



QUEST-IS'25

QUANTUM ENGINEERING SCIENCES &
TECHNOLOGIES FOR INDUSTRY & SERVICE



INTERNATIONAL YEAR OF
Quantum Science
and Technology



From Quantum Engineering to Applications for Citizens

1st December 2025 – 5th December 2025

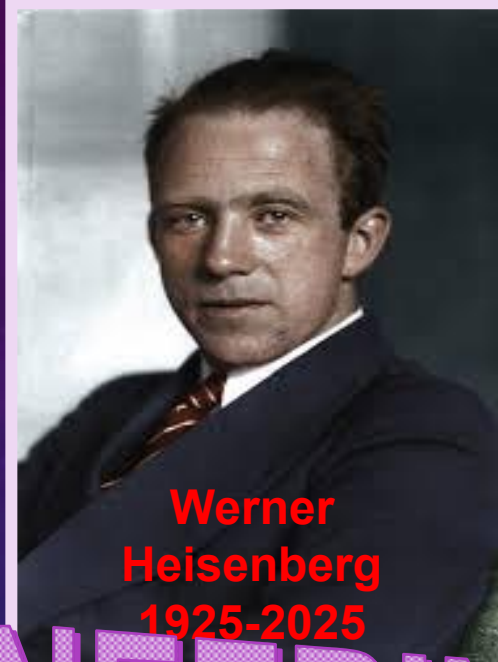
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SEE Congress department



INTERNATIONAL YEAR OF
Quantum Science
and Technology



Werner
Heisenberg
1925-2025

QUANTUM ENGINEERING



Sadi Carnot
Ingénieur-Savant
1824-2024

The etymology of the word **engineering**

Engineer in Middle English appears around the **14th century**.

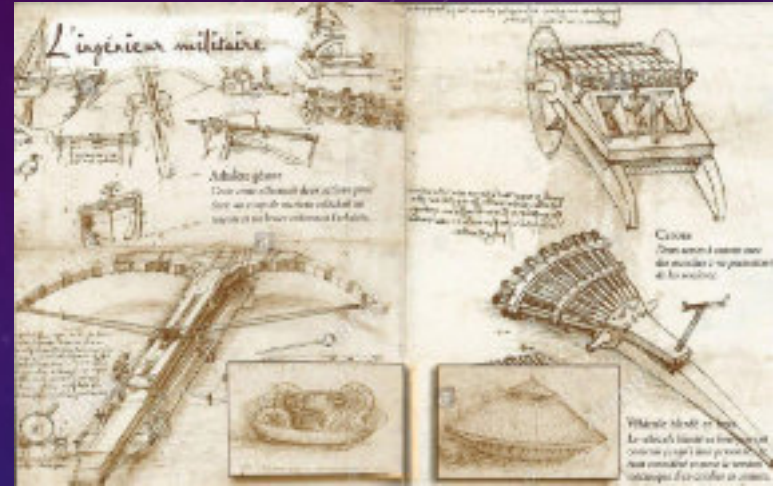
- Middle English **engineer** / **enginour** / **engineneur**
→ meaning a **designer or constructor of engines** (devices, machines, fortifications).
- These “engines” were often **military machines**: catapults, trebuchets, siege towers, etc.

Where “engine” comes from

- Old French **engin** (12th century)
→ *skill, cleverness; war machine; device*
- From Latin **ingenium**
→ *innate ability, natural talent, clever invention, ingenuity; a contrivance.*

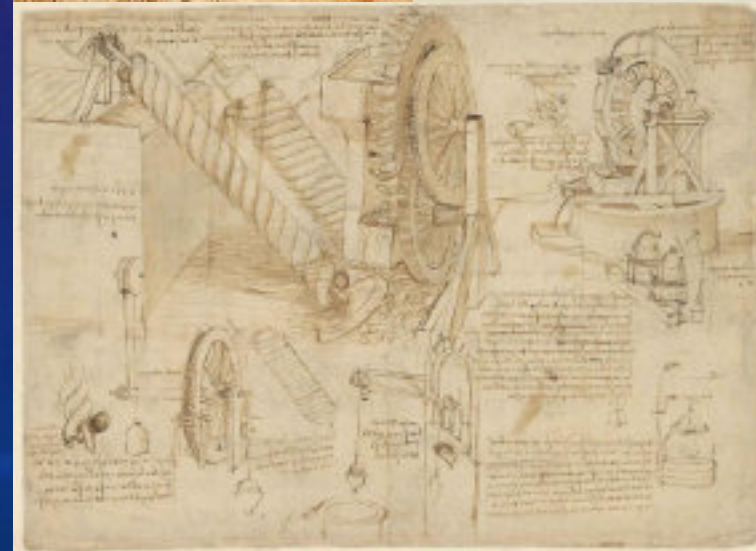
The deeper Latin root

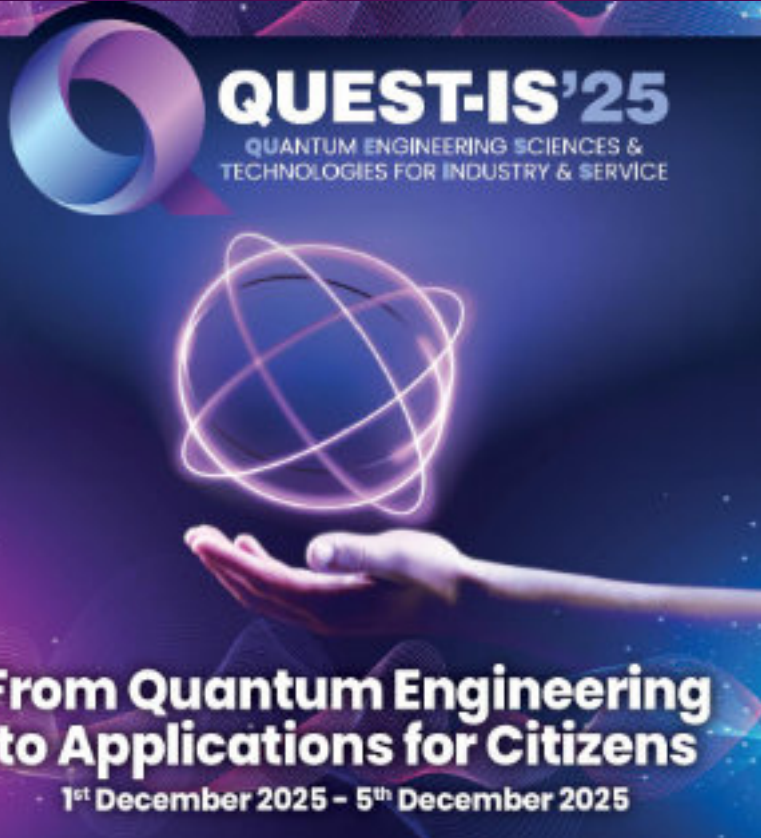
- **ingenium** comes from **in-** (in, into) + **gignere** (to beget, to produce).
→ Literally: “**that which is born within**”, i.e., **natural talent or inventive capacity.**



