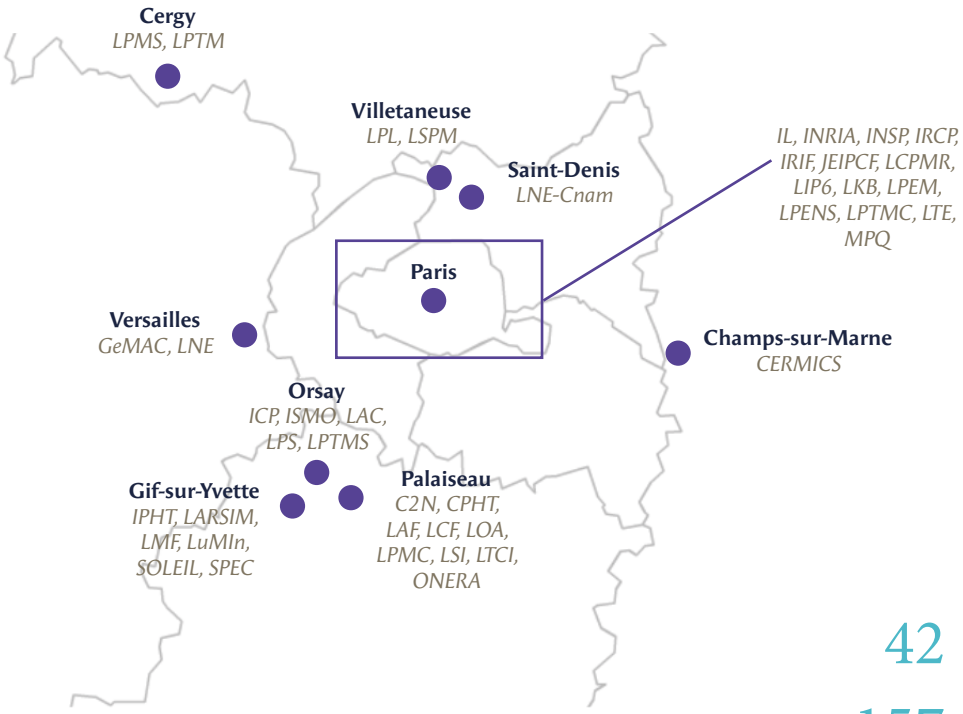
With an approach combining physics, applied mathematics, computer science, chemistry, materials, and engineering, QuanTiP covers all the major aspects of quantum technologies: “Quantum computing” and “Quantum simulators”, set to revolutionize our computing capabilities, “Quantum communications”, which will enhance data security, and “Quantum sensors and metrology”, which will enable ultimate sensitivities. QuanTiP members are committed to the maturation of quantum technologies —a key issue for sovereignty and growth— by developing structuring facilities and large-scale interdisciplinary projects, facilitating exchanges between researchers, entrepreneurs, and industry, and supporting the training of tomorrow's quantum engineers through research. In this way, the DIM is nurturing the regional ecosystem, paying particular attention to the transition between fundamental research and technological development, to bring about breakthrough innovations and new applications of quantum technologies, both in industry and in other scientific fields.

Through the calls for projects open to academic partners, the DIM QuanTiP provides doctoral and post-doctoral grants, funding for equipment, and technological transfer projects. It also supports scientific and general public events and proposes various training to the network members (start-up creation, scientific mediation, etc.). The DIM is committed to science communication and popularization.

Network

QuanTiP gathers about 1200 scientists in all the fields relevant to quantum technologies, with about one half being permanent staff, one third PhD students and one sixth postdocs. They are coming from 157 research groups from 42 laboratories spread around the whole region, active in universities, engineering schools and/or research centers (CNRS, CEA, Inria, LNE). QuanTiP academic network has important interactions with the socioeconomic quantum ecosystem, both large companies and startups originating from its laboratories.

Distribution of laboratories in région Île-de-France

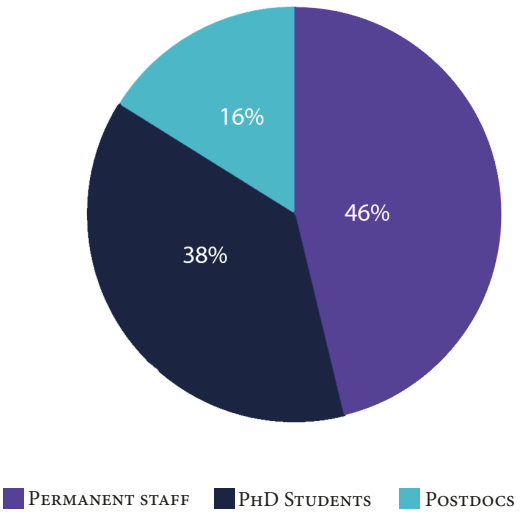


42 Laboratories

157 Teams

1240 Researchers

Distribution per position (april 2025)

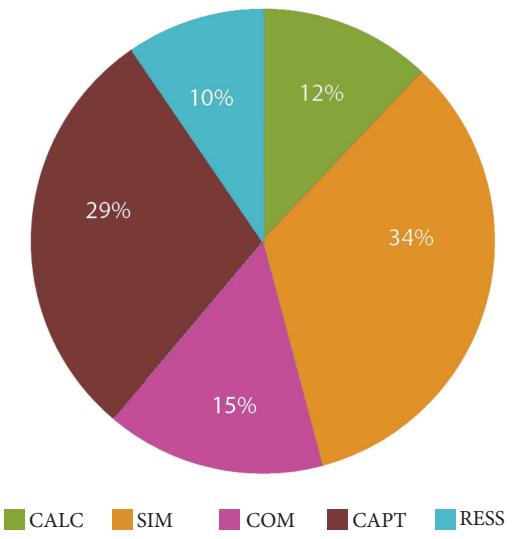


Axes

The DIM is structured into the four thematic axes related to our objectives, supported by three transverse axes covering scientific and technological resources for the thematic axes, scientific and economic impact of their results, and animation and training of the community.

