



All lectures will be videotaped



**Organizers:**

**Etienne Brion** (University Paris-Sud, ENS Paris-Saclay/CNRS, FR), **Eleni Diamanti** (Sorbonne University Paris, FR), **Mazyar Mirrahimi** (Inria Paris, FR), **Alexei Ourjountsev** (Collège de France & CNRS, FR), **Pierre Rouchon** (Mines ParisTech & Inria, FR)

**Invited speakers :**

**Michael Biercuk** (University of Sydney/Q-CTRL)  
**Hendrik Bluhm** (RWTH Aachen University)  
**Alfio Borzi** (University of Würzburg, DE)  
**Aashish Clerk** (University of Chicago, US)  
**Adolfo del Campo** (University of Massachusetts, Boston, US)  
**Ivan Deutsch** (University of New Mexico/CQuIC, Albuquerque)  
**Michel Devoret** (Yale University, New Haven, US)  
**Nicolas Didier** (Rigetti Computing, Berkeley, US)  
**Sophia Economou** (Virginia Tech, Blacksburg, US)  
**Franco Fagnola** (Politecnico di Milano, IT)  
**Akira Furusawa** (The University of Tokyo, JP)  
**Juan Garrahan** (University of Nottingham, UK)  
**Takis Kontos** (Laboratoire Pierre Aigrain, ENS, Paris, FR)  
**Florian Marquardt** (Max Planck Inst. for the Sc of Light, Erlangen, DE)

**Leigh Martin** (UC Berkeley, Whaley & Sidiqi groups, US)  
**Klaus Moelmer** (University of Aarhus, Denmark)  
**Hendra Nurdin** (The University of New South Wales, AU)  
**Jean-Michel Raimond** (UPMC/ LKB, ENS Paris, FR)  
**Alex Retzker** (The Hebrew University, Jerusalem, IL)  
**Alain Sarlette** (INRIA / QUANTIC, FR)  
**Sylvain Schwartz** (Labo Kastler Brossel de ENS, Paris, FR)  
**Gary Steele** (Kavli Inst & Delft Univ. of Tech., Delft, The Netherlands)  
**Mankei Tsang** (National University of Singapore, SG)  
**Lorenza Viola** (Dartmouth College, Hanover, US)  
**Howard Wiseman** (Griffith University, Brisbane, AU)  
**Rebing Wu** (Tsinghua University, CN)  
**Yanhong Xiao** (Fudan University Shanghai, CN)

## PROGRAM

### Monday July 2<sup>nd</sup>

08.45 am – 09.15 am	<b>Registration and welcome coffee – IHP ground floor</b>	
09.15 am – 09.30 am	<b>Open session</b>	
09.30 am – 10.20 am	<b>Florian Marquardt</b>	Neural networks discovering quantum error correction strategies from scratch.
10.20 am – 11.10 am	<b>Gary Steele</b>	The vacuum-gap transmon qubit: ultra-strong light matter coupling and insights into the physics of the Lamb shift.
11.10 am – 11.40 am	Coffee break IHP ground floor	
11.40 am – 12.30 pm	<b>Hendrik Bluhm</b>	A high-fidelity, quantum-control-tuned gate set for single-triplet spin qubits.
12.30 pm – 02.00 pm	Lunch break	
02.00 pm – 02.50 pm	<b>Jean-Michel Raimond</b>	Controlling a circular Rydberg state quantum simulator.
02.50 pm – 03.40 pm	<b>Alain Sarlette</b>	Towards low-complexity measurement-based feedback control.
03.40 pm – 04.00 pm	Coffee break IHP ground floor	
04.00 pm – 04.50 pm	<b>Juan Garrahan</b>	Dynamical large deviations and open quantum systems.
04.50 pm – 05.40 pm	<b>Sylvain Schwartz</b>	Building large controlled quantum systems with individual atoms.
<b>Broad Audience Conference – Joint Conderence by Klaus Mølmer</b> (Uiniversity of Aarhus, Denmark) & <b>Kim Helweg</b> (The Danish National School of Performing Arts, Copenhagen, Denmark)		
06.30 pm – 07.00 pm	<b>Klaus Mølmer</b>	«Think of atoms as guitars, flutes, timpani ...» A popular introduction to quantum physics – with music instrument analogies.
07.00 pm – 07.30 pm	<b>Kim Helweg</b>	«Composing with Quantum Information». Aspects of approaching creative musical processes with the inspiraiton from Quantum Mechanics.