**Leonardo
da Vinci**

di Leonardo da Vinci





INSTITUTIONAL OPENING SESSION



Loïc LELOARER
Head of the French
Quantum Strategy
SGPI

Bruno BONNELL
SGPI (Secretary General
for Investment)
FRANCE 2030



Alexandre LAHOUSSE
Deputy Director
DGA



Patrick AUFORT
Director
AID (Agence de
l'Innovation de Défense)



QUEST-IS BOOKLET



From Quantum Engineering to Applications for Citizens



1st International Quantum Engineering Conference & Exhibition
EDF Lab, Paris Saclay, France December 1st - December 5th, 2025



SOCIÉTÉ DE L'ÉLECTRICITÉ, DE L'ÉLECTRONIQUE
ET DES TECHNOLOGIES DE L'INFORMATION ET DE LA COMMUNICATION
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**The Electricity Fairy
(Raoul Dufy)**



**The Quantum Fairy
(Caroline Delétoille)**

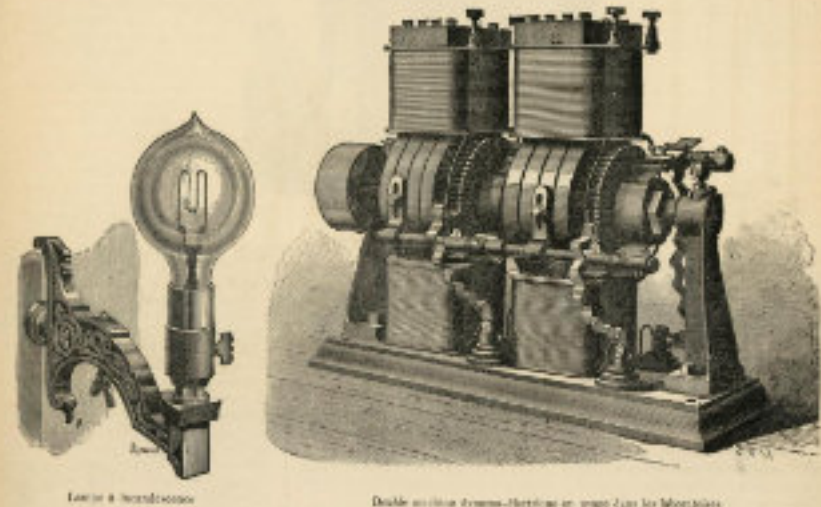


**Exposition internationale d'Electricité 1881
Palais de l'Industrie PARIS**



HENRIETTE-KLEINSTEIN, DE VOIR Georges de 小正里恩	JOURNAL SEMAINE DIMANCHE 10 OCTOBRE 1981 DE NUMERO - 70	ASSOCIATION : SLOVO DELARY 21 Boulevard - 130 08, St. M. 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871
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A la fin de l'exposition, le Journal continuera à paraître sous ce titre : JOURNAL DES SCIENCES APPLIQUEES A L'INDUSTRIE.



Concurrent with the Exposition, the **first International Congress of Electricians**, held in the halls of the Palais du Trocadéro, provided an opportunity for numerous scientific and technical presentations.

PHILIPPE AGHION NOBEL PRIZE 2025 FOR « THE THEORY OF SUSTAINED GROWTH THROUGH CREATIVE DESTRUCTION »

*Sadi Carnot, archetype
of the French
“Ingénieur Savant”*



Sadi Carnot

Classical
Thermodynamics
Engineer-Scientist
19th Century

WATT
(Power)



STEAM ENGINE

1712

WATT-HOUR

(Energy)

GDP per person

— United Kingdom — Sweden

\$

50,000

40,000

30,000

20,000

10,000

0

1825

1900

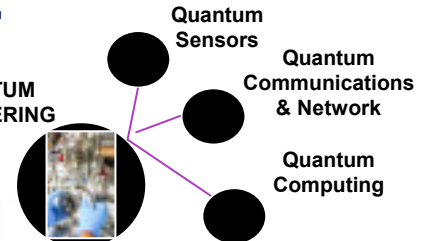
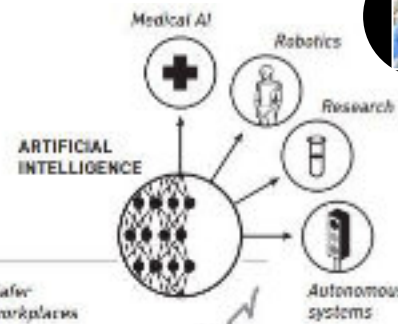
2022

GFLOPS
(Entropy)

GFLOPS/WATT

(Dissipation)

QUANTUM
ENGINEERING



Pierre Rouchon

Quantum
Thermodynamics
Engineer-Scientist
21th century



Philippe Aghion
Nobel Prize in
Economy

Figure 4. Over the past 200 years, annual growth has been around 1.5 per cent in Sweden and the United Kingdom. Technological innovations and scientific progress have built upon each other in an endless cycle. Data: Maddison Project Database 2023 with underlying sources from Broadberry et al. [2015], Krantz [2017], Schön and Krantz [2015].

SEE at a glance

- Meeting place for science, industry and society
- An officially recognised non-profit organisation
- About 2000 members and 5000 individuals involved
- Large participation from industry (~50%)
- 19 «Clubs techniques» and 12 «Groupes régionaux»
- Organizes conferences and seminars
- Initiates/attracts International Conferences in France
- Institutional French member of IFAC and IFIP
- Awards (Glavieux/Brillouin Prize, Général Ferrié Prize, Néel Prize, Jerphagnon Prize, Blanc-Lapierre Prize, Thévenin Prize), grades and medals (Blondel, Ampère)
- Publishes 3 periodical publications (REE, ...) & 3 monographs each year
- Web: <http://www.see.asso.fr> and LinkedIn SEE group
- SEE Presidents: Louis de Broglie, Paul Langevin, ...