Transverse axes \ Thematic axes	Quantum computing (CALC)	Quantum simulation (SIM)	Quantum communication (COM)	Quantum sensors and metrology (CAPT)
Scientific and technological resources (RESS)	Theoretical methods, new approaches, materials, integrated devices, dedicated technologies (microfabrication, cryogenics...)			
Scientific and economic impact (VALO)	Valorization, technological transfer to industry, identification of use cases in science and industry			
Animation and training (ANIM)	Communication, events, training and outreach			

Number of teams per axis (April 2025)



Axis

QUANTUM COMPUTING

Axis leaders

Partrice Bertet (CEA-SPEC)
Alain Sarlette (Inria Paris)

Board members

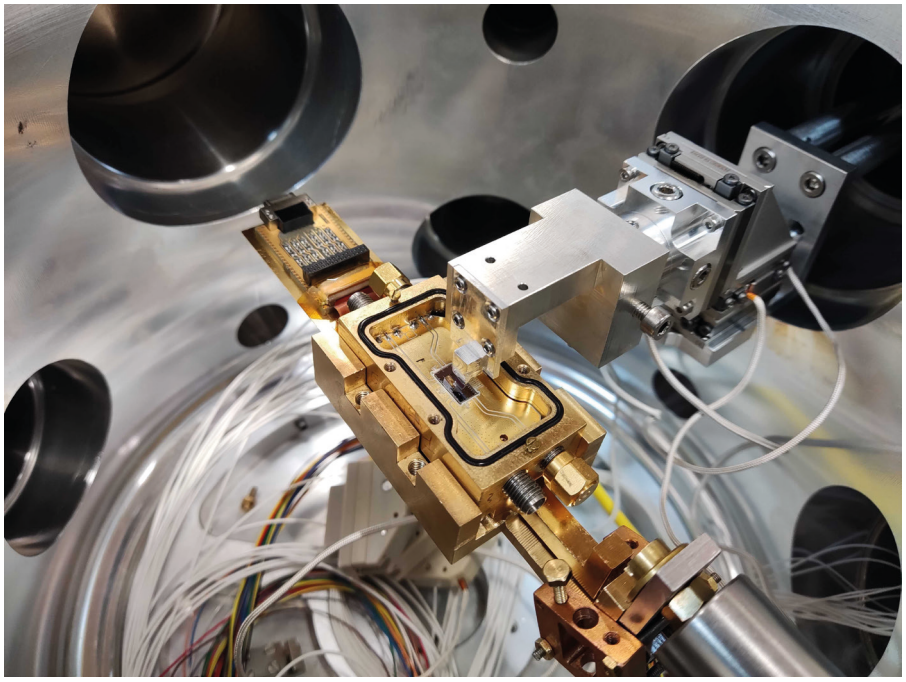
Thierry Lahaye (LCF)
Frédéric Magniez (IRIF)
Valentina Parigi (LKB)
Thomas Ayral (Eviden)

The objective of the Quantum Computing axis is to stimulate research in the Paris Region to develop the universal quantum computer, both on the experimental side (physical platforms for the device) and theoretical side (error correction procedures, algorithms for ideal or noisy computers).

Regarding the hardware, the Paris Region concentrates state-of-the-art experimental research on several platforms like superconducting qubits, trapped atoms and photonics, supporting leading international startups as well as research on a few more exotic platform candidates. The next goal is to attain high-fidelity basic quantum operations, demonstrating error correction capabilities compatible with the long-term goal of building a large-scale quantum computer. Progress along this line should also more directly enable demonstrations of NISQ computation, which has become a field of its own to highlight where quantum performance is already competitive on ultra-specific problems involving few dozen qubits and featuring occasional actual errors.

Regarding algorithms, new or improved quantum algorithmic routines are still being published on a regular basis. The coming years should see an interfacing effort, developing the typical quantum routines into end-to-end solutions for an ever wider range of applications. Beyond quantum modeling applications, standard computational tasks like extracting information out of differential equations, out of Monte-Carlo simulations, or with Machine Learning routines, should be pushed starting with efficient programming languages for exploiting quantum resources in actual use-cases, and down the stack to compilation into operations including optimal quantum error-correction requests.

This endeavor requires a conjunct effort of the physics, applied mathematics, and computer science communities involved in quantum technology research.



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Axis

QUANTUM SIMULATION

Axis leaders

Jéôme Beugnon (LKB)
Laurent Sanchez-Palencia (CPHT)

Board members

Jacqueline Bloch (C2N)
Jérôme Estève (LPS)
Christophe Mora (MPQ)
Goulven Quéméner (LAC)
Adrien Signoles (Pasqal)

The Quantum Simulation axis focuses on the experimental and theoretical study of quantum devices designed to solve complex problems in an analogical approach. Many scientific as well as applicative questions that are inaccessible even to large-scale classical computers do not necessarily require universal quantum computers. The idea of quantum simulation is to simulate the problem using another quantum system, easier to manipulate, and/or to explore extended configuration spaces. Verifying quantum simulators is crucial and requires interdisciplinary efforts to improve theoretical models. Their applications include understanding major challenging quantum phenomena such as high-Tc superconductivity, quantum magnetism, out-of-equilibrium dynamics in the presence of disorder, topological phases, as well as many other issues in materials science, high-energy physics, astrophysics, or quantum chemistry. Most of these problems are approached through optimization, which paves the way to extensions towards applications for industry and society.

