



**IQFA'11 - Université Grenoble Alpes - Institut Néel CNRS - All by visio-conferencing**



	Wednesday the 2nd of December 2020	Thursday the 3rd of December 2020	Friday the 4th of December 2020 <i>Quantum Computing Day</i>
08:30	Welcome - A. Auffèves (CNRS) & S. Tanzilli (CNRS)		National Quantum Initiative - J.-P. Bourgoin (MESRI) <i>with IQFA scientific committee</i>
09:00	<b>Tutorial - QSIM - F. Ferlaino (Uni. Innsbruck, IQOQI, Austrian Acad. Science, AT): <i>Supersolidity in the ultracold: when atoms behave as crystal and superfluid at the same time</i></b>	<b>Invited - QCOM - T. Vidick (CALTECH, USA): <i>MIP* = RE and Tsirelson's problem</i></b>	<i>See special program sheet</i> <i>Sessions Qubit Chips, Quantum-quantum Communication</i>
09:30		Contrib - QCOM - A. Durand (Univ. Montpellier, FR): <i>Single artificial atoms in silicon emitting at telecom wavelengths</i>	
10:00	<b>Invited - QSIM - T. Lahaye (CNRS, Int. Optique GS, FR): <i>Many-body physics in arrays of single Rydberg atoms</i></b>	Contrib - QPAC - M. Fellous (CNRS, Uni. Grenoble Alpes, FR): <i>Limitations in quantum computing from resource constraints</i>	
10:30	Coffee break	Coffee break	Coffee break
11:00	Contrib - QSIM - B. Vermersch (Uni. Grenoble Alpes, CNRS, FR): <i>Probing Quantum Entanglement with Randomized Measurements</i>	<b>Invited - QMET - Y. Chu (ETH Zurich, CH): <i>Quantum information processing with mechanical systems</i></b>	<i>See special program sheet</i> <i>Session Quantum Computing-oriented Nanotechnology</i>
11:30	QSIM - M. Robert-De-Saint-Vincent (Uni. Sorbonne Paris Nord, FR): <i>Adiab. spin-dpndnt momentum transfer in an SU(N) degen. Fermi gas</i>	Contrib - QMET - A. Ranadive (CNRS, Uni. Grenoble Alpes, FR): <i>A SNAIL Travelling Wave Parametric Amplifier</i>	
12:00	QSIM - I. Frerot (ICFO, Barcelona, ES): <i>Scalable device-independent certification of many-body entanglement using statistical inference</i>	Contrib - QMET - P.-A. Bourdel (Sorbonne Uni., CNRS, ENS Paris, FR): <i>Cavity Protected Polaritons in a Cold Atom Ensemble</i>	
12:30	Lunch	Lunch	Lunch
14:00	<b>Tutorial - QCOM - E. Kashefi (CNRS, Sorbonne Uni., Paris, FR): <i>Quantum Cyber Security: Challenges and Opportunities</i></b>	<b>Tutorial - FQA - I. Dotsenko (Sorbonne Uni., CNRS, ENS Paris, Coll. France, FR): <i>Quantum thermodynamics with individual atoms and trapped photons</i></b>	<i>See special program sheet</i> <i>Session Quantum Computing Systems</i>
14:30			
15:00	Contrib - QCOM - H. Defienne (Univ. Glasgow, UK): <i>Unscrambling entanglement through a complex medium</i>	Contrib - FQA - A. Abbott (Univ. Geneva, CH): <i>Computational advantage from quantum superposition of multiple temporal orders of gates</i>	
15:30	Coffee break	Coffee break	Coffee break
16:00	<b>Tutorial - QPAC - J. Petta (Princeton Uni., USA): <i>Quantum Information Processing with Spins in Silicon</i></b>	<b>Tutorial - QPAC - C. Gidney (Google AI Quantum, USA): <i>Spacetime tradeoffs when optimizing large quantum computations</i></b>	<i>See special program sheet</i> <i>Session Quantum Chip Control</i>
16:30			
17:00	Contrib - QPAC - P. Besserve (ATOS/EP, Palaiseau, FR): <i>Tackling many-body problems with a noisy quantum computer</i>	Contrib - QPAC - E. Gouzien (CEA Saclay, FR): <i>How to hack 2048 RSA code with 8100 qubits and a multimode memory with 2 hours storage</i>	
17:30	<b>Poster session 1</b> <i>All posters</i>	<b>Poster session 2</b> <i>All posters</i>	
19:00	<i>End of the day</i>	<i>End of the day</i>	<i>End of the Colloquium IQFA'11</i>



## **IQFA'11 – Friday the 4<sup>th</sup> of December 2020 – Special Day on Quantum Computing**

- 9h00 Introduction of the Q computing day, Tristan Meunier, (CNRS Institut Néel)

### **Session Qubit chips**

- 9h10 Superconducting cat qubits: a shortcut to universal fault tolerance, Théau Peronnin (Alice et Bob)
- 9h30 CMOS Superconducting Qubits, François Lefloch (CEA IRIG)
- 9h50 Spin Qubits in Si semiconductor, Benoit Bertrand (CEA-CNRS Grenoble)
- 10h10 Development of an integrated photonic platform on silicon for photonic qubits, Ségolène Olivier (CEA LETI)
- 10h30 Carbon Qubits, Pierre Desjardins (C12 Quantum Electronics)
- 10h50 Atomic Qubits, Georges Olivier Raymond (Institut d'Optique, Pasqal)
- 11h10 Pause 10 minutes

### **Session Quantum-quantum Communication**

- 11h20 Spin photon coupling, Loïc Lanco (CNRS C2N)
- 11h40 Electro-opto-mechanics for microwave-to-optical photon conversion, Sébastien Hentz (CEA LETI, MPQ, CNRS Institut Néel)

### **Session Quantum Computing-oriented Nanotechnology**

- 12h00 3D Integration & Packaging for Si quantum circuits, Jean Charbonnier (CEA LETI)
- 12h20 NanoFabrication for Superconducting quantum circuits, Denis Vion (CEA Saclay)

### **Session Quantum Computing Systems**

- 14h00 How to integrate a quantum computer in a computing centre? Jacques-Charles Lafoucrière (CEA DAM)
- 14h20 System architecture for quantum computing, Eric Guthmuller (CEA LIST)
- 14h40 Hybrid programming in the NISQ era, Thomas Ayrat (ATOS)
- 15h00 Quantum bit computer aided design (QCAD), Yann Michel Niquet (CEA IRIG)
- 15h20 Quantum Computing for Programmers: Compilation Challenges, Henri Pierre Charles (CEA LIST)
- 15h40 Pause 20 minutes
- 16h00 Quantum engineering at INRIA, Anthony Leverrier (INRIA)
- 16h20 Quantum Architecture with photons, Shane Mansfield (Quandela)

### **Session Quantum Chip Control**

- 16h40 Cryo-CMOS control circuits for quantum circuits, Gérard Billiot (CEA LETI)
- 17h00 Superconducting amplifiers, Luca Planat (CNRS Institut Néel)
- 17h20 Cryogeny for quantum computing, Philippe Camus (CNRS Institut Néel)