Paul Langevin



Louis de Broglie

1883-2025: From SIE & SFE to SEE: 142 years of Sciences
Société de l'électricité, de l'électronique
et des technologies de l'information et de la communication



1881

Exposition Internationale d'Electricité



1883: SIE
Société
Internationale
des Electriciens



1886: SFE
Société
Française
des Electriciens



2025: SEE

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Dr. Djeylan Aktas

(Institute of physics SAS, Bratislava)

Experimental Quantum Communications



Pr. Alain Aspect

(Paris-Saclay Univ., France)

The two quantum revolutions : from concepts to applications



Olivier Ezratty

(Freelance quantum engineer, France)

The interplay between Quantum Engineering and Quantum Science



Pr. Marco Genovese

(INRIM, Italy)

Quantum Sensors



Pr. Frank Phillipson

(TNO, Netherlands)

Quantum Computing Applications



Pr. Pierre Rouchon

(Mines-Paris Univ., France)

Quantum error correction and feedback



Richard Versluis

(TNO/TU Delft, Netherlands)

Quantum Enabling Technologies Engineering



Pr. Oscar Diez

(European Commission Representative, DG Connect, EU)

The European Commission's Vision for Quantum Engineering: Challenges and Opportunities in EU-Funded Projects



Pr. Vicente Martin

(Univ. Politécnica de Madrid, Spain)

Quantum Engineering

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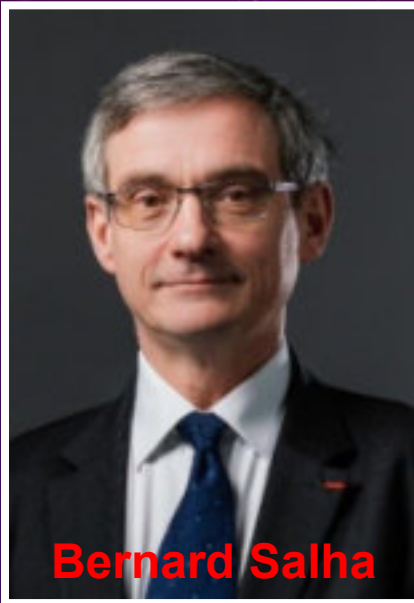


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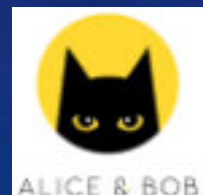
NATO Chief Scientist



**Shane
MANSFIELD**



**QUANDELA
Chief Research Officer**

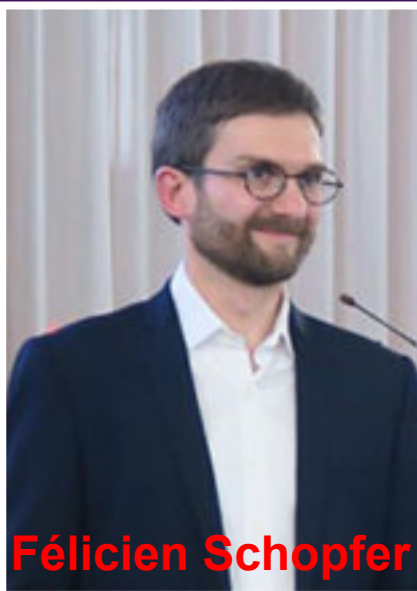


**Rémi de
LA VIEUVILLE**

**ALICE&BOB
Head of Quantum HPC**



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Félicien Schopfer

LNE MetriQs Manager



**Cocktail by invitation
(Bus transport from EDF)**

SLIDES



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Required File Naming Convention

Your file must be named as follows:

day – room – paper number

Examples:

- **01-theatre-605** → Day 1, Amphitheatre, Paper 605
- **03-auditorium-705** → Day 3, Auditorium, Paper 705

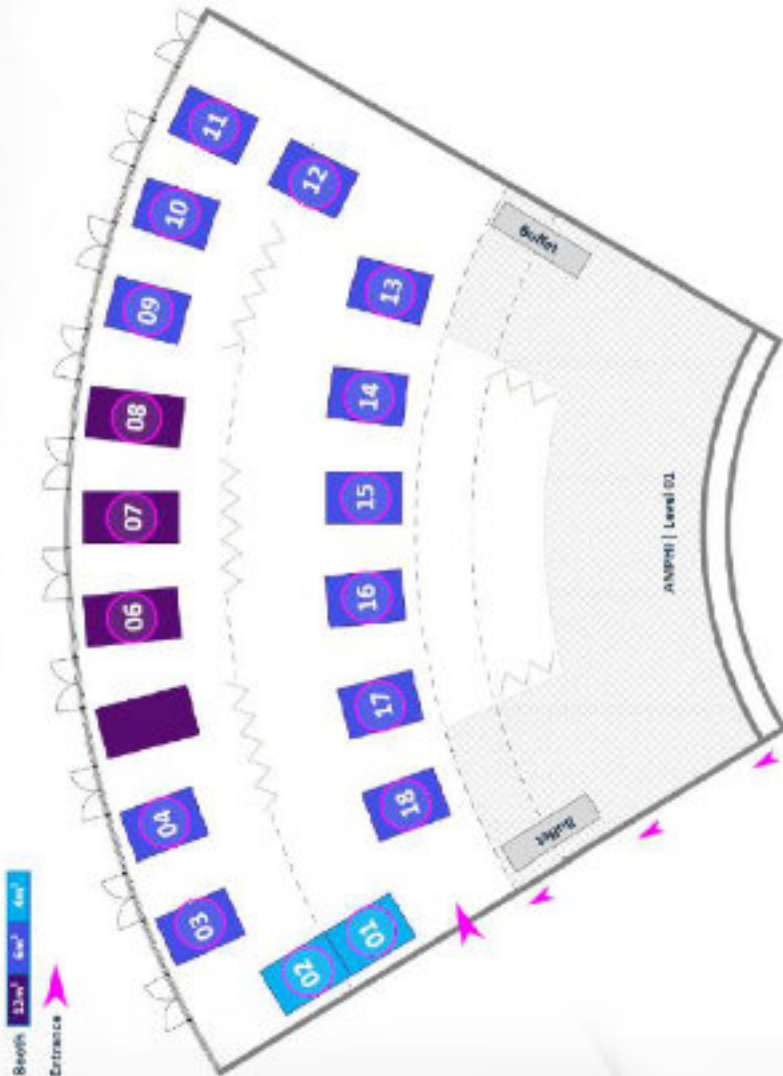
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Exhibition Zone