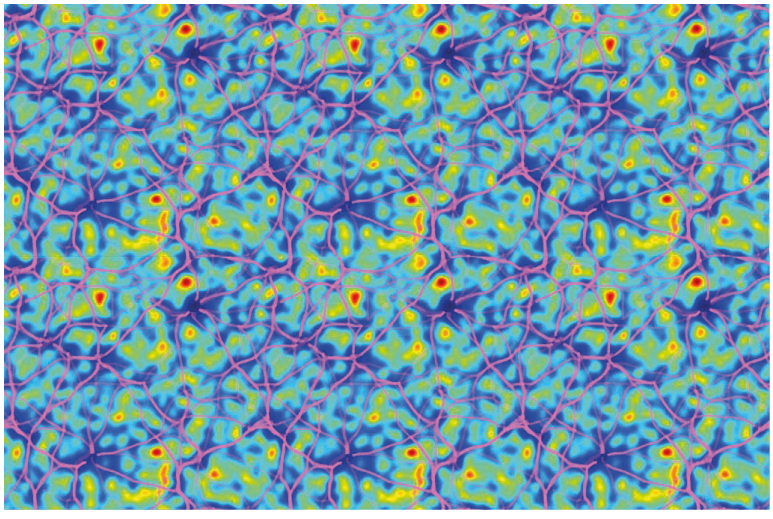
The focus of the axis is to develop and mature quantum simulators along several lines:

1. Development of a variety of quantum simulation platforms, in quantum gases, photonic systems and solid-state materials

2. Develop protocols to implement, develop, and validate quantum simulators in a variety of scientific problems, taking advantages of a close synergy between experiments and theory

3. Valorize existing platforms and explore present-day possibilities

4. Extend applicative use-cases in close synergy between academia and industry



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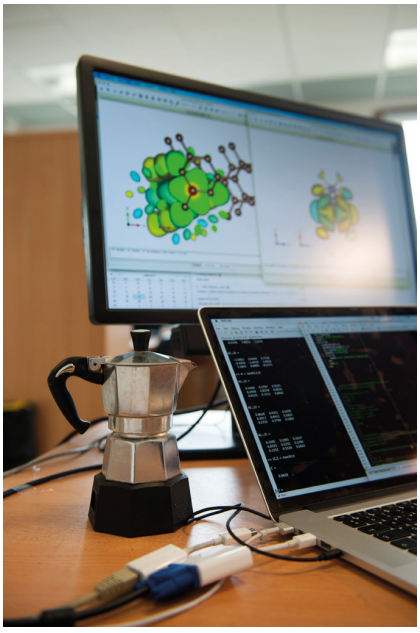

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Axis

QUANTUM COMMUNICATION

Axis leaders

Nadia Belabas (C2N)
Alex Bredariol Grilo (LIP6)

Board members

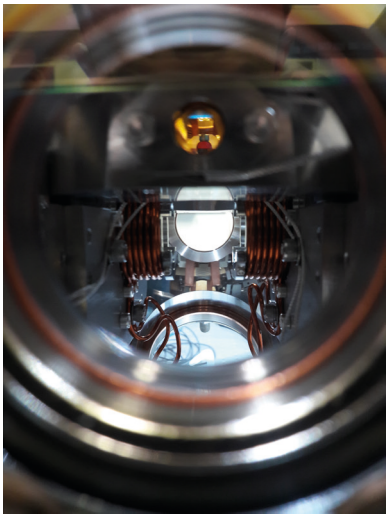
Romain Alléaume (LTCI)
Maria Amanti (MPQ)
Jean-Michel Melkonian (ONERA)
Alexei Ourjoumstev (JEIPCF)
Tom Darras (WeLinq)

One of the most mature applications of quantum technologies is the secure exchange of information via quantum communications, which generalizes quantum cryptography methods. The aim of the community is to build hybrid quantum communication networks that integrate multiple physical quantum information platforms and encoding methods, ensuring secure exchanges resistant to attacks from both classical and quantum supercomputers. In the quantum communication axis approach we push forward all the components of a quantum network: the generation and detection of photons and entangled states, quantum memories, and atom-light interfaces using hybrid or opto-mechanical systems, useful for developing quantum repeaters to extend the network and improve existing cryptographic technologies.

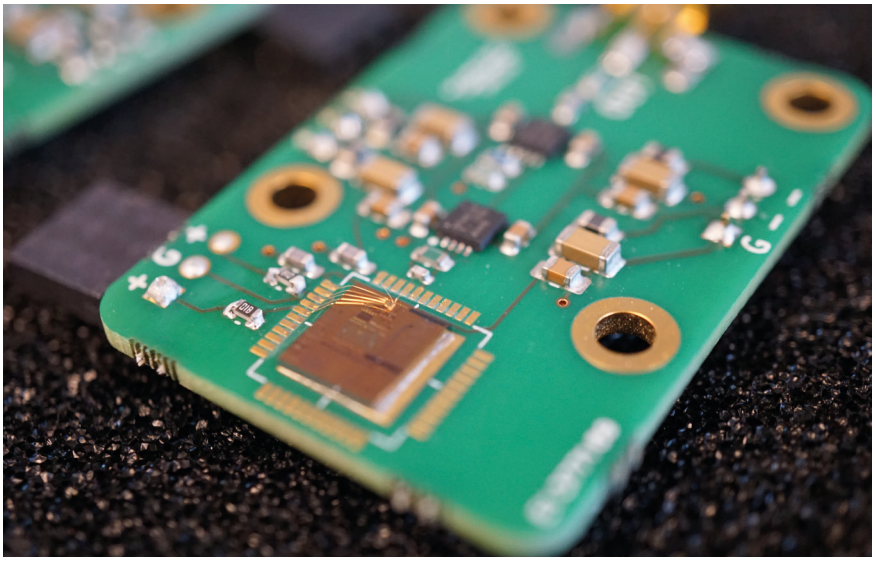
Quantum cryptography has developed very rapidly in recent years, both theoretically (security proofs, device validation criteria) and experimentally (increasingly high-performance systems). It therefore appears to be a forerunner for quantum technologies, particularly for the transition between research and applications «out of the laboratory». In this field, the region is very well endowed, with state-of-the-art teams and excellent theory-experience and physics-computing synergies. Several manufacturers (Thales, Nokia, iXblue...) and startups (Quandela, VeriQloud, Kets, Cryptonext...) are involved.