Exhibition Map

Exhibitors List

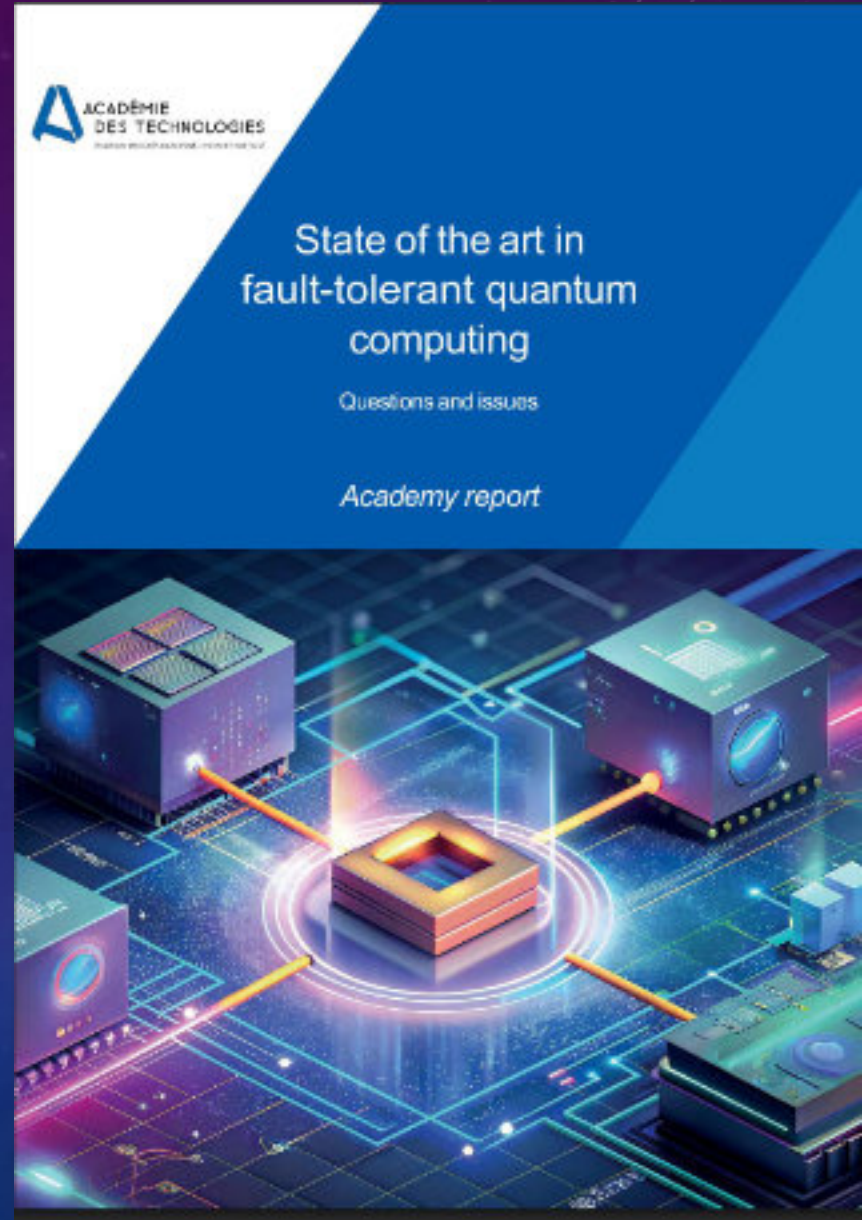
Exhibition map | EDF LAB PARIS-SACLAY | AZUR BUILDING | GROUND FLOOR FOYER



- | | |
|----|---|
| 01 | Académie des technologies |
| 02 | Qnity |
| 03 | Alice & Bob |
| 04 | Quandela |
| 06 | Agence Innovation Défense -AID |
| 07 | Thales |
| 08 | IBM |
| 09 | SK Broadband |
| 10 | Nokia |
| 11 | Makors du Quantique |
| 12 | CEA |
| 13 | Laboratoire national de métrologie et d'essais -LNE |
| 14 | IEEE |
| 15 | DEMICON |
| 16 | Radiall |
| 17 | NATO |
| 18 | Qnoby |

2025 REPORT OF FRENCH ACADEMY OF TECHNOLOGIES

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69 Selected papers over 120 are edited by SPRINGER in this QUEST-IS Proceedings.

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We have received more than 120 papers. Some of them have been rejected in a first phase (topic not compliant, plagia, ...).

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84 submissions have been selected for QUEST-IS oral talks and additional 17 in Posters.

QUEST-IS SPRINGER PROCEEDINGS



This two-volume set **SPRINGER NATURE CCIS 2743 and 2744** constitutes the refereed proceedings of more than 700 pages. The full papers included in this book were carefully reviewed and selected.

They were organized in topical sections as follows:

Part I: Enabling Technologies; Quantum Sensors Applications; Quantum Sensors in Detection and Sensing; Quantum Communications – Test Platforms for Qkd; Quantum Key Distribution; Towards A Quantum Internet Infrastructure; Quantum Algorithms, Computing & Simulation – Benchmarking: Methods & Applications; Error Mitigation & Fidelity; and Quantum Algorithms for Finance & Industry.

Part II: Quantum Algorithms, Computing & Simulation – Quantum Algorithms for Finance & Industry; Scheduling, Logistics & Complex Systems; Quantum Machine Learning; Physics & Engineering Applications; Simulation & Quantum Chemistry; Hardware & Architectures; and Specialized Applications & Security.

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First International Conference, QUEST-IS 2025, Paris, France, December 1–4, 2025, Proceedings, Part I

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Organization of the Sessions

SESSION MONDAY, DECEMBER 1ST

Time	Auditorium I	Amphithéâtre
09:00	Opened by Bruno Bonnell General Secretary for Investment (Prime Ministry) France 2030	
09:20	Platinum sponsors addresses A/D	
09:40	QUEST'IS General Chairs (F. Barbaresco & F. Gisin) Opening & General announcements about the conference	
09:55	Welcome address by EDF Executive	
09:50	Platinum & Gold sponsors addresses THALES, NATO STO TSI & CEA	
10:45-11:20	Coffee break	
11:20	Quantum error correction and feedback Keynote speaker : Pierre Rouchon(French Academy of Sciences)	
11:50	The interplay between Quantum Engineering and Quantum Science Keynote speaker : Olivier Ezry(Author of Understanding Quantum Technologies)	
12:20	Inauguration and Visit of the QUEST'IS 2025 Exhibition	
12:20-13:30	Lunch break	
13:30	Quantum Sensors Keynote speaker : Marco Sanvenera(NRRI)	
14:00	"Parallel session ""Sensors"" Chair: Magnus HÖGER, Guido TORRESE"	"Parallel session ""Computing, Algorithms, Simulation"" Chair: Frédéric BARBARESCO, Emmanuelle VERGNAUD"
14:00	Design Concept of NV-Center-Based Wideband Current Comparators (E11) Yasutaka AMAGAI, Hidekazu MURAMATSU, Yuta KANFURA, Hiromitsu KATO, Norihiko SAKAMOTO, Nobu-Hisa HANENO, Yuki HATANO, Mutsuko HATANO, Takayuki INASAWA	BenchQC - Scalable and modular benchmarking of industrial quantum computing applications (E23) Florian GOSSLER, Eric STOPFER, Christian UFFRICH, Nico MEYER, Daniel D. SCHERER, Friedrich WAGNER, Johannes M. OBERREUTER, Zao CHEN, Alessandro MAGGI, Daria GUTINA, Ulrich SCHWENK, Kimberly LANGE, Vanessa JUNK, Thomas HUSSEIN, Marvin ERDMANN, Florian KOWT, Benjamin DECKER, Greshma SHAJI, Etienne GRANET, Henrik DREYER, Theodora-Augustina DRAGAN, Jeanette Miriam LORENZ

14:20	Detection of grinding burns with NV center in diamond magnetometer (201) Baptiste VINDOLET, Guillaume BOURCIN, Benjamin DUCHARNE, Hoa Nam NGUYEN, Xavier MOUGENOT, Christophe GALLAIS, Thomas HINGANT	BACQ - Application-oriented Benchmarks for Quantum Computing Made Easy (E13) Frédéric BARBARESCO, Frédéric SCHOPFER, Emmanuelle VERGNAUD
14:40	Unsett Gere - An Open-Source Hackable Quantum Sensor (E61) Mark CARNEY, Victoria KUMARAN	Quant'AI - An End-to-End Quantum AI Benchmarking Framework for Both Researchers and Practitioners (E57) Cristinel CORVALAN MORBEUCO, Pascal HALFMANN, Andrew BARLOW, Alexander GENG, Ali MOGHISEH, Michael TREBING, Christine PRILADA, Hans-Martin REISER, Colin STAHLKE
15:00	Quantum Sensing Applications for Nondestructive Evaluation in the Nuclear Industry (E95) Luks BREDEL, Emma WONG	Application of Multi-Criteria Decision Aiding to Quantum Benchmarking: Some Results on Scale Invariance (E70) Christophe LABREUCHE
15:20-15:50	Coffee Break + QUEST'IS Poster session	
15:50	Platinum & Gold sponsors addresses IBM, QUANTERA, ALCANTARA	
16:30	"Parallel session ""Sensors"" Chair: Khalid ALMUTAIRI, Yasutaka AMAGAI"	"Parallel session ""Computing, Algorithms, Simulation"" Chair: Frédéric SCHOPFER, Rishu WU"
16:30	Noise Mitigation in Single Microwave Photon Counting by Cascaded Quantum Measurements (E76) Alexandre MAR, Emmanuel FLURIN	Benchmark of MRF algorithms on Quantum Computer (E48) Paul ROUSSET-ROUARD, Bing Hong TEH, Jean-Marc DRAGON
16:50	Molecular Spectroscopy Experiments for Direct Detection of Dark Matter (E94) Romain LUCAS CONSTANTIN	The Maximum Cardinality Matching problem G_n series as a benchmark for quantum computers (E88) Stéphane LOUISE
17:10	Transformation of photon statistics via generalized moment generating function (E97) Amrour RAHMI	Benchmarking data encoding methods in Quantum Machine Learning (E69) Olivier ZANG, Grégoire BARRUE, Tony QUERTIER
17:30	Microwave Sensing by Trap Loss Spectroscopy in a Cold Ensemble of Rydberg Atoms (E09) Romain GRÄBER, Alexis SCHÄFER, Anthony EL BEKAI, Sylvain SCHWARTZ	Quantum Emulator Benchmarking Made Easy (E28) Anna LEONTEVA, Maxime OUTTERDYCK, Guido MASSELLA
17:50	Evaluating Quantum Wire Cutting for QAOA: Performance Benchmarks in Ideal and Noisy Environments (E21) Michel MEULEN, Neils NEUMANN, Jasper VERBREE	
18:10	Governmental talk	
18:30-19:30	Transportation by coaches from EDF R&D Paris Saclay Campus to UPE Paris headquarters	
19:30-21:00	LNE Cocktail	

SESSION TUESDAY, DECEMBER 2ND

Time	Auditorium 1	Auditorium 2
09:00	Opening Session — The two quantum revolutions: from concepts to applications Alain Aspect (Prix Nobel de Physique 2022)	
09:30	Experimental Quantum Communications Deyan Ahtas	
10:00 - 10:30	Coffee Break + QUEST-IS Poster Session	
	"Quantum Communications – Test Platforms for QKD Chair: James GRIEVE, Romulo ALLEAUME, Laurent LABONTE"	
10:30	"The Gilles Brassard Laboratory: A Research Platform for Secure Quantum-Era Communications (193) Antoine DIERICK, Lohita RAKOTONDRAIBE, Jonathan PISANE"	
10:50	"Development of National Quantum Safe Network Testbed in Singapore (177) Hao QIN, Jing Yan HAW"	
11:10	Metrology for Real-World QKD (160) Alice MEDA, Salvatore VIRZI, Marco GRAMEGNA, Giorgio BRDA, Marco GENOVESE, Ivo Pietro DEGIANNI	
11:30	Quantum: A Modular Quantum Communication Testbed for Scalable Fiber and Satellite Integration (212) Julien CHENEDE	
11:50	Quantum enabling technologies from science to engineering Richard Versakis	
12:20 - 12:10	Lunch Break	
	"Quantum Enabling Technologies Chair: Guillaume DE GIOVANNI, Mathieu TALPIN"	
13:10	Thales' Roadmap and Product Innovations in Cryogenics for Quantum Applications (109) Christophe VASSE, Garrit DE JONGE, Emilien DURUP, Florian DUPE, Daniel WILLEMS	
13:30	Development of Cryogenic Infrastructures for Quantum Computing (114) Simon CRISPEL, Florian MARTIN, Mathieu SCHMIGEL, Jean-Marc BERNHARDT	
13:50	Preliminary Demonstration of Spin Qubit Control Using the Quantum Instrumentation Control Kit (QICK) (119) Dana EL HAJI, Yvelin SCHMITT, Xavier JEHL, Benjamin CRITON, Guillaume DE GIOVANNI, Jérémie THEZE, Arnaud PERRIN	
14:10	Microwave Interconnectivity as a Scalable Solution for Quantum Computing (120) Laurent PETIT, Evan ICHER, Fabrice JANOT, Fleury GRANDJEAN, Guillaume MARION, Thierry LE NADAN, Claude BROCHETON, Bastien HUON, Jacques MARTINET, Julien LEGRAND	
14:30	Scalable Photonic Control System for Large Scale Quantum Computers (203) Abhishek Anandpally, Maeva Franco, Arnaud Perrin, Jérémie Théze, Dana El Haj, Guillaume De Giovanni	
14:50	"Quantum Algorithms, Computing & Simulation – Error Mitigation & Fidelity Chair: Jérémie GUILAUD, Simeon SADANA"	"Quantum Algorithms for Finance & Industry Chair: Amos RIERA, Rosie WU"
14:50	Optimizing Qubit Routing with Bridge Gates: Extending Quantum Circuit Efficiency Across Arbitrary Distances (168) Ward Van der Schoot, Willem De Kok, Frank Philippon	Q-PORT: Quantum Portfolio Optimization with Resource-Efficient Encoding and Scalability Analysis (131) Alberto Marchais, Muhammad Umar Hafeez, Noohalla Inan, Muhammad Kashif, Muhammad Shafique