The Quantum communication axis of QuanTiP supports research and innovation with three main objectives, using technologies developed in the Paris Region 1) Developing quantum cryptography and quantum networks 2) Improving sources and detectors 3) Enabling long-distance quantum communications.

The building blocks and efforts in point 2 and 3 are relevant notably for optical quantum computation hardware. Conversely, the progress achieved in 1 and 3 are useful for distributed and secure computation or sensing.



© Alexei Ourjoumstev, JEIPCF



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Axis

QUANTUM SENSORS AND METROLOGY

Axis leaders

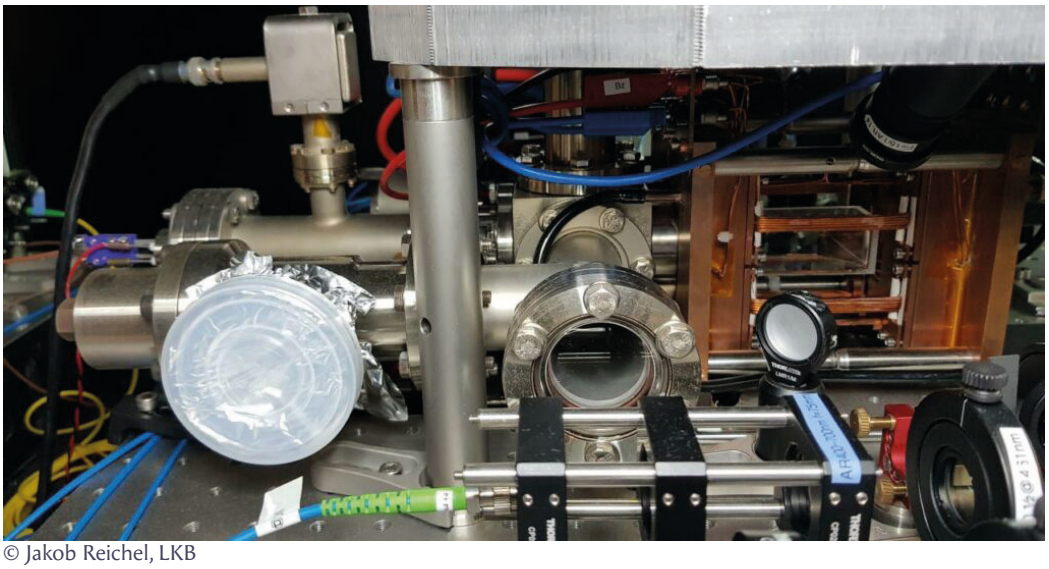
Ivan Favero (MPQ)
Franck Pereira (LTE)

Board members

Cheryl Feuillet-Palma (LPEM)
Fabienne Goldfarb (LUMIN)
Mathieu Manceau (LPL)
Laura Thevenard (INSP)
Dimitri Labat (Chipiron)

Whatever the physical system used (atoms, molecules, spins, optomechanical devices of micro- or nanometric dimensions), the Quantum Sensors and Metrology axis aims at developing quantum sensors exploiting the quantum properties of matter and light to achieve very high sensitivity to external force fields.

They can be used to measure a wide range of physical quantities, opening up applications in numerous fields with high societal impact, such as climate and natural resource monitoring, healthcare, positioning, navigation and timing, or natural disaster prevention. While these sensors are often limited by classical noise sources, measurement protocols exploiting quantum correlations offer the possibility of pushing their sensitivity below the standard quantum limit.



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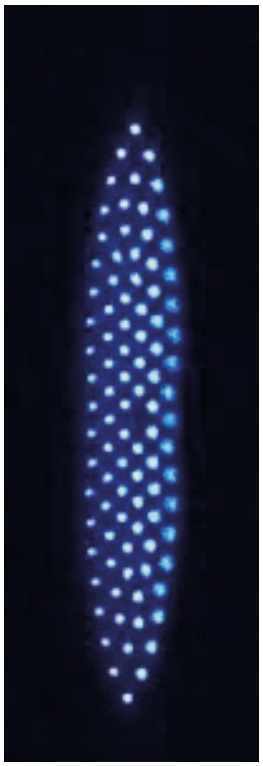

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Axis

SCIENTIFIC AND TECHNOLOGICAL RESOURCES

Axis leaders

Danijela Marković (LAF)
Alexandre Tallaire (IRCP)

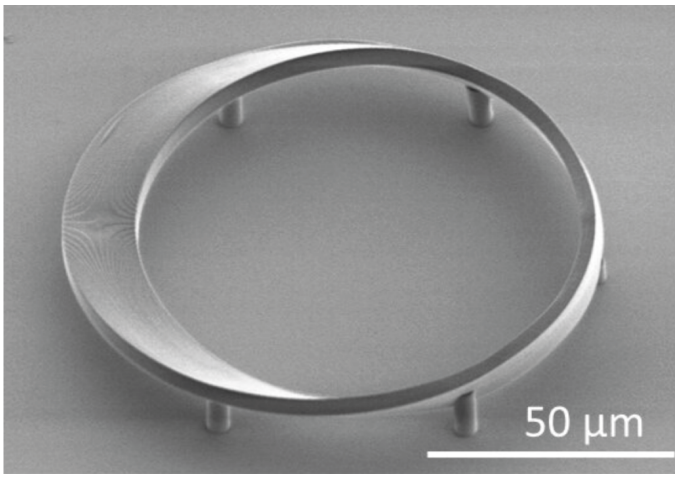
Board members

Marie-Pierre Adam (LUMIN)
Aymeric Delteil (GeMaC)
Mark-Olivier Goerbig (LPS)

The Scientific and Technological Resources axis of QuanTiP is transverse and strongly interdisciplinary as it aims at supporting research efforts in sensing, computing, communication, and simulation, by providing them with the essential building blocks required for their development.