15:10	No Scratch Quantum Computing by Reducing Qubit Overhead for Efficient Arithmetic (185) Ornid Raizy, Norbert Wüth, Paul Lukowicz, Maximilian Kiefer-Emmanouilidis	Quantum Amplitude Estimation in Practice: A Case Study in Option Pricing (132) Noohalla Inan, Muhammad Kashif, Alberto Marchais, Moonis Usman, Muhammad Shafique
15:30	Quantum Minimal Learning Machine: A Fidelity-Based Approach to Error Mitigation (182) Clemens Lindner, Joonas Hämäläinen, Matti Raesske	Not-Starting Quantum Portfolio Optimization (164) Sebastian Schütler, Tomislav Maras, Alexander Dötterweich, Nico Platkowski
15:50	Resource Estimation for Matrix Inversion via QSVT with the Clifford-T Gate Set (149) Hiroaki Marukani, Kenzo Makino, Yasuhiro Lee, Raita Kanno, Tomonori Fukuta	Toward Quantum Utility in Finance: A Robust Data-Driven Algorithm for Asset Clustering (207) Shyam Sharma, Supreeth Mysore Venkatesh, Pushkin Kachroo
16:10	When Quantum and Classical Models Disagree: Learning Beyond Minimum Norm Least Square (139) Simone Thabet, Léo Montbroussou, Elott Z. Mamon, Jonas Landman	Quantum Approaches for the Unit Commitment Problem – A Literature Survey (143) Frank Philippon, Sven Müller
16:30 - 17:00	Coffee Break	
17:00	"Quantum Algorithms, Computing & Simulation – Hardware & Architectures Chair: Amos RIERA, Mikko MOTTONEN"	
17:00	The Current Landscape of Quantum Hardware Development – An Overview (224) Siddharth Raghav Chander	"Quantum Algorithms, Computing & Simulation – Specialized Applications & Security Chair: Rémi de La VIEUVILLE, Frank PHILLIPSON"
17:20	Cohomology Development at IBM Quantum Computers (167) Matthew Staggs, Arthur Rebellio, Ivan Tikhomirov, Andrew Guthrie, Lihuang Zhu, Asad Karis, Alejandro Gomez-Piñero, Thomas Mylari, Eelis Takala, Leonid Abdurakhimov, Juha Hassel	A Hybrid Quantum-Classical Approach for Urban Drone Path Planning – Lessons from Implementing on Existing Quantum Computers (116) Hien Lee Kwi, Bing Hong Teh, Teik Young Chai, Yung See Gan
17:40	ST Microelectronics / Qasbiy Path for Spin-Based Large Scale Quantum Core (225) Tizian Micun, Nicolas David, Maud Vinet, Franck Arnaud, Jean-Charles Barbel	Quantum-Backed Integrity for Industrial Blockchain Events: A Secure Logging Framework Using Qiskit and Ethereum (108) Benoit Prieur
18:00	On the Entropic Cost of Measuring to Infer (211) Nathan Shethel, Alexis Auffèves	QUBO Formulation for Fault Location on Power Grid with Sparse Measurements (147) Elai Gravit, Beatriz Moyá, Sergio Tomassola, Nicolas Hacoit, Xavier Kestelyn, Rancisco Chivista, Flavi Haffit, Paul-Henri Langlois
18:40	Transportation by coaches from EDF R&D Paris Saclay Campus to Poissy Boat	
19:30 - 23:00	QUEST-IS Gala Dinner	

SESSION WEDNESDAY, DECEMBER 3RDWednesday, December 3rdWednesday, December 3rd

Time	Auditorium 1	Auditorium 2
09:00	Quantum Communications keynote speaker : Vicente Martin(Unc. Politécnica de Madrid)	
09:30	"Quantum Communications - Quantum Key Distribution" Chair : Jonathan PISANE, Nicolas FABRE, Mathias BERTRAND	"Quantum Algorithms, Computing & Simulation - Quantum Machine Learning B" Chair : Stéphane VALLÉ, Tony QUÉTIÉ
09:30	Networkwide Quantum Key Distribution with Orion Routing Relay (121) Pedro OTERO GARCIA, David PEREZ CASTRO, Manuel FERNÁNDEZ VEIGA, Ana FERNÁNDEZ VILAS	Quantum Neural Networks Under Threat: Modeling Security Risks and Attack Vectors (146) Nouhaila INAN, Walid EL MAGUANI, Alberto MARCHISIO, Muhammad SHAFIQUE
09:50	Complete centralized architectures for QKD networks (144) Soléphanie MOLIN, Anne DE CHASTENET D'ESTERRE, Eric ALGÉ, Gonzague REYDET, Philippe LE GROS, Maxime COURSIMAULT	Photonic Quantum Convolutional Neural Networks with Adaptive State Injection (188) Léo MONEROUSSOU
10:10	QKD-Encryption of Air Traffic Control Data with Negligible Extra Latency (160) Abraham SOTOMAYOR FERNÁNDEZ, Pauline GAVIGNET, Patricia ROBERT, Sandrine GRUANT, Luca CALDERARO, Alessandro EMANUELE, Costantino AGNESI, Gonzague REYDET, Olivier FERROUILLAT, Stéphane MOLIN, Nicolas COURTEL, Sébastien FOURNIER-BAZOUINE, Alexandre TREMON, Thierry ANDRE	Machine Learning-Driven Quantum Hacking of CHSH-Based QKD: Exploiting Entropy Vulnerabilities in Self-Testing Protocols (180) Hubert KOLCZ, Tushar PANDAY, Yag SHAH
10:30	Multi-Level Parameter Estimation for Receiver Noise in CV-QKD (179) Guillaume RICARD, Yves JAQUEL, Romain ALLÉAUME	EniQKD - Enabling Hybrid Quantum Applications (155) Dimitris GIADOUNAS, Martin BECHTOLD, Martin BEISEL, Patricia BICKERT, Alessio CASTANEDA MEDINA, Michael FROMM, Alexander GENG, Ilie-Daniel GHEORGHE-POP, Florian GÜTLER, Cristian GROZEA, Dominik HELDWEIN, Michael HOLZ, Matthias KABEL, Colin KAUWE BECKER, Sophia LAHIS, Fernando LIMA, Théo USART-LIEBERMANN, Danya MARTYNUK, Martin MENGEL, Ali MOGHISEH, Andreas MÜLLER, Joe RYON, Marcel SEELBACH-BENHNER, Sebastian SENGE, Nikolay TCHOUTCHEV, Felix TRUGER, Jure ULMANN, Sebastian WAGNER, Benjamin WEDER, Armin WOLF
10:50		Towards Quantum Advantage with Photonic State Injection (138) Léo MONEROUSSOU, Elvira Z. MAMON, Hugo THOMAS, Verena YACOB, Ulysse CHABAUD, Elhem KASHER
11:10-11:40	Coffee Break + QUEST-IS Poster session	
11:40	Quantum Computing Applications keynote speaker : Frank Phillips(TNO)	