It encompasses theoretical models, numerical and analytical mathematic tools, but also new approaches that will facilitate the adoption of quantum information processing techniques in particular. Material science and associated fabrication technologies to achieve "quantum-grade" platforms that are robust yet flexible, ranging from bulk crystals to nanomaterials, are also an important part of this transverse axis.

The integration of quantum functionalities into compact, well designed and efficient devices, that feature hybrid combinations of material systems and allow an easy manipulation of their quantum states is an absolute necessity to achieve the foreseen goals. This will rely on enabling technologies that must be specifically developed for this area. They include for example adapted cryogenic systems, highly stable and narrow lasers, low-noise electronic circuits, as well as micro and nanofabrication approaches.



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Axis

SCIENTIFIC AND ECONOMIC IMPACT

Axis leaders

Matthieu Delbecq (LPENS)
Agnès Maître (INSP)

Board members

Eleni Diamanti (LIP6)
Sylvain Gigan (LKB)
Almazbek Imanaliev (LNE)
Riadh Issaoui (LSPM)
Elvira Shishenina (BMW)

The goal of the Scientific and Economic Impact axis is to stimulate the socio-economic and scientific impact of research into quantum technologies. The actions are supported by a board of about 5 people who ensure an effective interface between the scientific community and the socio-economic world.

The objectives are to develop use cases for quantum technologies for new scientific or industrial applications and to encourage, train and support the DIM members in their efforts to exploit these technologies. Several dedicated events and actions are organized for these purposes, open to all, from PhD candidates to researchers. These include a valorization awareness day with lectures on intellectual property, entrepreneurship and testimonies from quantum entrepreneurs as well as a 3-day entrepreneurship training school.

These days help to arouse the interest of players in the academic world, who are still too little informed about the possibilities available to them in this field. They provide an opportunity to identify technologies and potential candidates who could benefit from QuanTiP to get started. One of our challenging mission is to identify such ambitious projects based on promising technologies at a very early stage and provide them with the means to demonstrate proof of concept or design a prototype that validates the fact that this technology can leave the laboratory. This is done with the help of comparatively upstream pre-maturation actions that are lacking in the current ecosystem.

Researcher-company day of the DIM QuanTIP, October 10, 2024.


Quantum job fair, November 13, 2024.

Axis
ANIMATION AND TRAINING

Axis leaders

Senka Ćuk (QuanTiP)
Jérôme Lodewyck (LTE)

Board members

Michèle Leduc (LKB)
Denis Vion (SPEC)
Valia Voliotis (INSP)
Mattia Walschaers (LKB)

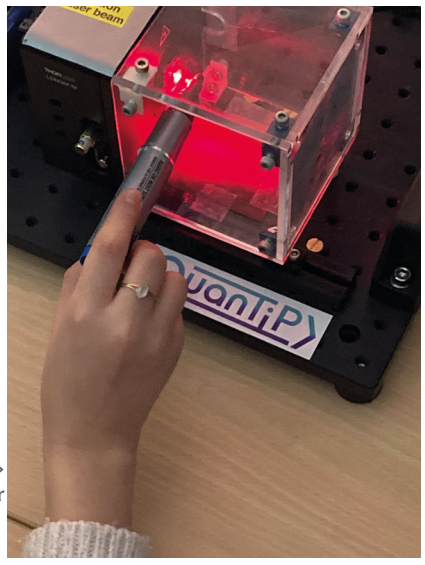
The Animation and Training axis aims to promote a common scientific culture and to strengthen exchanges and collaborations among DIM researchers and partners. The axis also seeks to raise the visibility of our research network, both locally and internationally, through appropriate communication and initiatives targeting the academic world, start-ups and companies, and the general public.

The Axis board evaluates funding requests received through our calls for scientific event projects (conferences, workshops, doctoral schools, etc.) while encouraging the participation of young researchers and gender balance among speakers.

All year round the axis organizes scientific events and training for the network members - these activities will be described in the following sections. This axis also plans and coordinates actions for the general public and high schools. Each year, we recruit PhD students for dedicated outreach missions. The students participate in science fairs and scientific speed meetings and organize lab tours, workshops, and presentations for high school students. They also work closely with our communication officer to develop new tools for science outreach. The Animation axis nourishes collaboration with other quantum hubs within the regional ecosystem (QICS - Quantum Information Center of Sorbonne University, PCQT - Paris Center for Quantum Technologies, Quantum-Saclay), the French Physics Society, other DIMs of the Paris Region, as well as with associations and FabLabs (Atouts Sciences, Ludomaker, TRACES, Palais de la découverte...).

Fête de la Science 2024

High school Maurice Ravel, January 24, 2025



«Optical tweezers» demonstrator

PhD students involved in outreach mission:

In 2024 - 2025:
Lilay Gros-Desormeaux (MPQ)
Lucas Jarjat (LPENS)
Amin Lakhal (LKB)
Bastien Mirmand (LPL)

In 2023 - 2024:
Lucas Jarjat (LPENS)
Aurore-Alice Young (LKB)

Budget

In 2024, QuanTiP received support from the Paris Region, amounting to 1 M€ for operating costs and 1.5 M€ for investment expenses.

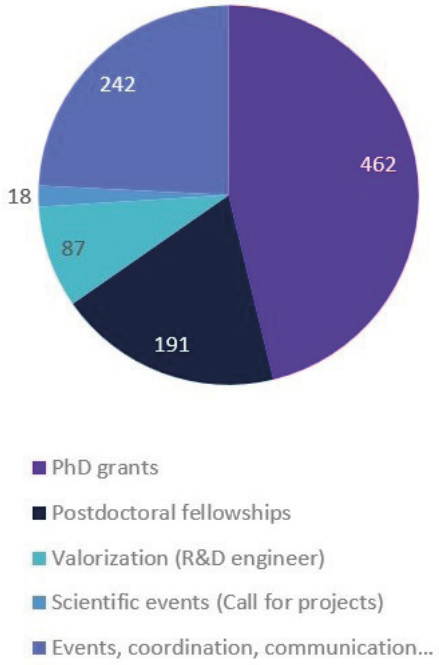
Operating expenses primarily cover PhD grants, either 18 or 36 months (up to 116,000 € for a three-year fully funded position), one-year postdoctoral fellowships (capped at 65,000 €), nine-month recruitments of research engineers working on prototyping, and salaries of the communications officer and the project manager of the DIM. Included are also compensations for PhD students on public outreach missions for the DIM, costs of scientific event organization (including roughly 20 k€ for our yearly international conference), training and doctoral schools, outreach activities, and the CNRS fees. The investment budget in 2024 is a co-funding, as requested from regional funding rules, meaning that QuanTiP subventions cover up to 66% of the total cost of the equipment. The subventions are attributed in the framework of the following two calls for projects:

1. Call for large-scale equipment projects that require collaborations among at least two teams and a total cost above 152 k€ (the participation of QuanTiP is between 100 and 200 k€);

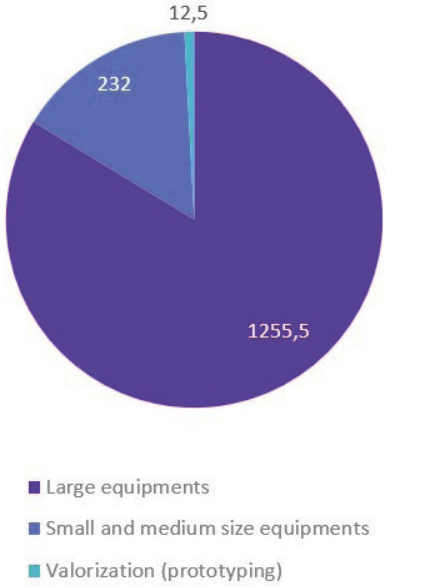
2. Call for medium and small-scale equipment projects with a cost below 150 k€ and where collaboration is not mandatory (with QuanTiP contribution capped at 50 k€).

The charts below give an overview of the budget breakdown for 2024.

Operating budget 2024 (k€)



Investment budget 2024 (k€)



Animation and training

Events and training

The DIM QuanTiP organizes its annual meeting at the Sorbonne Paris Nord University in Villetaneuse each year. This event that brings together network members aims to encourage interactions and increase the visibility of research activities within the DIM. The previous meeting, held on May 29, 2024, gathered roughly 110 participants around presentations of our activities and accomplished results, scientific talks, poster sessions, and one « quantum » board game session.

In June 2024, we organized a thematic workshop on different quantum computing platforms for mathematicians and computer scientists interested in the quantum field. The event inspired several members of this community to join the DIM.

Among the events that QuanTiP organizes regularly is a week-long international conference covering one of the four main research areas (axes) of the DIM. The previous one, the International Conference on Quantum Computing (ICoQC2025), took place from May 12 to 16, 2025, at the Institut Henri Poincaré in Paris.

QuanTiP aims to strengthen exchanges between research institutions and industry. In October 2024, we organized a networking event where researchers and representatives of start-ups and industries presented several use cases and applications of quantum technologies and discussed collaboration opportunities.

In November 2024, we organized, jointly with the GdR TeQ, another edition of a «Quantum Job Fair» for students and post-docs from our networks, with the participation of our industrial partners and researchers offering PhD and postdoctoral positions in their laboratories.

To raise community awareness of the challenges of valorization of research through technology transfer or the creation of start-ups, the DIM organized in November 2024 a one-day training on innovation, intellectual property, and key elements in building a start-up, with the support of valorization players (coaches, start-ups, IP-lawyers, SATT, CNRS Innovation, etc.). We are currently preparing a three-day summer school on entrepreneurship that will be held in June 2025.

In partnership with other regional DIMs, we proposed to researchers a series of courses in scientific communication and outreach (MasterClass) from March to July 2024. These sessions, provided by the association TRACES, are tailored to train and encourage more researchers to engage in outreach activities.

Within our calls for projects (AAP Manifestation scientifique and AAP Au fil de l'eau), the DIM supports the organization of scientific events (conferences, workshops, doctoral schools), as well as general public events. The full list of conferences and workshops supported by the DIM in 2024 is provided below within the list of funded projects. QuanTiP also supported the organization of the exhibition "Quantum Sensation" which offers an immersion into the quantum world through a connection with memory and the reconstruction of memories. The exhibition will run from April 10 to July 26, 2025 at the Maison Henri Poincaré in Paris.

Animation and training

Outreach

Several outreach actions focusing on the general public and high school pupils were carried out in the previous year:

•Participation in science fairs (Fête de la science : October 8, 2024 at Sorbonne Paris Nord University, and on October 12 and 13 at the Village des sciences at Jussieu).

•High school visits (in Paris, Clichy, Epinay-sur-Seine, between January and May 2025), with presentations on quantum science and technologies, demonstrations of properties of light and different experimental techniques (particle trapping), and discussions on motivations for doing a PhD.