12:10	"Quantum Communications - Towards a Quantum Internet Infrastructure" Chair : Pyry KAJASTEN, Bertrand MATHIEU	"Quantum Algorithms, Computing & Simulation - Physics & Engineering Applications" Chair : Geras WENDIN, Guido MASELLA
12:10	Crystalline waveguides for efficient integrated quantum memories (118) Michael CHARL, Alban FERRIER, Anne TALNEAU, Perrine BERGER, Loïc MONTVAL, Sacha WEUNSHI	Numerical experiments using block-diagonalization technique for solving Poisson's equation (158) Othman MANSOUR, Sunhyang TY, Asif TAHNASEBIMORADI, Renaud VILMART, Rim KADDAH
12:30	Entanglement routing in large-scale quantum networks with ground-space interconnection (154) Agathe BLAISE, Luca PACCARD, Fabrice ARNAL, Stéphane MOLIN, Laurent DE FORGES DE PARNY	A Hybrid Quantum-Classical Algorithm for Fault Tree Analysis Via Finding Vertex Separators in a Graph (159) Pedro Henrique PONS ROBERTIN, Mohamed HIBI, Rola SAIDI
12:50	Overview of NCIA's activities in Quantum Communications (205) Joanna SUWA, Konrad WRONA, Matej PIETRUCZAK	Quantum Annealing Approaches for Minimal Cut Set Identification in Fault Trees (145) Rola SAIDI, Luis Fernando PEREZ ARMAS, Samuel DELEPLANQUE, Mohamed HIBI, Stefan CREEMERS
13:10	On the road to satellite-based Quantum Information Networks: Hong-Gau-Mandel effect with pulsed coherent states (186) Mathieu BERTRAND, Luca PACCARD, Pedro ROLDAN GOMEZ, Laurent DE FORGES DE PARNY, Michel SOTOM, Elziane SAMAN, Olivier ALJART, Matteo SCHAVON, Sacha GRESSANI, Erik KIRSTEL, Thierry LANZ, Denis DAMANTI, Sébastien TANZILLI, Mathias VAN DEN BOSSCHE	Monte Carlo Particle Transport on Quantum Computers (189) Noé OLIVIER, Michel NOWAK
13:30		Pattern Matching Using Sliding Windows on Quantum Computers (220) Youssef FERH, Alexander GENG, Maximilian KIEFEREMMANOULIDIS, Ali MOGHISEH
13:50-14:40	Lunch break	
14:40	"Quantum Algorithms, Computing & Simulation - Simulation & Quantum Chemistry A" Chair : Antoine MICHEL, Christophe DOMAIN	"Quantum Algorithms, Computing & Simulation - Simulation & Quantum Chemistry B" Chair : Jeanette LORENZ, Aliou DESERTAIN
14:40	Solving the 3D Heat Equation with VQA via Reneshaing-Based Warm Starts (200) Samuel DONACHE, Ulysse RIMOND, Arthur MATHOREL, Kyril KAZYMYRENKO	Quantum algorithms for anisotropic diffusion and convection equations with vector norm scaling (194) Julien ZYLBERMAN, Thibaut FREDON, Nuno F. LOUREIRO, Fabrice DEBBASCH
15:00	K-ADAPT-VQE: Optimizing Molecular Ground State Searches by Chunking Operators (204) Tatiana GESPALOVA, Oumayma LAOCHARI, Guido MASELLA	Fully Quantum Algorithm for the 1-dimensional linear Lattice Boltzmann Method (141) Mohammed BEDICHE, Mathias VAN WYVEREN, Denis RICO, Pierre SAGAUT

QUEST-IS'25

Wednesday, December 3rd

15:20	A hardware agnostic resource optimizer for variational quantum eigensolver and scenarios for quantum energetic advantage (213) Harshit VERMA, Thomas AYRAL, Robert WHITNEY, Alexis AUFFEVE	Tucker iterative quantum state preparation (181) Carsten BLANK, Israel ARAUJO
15:40	Neural Network Assisted Fermionic Compression Encoding: A Lossy-QSCF Framework for Scalable Quantum Chemistry Simulations (226) Yu-Cheng CHEN, Ronin WU, Man Hei CHENG, Minhsu HSIEH	Quantum Approaches to the Minimum Edge Multiway Cut Problem (215) Ali Sabir ABBASSI, Yann DUJARDIN, Eric GOURDIN, Philippe LACOMME, Caroline PRODHON
16:00	Towards a Quantum Generative Graph-Based Clustering for Molecule Discovery (128) Julien RAUCH, Stéphane VIALLE, Damien RONTANI	Systematic improvement of the quantum approximate optimisation ansatz for combinatorial optimisation using quantum subspace expansion (178) Yann BEAUJEAULT-TAUDIERE
16:20	"Quantum Algorithms, Computing & Simulation - Scheduling, Logistics & Complex Systems Chair : Yuichi NAKAMURA, Setra RAKOTOMAVO"	"Quantum Algorithms, Computing & Simulation - Quantum Machine Learning A Chair : Stéphane VIALLE, Alain DESSERTAINE"
16:20	Constrained Quantum optimization for Scheduling Aircraft Arrivals (142) Gaspard CASSASSOLLES, Hien Lee KWA, Teck Young CHAI, Yung Sze GAN	IQNN-CS: Interpretable Quantum Neural Network for Credit Scoring (135) Abdul Samad KHAN, Nouhaila IBRAH, Aeysha KHAUQUE, Muhammad SHAIQUE
16:40	QAOA in Quantum Datacenters: Parallelization, Simulation, and Orchestration (112) Anana LIAQAT, Ahmed DARWISH, Adrian ROMAN, Stephen DIADAMO	Subspace Preserving Quantum Convolutional Neural Network Architectures (137) Léo MONBrousseau, Jonas LANDMAN, Letao WANG, Alex B. GRILLO, Elham KASHEFI
17:00	Towards Large-Scale Satellite Acquisition Scheduling with Hybrid Quantum-Classical Optimization (198) Amer DELILBASIC, Morris RIEDEL, Kristel MICHELSEN, Gabriele CAVALLARO	Quantum Geometric Learning: Encoding and Classification in Kendall Shape Spaces (174) Rasha FRUA, Mehdi HOUAS, Behjet BOUSSOFARA, Mourad BEN AMMAR
17:20	Quantum model for CVRPTW (190) Imran MEGHAZI, Eric BOURREAU	Quantum-Enhanced Consensus Clustering through Quantum Annealing and QAOA (199) Daniele FRANCHI, Rui WANG, Amer DELILBASIC, Kristel MICHELSEN, Gabriele CAVALLARO
17:40	A Specialized Hybrid Column Generation Framework for the Quadratic Multi-Knapsack Problem (127) Luis Fernando PÉREZ ARMAS, Samuel DELEPLANQUE, Stefan CREEMERS	Hybrid quantum classical algorithms: a cloud on-demand viewpoint (227) Aleksander WENNERSTEEN, Kemal BIDZHIEV, Mauro D'ARCANGELO, Matthieu MOREAU, Anton QUELLE, Alexandre DAUPHIN, Mourad BEJI
18:00	The European Commission's Vision for Quantum Engineering: Challenges and Opportunities in EU-Funded Projects Oscar Díez(DG CONNECT)	
18:30-18:45	Closing session (Paper Awards)	

TQCI SEMINAR & TUTORIALS December 4th

A TQCI dedicated to

INTERNATIONAL FEEDBACKS ON FIRST QPU INTEGRATIONS

Key sessions:

1. Integration constraints and impacts on computing/ datacenters facilities
2. Middleware aspects
3. Users first steps and experience
4. Users' perspectives and middle term needs

TQCI Seminar General Chair : Emmanuelle Vergnaud (TERATEC)



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In parallel, Tutorials proposed to acculturate to Quantum technologies, on a pay per tutorial basis. Each session is led by leading experts and limited in size to ensure interactive participation.