•Laboratory visits for high school students (LTE, April 11, 2025).

We develop and propose various resources for scientific outreach: popular experiments (Optical tweezers) and optics kits, laser games, "quantum" board games, posters and quizzes, etc.

Given the International Year of Quantum Science and Technologie 2025, we have recruited four PhD students in 2024 to work on scientific outreach and mediation (Lucas Jarjat, LPENS, Bastien Mirmand, LPL, Amin Lakhal, LKB, and Lilay Gros-Desormeaux, MPQ), who will support us in different initiatives aimed at the general public or school audiences (videos, board games).

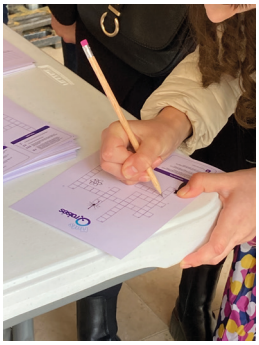
To anticipate on next year's report, let us mention that the DIM is coordinating the organization of a "Quantum week" at the Palais de la Découverte, Paris, from September 23 to September 28, 2025, involving several players from the regional « quantum » ecosystem and the French Physics Society.

Communication

The new website of the DIM QuanTiP has been online since September 2024, https://quantip.org/. It features information about our network and the teams involved, calls for projects, events, scientific highlights, and some resources for the general public and high schools.

The DIM QuanTiP is also present on LinkedIn. Our communication officer ensures the visibility of the DIM's actions and dissemination of information on our events, job offers, latest publications, outreach activities, etc.

In February 2025, we launched a newsletter.



Fête de la Science 2024

Fête de la Science 2024

Fête de la Science 2024

Funded projects 2023

In 2023 we have been able to fund 3 full PhD fellowships, 4 1-year postdoc fellowships, 7 Large equipment collaborative projects and 7 Small and medium equipment projects. The detailed list is given below. In addition, we have supported 2 valorization projects, we have awarded 3 technological contest prizes, and 4 scientific events and student training sessions. The number of funded projects is indicated together with the number of applications. The pressure on PhD grants was particularly high in 2023.

Main axis distribution

Second axis distribution

Scientific events

Training

Les Houches 2023:
Doctoral training, ultracold molecules, quantum physics and application

LOQCathon 2.0:
The 2nd interdisciplinary quantum hackathon on linear optical quantum computation

Workshop

Quantum information:
Theory and applications

Conference

2nd Colloque du GDR Technologies Quantiques (TeQ)

Technological contest

Tapered fibre manufacturing process: a versatile and efficient new tool for photonic coupling.
C. Le Fur, I. Favero

1

Optimal key rates for quantum key distribution.
T. Van Himbeeck, P. Brown

2

A Micron Scale Lab on a Single Disk for Sensing and Metrology.
H. Neshasteh, I. Favero

3

Funded projects 2023

PhD fellowships (3/23)

- *Driven dynamics of Yu-Shiba-Rusinov bound states (Shiba-Dyn).** **P. Simon** - *LPS*
- *HYbrid Boron nitride Integrated structures for QUantum Sources (HYBISQUS).* **A. Deteil** - *GEMaC*
- *Laser-Trapped Circular Rydberg Atoms for Quantum Simulation (L-T CRAQS).* **C. Sayrin** - *LKB*

Postdoctoral fellowships (4/8)

- *Mobility Edge of the Anderson Transition (MEAT).* **V. Josse** - *LCF*
- *Quantum ContrOl of a meChanical resONator with a flUxonium qubiT (COCONUT).* **S. Deléglise** - *LKB*
- *Quantum sensors for extreme conditions based on SiV and GeV diamond centres (SensExtremeDAC).* **J-F. Roch** - *LuMIn*
- *Thermal transport in non-Abelian quantum Hall states of graphene (ThermaNabe).* **F. Parmentier** - *SPEC*

EML: Large equipment (7/8)

- *High Throughput Electrical Testing of Quantum Devices & Materials (QuTest).* **P. Abgrall, S. Deléglise, J. Estève** - *CEA, LKB, LPS*
- *Metrological validation of Quantum Optomechanical Thermometry in the 1K - 30K range (Quantum T).* **O. Kozlova, T. Briant** - *LNE-Cnam, LKB*
- *Novel resource states for quantum computing using single emitters in nanostructures (RESCUE).* **H. Le Jeannic, L. Lanco** - *LKB, C2N*
- *On-chip quantum interconnections with rare-earth ion-doped nanomaterials (CONEXO).* **A. Tiranov, K. Bencheikh** - *IRCP, C2N*
- *Quantum anomalous Hall effect with 2D magnets (Q-MAG).* **R. Ribeiro-Palau, P. Roulleau** - *C2N, CEA*
- *THz quantum sensing with quantum dots in resonators (TeraQD).* **J. Mangeney, C. Feuillet-Palma** - *LPENS, LPEM*
- *2D transition metal dichalcogenides heterostructures: a new platform for the quantum control and simulation of superconducting condensates (QUANTUM2DTMD).* **Y. Gallais, Y. Laplace, M. Schiro** - *MPQ, LSI, CdF*

PME: Small and medium-size equipment (7/9)

- *COherent viBRAtional control of cold and ultra-cold molecules (COBRA).* **B. Darquié** - *LPL*
- *Cold Atom Sources for Strontium and Ytterbium Systems (CASSYS).* **J. Lodewyck, S. Lepoutre** - *LTE, LAC*
- *Rare-Earth-based QUantum INertial Sensor (REQUINS).* **A. Louchet-Chauvet** - *IL*
- *ROtating mechanical force Sensor (ROSE).* **L. Rondin, L. Longchambon** - *LuMIn, LPL*
- *Spatial entanglement in nonlinear waveguide lattices (Q-LAT).* **F. Baboux** - *MPQ*
- *Telecom-Wavelength frequency conversIon of photoNic qubits from quantum dot Sources (TWINS).* **N. Belabas, D. Fioretto** - *C2N*
- *Time-resolved cathodoluminescence for controlling the levels of impurities in quantum grade Diamond (TICACOLID).*** **C. Arnold** - *GEMaC*

APV: Valorizing research through technology transfer (2/2)

- *Continuous Variable ENtanglement-based and frequency MUltiplexed Quantum Cryptography (CV-ENMUQC).* **V. Parigi** - *LKB*
- *Single microwave photon detector for quantum detection (SIMPHOSEN).* **E. Flurin** - *SPEC CEA*

* Due to a change of PhD student, the project had to start over. A report for this project will be provided in the 2026 Scientific report.
** The equipment was ordered following a public tender, which tooks some time. The equipment will arrive in the next few months.

Funded projects 2024

In 2024 we have been able to fund 5 full PhD fellowships, 4 1-year postdoc fellowships, 7 Large equipment collaborative projects and 5 Small and medium equipment projects. The detailed list is given below. In addition, we have supported 3 valorization projects, we have awarded 2 technological contest prizes, and scientific events and student training sessions. The number of funded projects is indicated together with the number of applications.

Main axis distribution

Second axis distribution

Scientific events

Exhibition

Exhibition « Sensation quantique »

Workshop

CoRoMo: "Quantum control of rotational dynamics"

INTERACT: interplay between tunneling current and optical excitations

Graphix workshop

Conference

Symposium: Quantum Emitters: From atoms to solid state and their role in quantum optics

We are Quantum (WAQ) x YQIS 2024

ORIGINE: 40 ans des boîtes quantiques épitaxiées - Hommage à Jean-Yves Mazin

Light-matter interactions and collective effects

Polish-French Symposium III: Developments in the physics of ultracold matter

Technological contest

COntinuous variable Multiplexed Entanglement-based Technology in Quantum Cryptography
D. Fainsin, V. Parigi

1

Lossless generation of decoy states for quantum cryptography with quantum emitters
Y. Portella, D. Fioretto

2

Funded projects 2024

PhD fellowships (5/16)

- *The supersolid phase of homogeneous dipolar gases, a new window on quantum magnetism (UniSolDy).* **R. Lopes** - *LKB*
- *Hybrid spin-superconductor systems : A Novel Quantum Information Processing Platform (HSSQ).* **P. Bertet** - *SPEC CEA*
- *DUal Atomic Loader in an Ytterbium clock for a Phd Application (DUALYPA).* **R. Le Targat** - *LTE*
- *Correlation Imaging for Strongly Interacting Fermions (CISIF).* **T. Yefsah** - *LKB*
- *Quantum Imaging using non-degenerated harmonics (QUINS+).* **H. Merdji** - *LOA*

Postdoctoral fellowships (4/7)

- *Security proof for Continuous-Variable Quantum Key Distribution (SecCVQKD).* **A. Leverrier** - *Inria*
- *Twisted bilayer graphene: Symmetry of moiré minibands as a function of twist angle (TBGSym).* **H. Aubin** - *C2N*
- *ADVanced technologies for ENGineering diamond-based sEnsoRS (ADVENGERS).* **A. Tallaire** - *IRCP*
- *Collective light scattering and forces in fluctuating quantum systems (CLARIFY).* **N. Cherroret** - *LKB*

EML: Large equipment (7/7)

- *Mid Infrared Quantum Imaging and Spectroscopy (MIRQUIMAS).* **M. Amanti, J-M. Melkonian** - *MPQ, ONERA*
- *2D Critical Phenomena and phase transition Atom by atom (2D-CPA).* **T. Chalopin, N. Dupuis** - *LCF, LPTMC*
- *Desired cryostat for electronic transport testing of MBE material and devices (Désirée C).* **U. Gennser, G. Menard** - *C2N, LPENS*
- *Etching platform for QUantum technologies In Paris (EQUIP).* **T. Jacqmin, D. Garcia Sanchez** - *INSP, LKB*
- *Control of Cold Molecules for Quantum Technologies (CoCoQuaT).* **H. Lignier, Q. Bouton, B. Darquié, M. Manceau** - *LAC, LPL*
- *Unconventional Superconductivity in (Magnetic) Metals and 2D Materials (SUMMET2D).* **C. Quay, Y. Gallais** - *LPS, MPQ*
- *Engineering QUantum emitters through mIXed dimension van der Waals hetero-structures (EQUINOX).* **C. Voisin, J-S. Lauret** - *LPENS, LuMIn*

PME: Small and medium-size equipment (5/6)

- *Efficient Photonic Interconnect for atomic Quantum (EPIQ).* **A. Ourjoumtsev** - *JEIPCdF*
- *In-vacuum Fibers for a Quantum Interface with Strontium ionS (IFQSS).* **V. Cambier** - *MPQ*
- *Near field imaging of THz Resonators with Rydberg Atoms (TERRA).* **A. Laliotis, J-M. Manceau** - *LPL, C2N*
- *Quantum Atomic Force Microscope (Quantum-AFM).* **I. Favero** - *MPQ*
- *Improving NV-based detection of superconductivity in diamond anvil cells (iNV-DAC).* **J-F. Roch** - *LuMIn*

APV: Valorizing research through technology transfer (3/5)

- *Ultralow-power logic-in-memory devices based on ferroelectric two-dimensional electron gases (ULTIMATE).* **M. Bibes** - *LAF*
- *Optomechanical Microscale Multiphysics Sensor (OMiMUS).* **I. Favero** - *MPQ*
- *NANOpositionneurs cryogéniques à MOUVement glissant collant (NANOMOUV).* **F. Debontridder** - *INSP*