- **Quantum Key Distribution: from theory to practical applications**
– Yoann Pietri, LIP6, Sorbonne Université
- **Quantum Crystallographic Tomography of Phase Space: examining chemical bonds from all angles**
– Pr. Jean-Michel Gillet, Structures, Properties and Modelling of Solids lab., Paris-Saclay University, CentraleSupélec
- **Quantum RF Sensing with Hot Rydberg Atoms**
– Fabien Bretenaker, Lumière, Matière et Interfaces (LuMIn), Université Paris-Saclay, CNRS, CentraleSupélec, ENS Paris-Saclay
- **Introduction to Quantum Acceleration of Algorithms**
– Alain Sarlette, INRIA
- **Quantum Programming Languages**
– Pr. Benoit Valiron, Formal Methods Laboratory, Paris-Saclay University, CentraleSupélec
- **OpenVQA: Quantum Chemistry and Physics Simulations with Qiskit and myQLM**
– Dr. Mohammad Haidar, Lead OpenVQA Hub community and Founder Wyw, Paris

SESSION THURSDAY, DECEMBER 4TH

Thursday, December 4th

Time	TQCI Seminar program
08:30	Welcome coffee
08:45	Welcome and introduction
09:00	A- Integration constraints and impacts on computing/datacenters facilities
09:00	The integration of quantum machines into the environment of a CEA high-performance computing center
09:20	Eviden's 1 st Quantum Computer Integration
09:40	Integration of quantum computers in a HPC environment
10:00	Installation and Operation of Quantum Computers in JHPC-Quantum project
10:20	Bringing the Cat Home: Deploying On-Prem Quantum Computers with Superconducting Cat Qubits
10:40	Lasers resilience
10:40	risks to people - cryostat integration and safety - cryostat evolution roadmap and adaptations required
10:40	Electronique de contrôle (hw side)
10:40	Coffee Break
11:00	B- Middleware aspects
11:00	Practice and Experience in JHPC-Quantum: HPC Oriented quantum-HPC integration
11:20	MMIQ: Large-Scale Emulation and the Path Towards QPerfect's Fault-Tolerant Software Stack
11:40	Equipe de QDMI
11:40	Integrating actual QPU in Computing Center architecture with Qspivis
12:10	Integrating multiple QPUs into a pre-existing HPC environment
12:30	Cineca /E4
12:30	Lunch
13:30	C- Users first steps and experience
13:30:00	EuroQHPC-Integration: towards a pan-European hybrid HPC-QC platform
14:00:00	Earth Observation with HPC Systems and Quantum Algorithms
14:30:00	ONHcloud Quantum Platform & DestinE Integration
15:00:00	Many-body Quantum Score: A scalable benchmark for digital and analog QPUs and first results on a Pasqal device
15:20:00	Applicative Benchmarking for QPU: the case of DWave
15:40:00	Coffee Break
16:00:00	Users first steps and experience
16:20:00	How we renew an HPC cluster
16:40:00	Discussion on integration and validation of quantum computing technologies
17:30:00	End of day

hybrid quantum computing, December 5th

Friday, December 5th

SESSION FRIDAY, DECEMBER 5TH

Heure	Session
08:45	Welcome coffee
09:15	Introduction France
09:25	QuantumDelta The Netherlands
09:50	QuantumBW Germany
10:15	RIKEN Japan
10:40	Coffee break
10:55	DistribQ Canada
11:30	Munich Quantum Valley Germany
11:45	Maisons du Quantique France
12:10	Closing remarks
12:30	End of the session

MDQ Seminar – Day 5: Hybrid Quantum Computing Collaboration Session

December 5th 2025

Maisons du Quantique invite you to a special morning session dedicated to exploring international initiatives that support end-users in adopting and leveraging hybrid quantum computing.

The session will feature presentations from:

- Japan – RIKEN
- Canada – PINQ and University of Sherbrooke
- The Netherlands – Houses of Quantum
- Germany – QuantumBW and Munich Quantum Valley initiatives



MAISONS
DU
QUANTIQUE



Cocktail & Dinner



Only On invitation



Welcome Cocktail

The Welcome Cocktail Reception will take place on December 1st

18:30 - transportation by coaches from EDF R&D Paris Saclay Campus to LNE Paris headquarters

19:00-21:00 - Laboratoire national de métrologie et d'essais (LNE)
1 Rue Gaston Boissier, 75015 Paris

Gala Dinner

the Gala Dinner will take place on December 2nd

18:40 - transportation by coaches from EDF R&D Paris Saclay Campus to Polpo Brasserie

19:30-23:00 - QUEST-IS Gala dinner at Polpo Brasserie 47 Quai Charles Pasqua, 92300 Levallois-Perret



Quantum Engineering Challenges and Issues for Quantum Computing, Quantum Sensors and Quantum Communication

Quantum engineering denotes the systematic endeavour to transform the abstract formalism of quantum mechanics into practical technologies. It occupies a unique position at the confluence of physics, materials science, control theory, computer science, and systems engineering.

The field encompasses three principal technological domains, quantum computing, quantum sensing, and quantum communications, each facing distinct, though deeply interconnected, challenges. Despite their differences, these disciplines share a common difficulty: the engineering of systems that rely upon fragile quantum states, whose coherence can be destroyed by the slightest interaction with their environment.

- Quantum computing aspires to create fault-tolerant logical qubits but is constrained by decoherence and the immense overheads of error correction.
- Quantum sensing seeks ultimate precision, yet must balance coherence preservation with environmental coupling.
- Quantum communications endeavour to distribute entanglement securely over global distances, but remain limited by photon loss, imperfect memories, and the absence of scalable network architectures.

The future of quantum engineering lies in the emergence of a new discipline, quantum systems engineering, which formalises the design, verification, and integration of quantum devices in the same way that aerospace or microelectronics engineering did for their respective domains.