### Tuesday July 3<sup>rd</sup>

09.30 am – 10.20 am	<b>Takis Kontos</b>	Mesoscopic quantum electrodynamics with carbon nanotubes.
10.20 am – 11.10 am	<b>Sophia Economou</b>	Fast, high fidelity control in spectrally crowded systems.
11.10 am – 11.40 am	Coffee break IHP ground floor	
11.40 am – 12.30 pm	<b>Klaus Moelmer</b>	Measurement signals, quantum correlation functions and quantum trajectories.
12.30 pm – 02.00 pm	Lunch break	
02.00 pm – 02.50 pm	<b>Howard Wiseman</b>	Experimental optical phase measurement at the exact Heisenberg limit.
02.50 pm – 03.40 pm	<b>Lorenza Viola</b>	Advances in Quantum Spectral Estimation.
03.40 pm – 04.00 pm	Coffee break IHP ground floor	
04.00 pm – 05.40 pm	<b>Poster session 1</b>	IHP ground floor
<b>Broad Audience Conference by Michel Devoret</b> (Yale University, New Haven, US)		
06.30 pm – 07.30 pm	<b>Michel Devoret</b>	The «Observer effect» in quantum mechanics / L' «effet observateur» en mécanique quantique.

### Wednesday July 4<sup>th</sup>

09.30 am – 10.20 am	<b>Akira Furusawa</b>	Time-domain multiplexed measurement-based quantum computing for large-scale optical quantum computing.
10.20 am – 11.10 am	<b>Yanhong Xiao</b>	Spectroscopy and spin squeezing using weak measurement.
11.10 am – 11.40 am	Coffee break IHP ground floor	
11.40 am – 12.30 pm	<b>Michel Devoret</b>	Catching and reversing a quantum jump mid-flight.

12.30 pm – 02.00 pm	Lunch break	
02.00 pm – 02.50 pm	<b>Alex Retzker</b>	Limits on spectral resolution measurements by quantum probes for nano NMR.
02.50 pm – 03.40 pm	<b>Nicolas Didier</b>	Hybrid quantum/classical computing on a 19-qubit processor based on parametrically-activated entangling gates.
03.40 pm – 04.00 pm	Coffee break	IHP ground floor
04.00 pm – 05.40 pm	<b>Poster session 2</b>	IHP ground floor

### Thursday July 5<sup>th</sup>

09.30 am – 10.20 am	<b>Ivan Deutsch</b>	Quantum computational supremacy in the sampling of bosonic random walkers on a one-dimensional lattice.
10.20 am – 11.10 am	<b>Mankei Tsang</b>	Seize the Moments: Enhancing Moment Estimation for Subdiffraction Incoherent Imaging.
11.10 am – 11.40 am	Coffee break	IHP ground floor
11.40 am – 12.30 pm	<b>Aashish Clerk</b>	Efficient reservoir engineering of complex bosonic states.
12.30 pm – 02.00 pm	Lunch break	
02.00 pm – 02.50 pm	<b>Alfio Borzi</b>	On the optimal control of a Kohn-Sham quantum model.
02.50 pm – 03.40 pm	<b>Hendra Nurdin</b>	The dynamics of quantum systems interacting with propagating pulsed quantum light.
03.40 pm – 04.00 pm	Coffee break	IHP ground floor
04.00 pm – 05.40 pm	<b>Poster session 3</b>	IHP ground floor
<b>06.30 pm – 10.00 pm</b>	<b>Cocktail Dinner</b>	<b>Sorbonne University</b> <b>Zamansky Tower – 24<sup>th</sup> floor</b> <b>4 place Jussieu – 75005 Paris</b> <b>Subway line 7 – Station : Jussieu</b> <b>Note : bring your ID card or Passport</b>

### Friday July 6<sup>th</sup>

09.30 am – 10.20 am	<b>Rebing Wu</b>	Data-driven gradient optimization for learning high-precision quantum control.
10.20 am – 11.10 am	<b>Michael Biercuk</b>	Virtualizing quantum errors: open-loop controls for noise characterization and modification of error correlations.
11.10 am – 11.40 am	Coffee break	IHP ground floor
11.40 am – 12.30 pm	<b>Adolfo del Campo</b>	Quantum thermodynamics of complex systems.
12.30 pm – 02.00 pm	Lunch break	
02.00 pm – 02.50 pm	<b>Franco Fagnola</b>	On the structure of quantum Markov semigroups.
02.50 pm – 03.40 pm	<b>Leigh Martin</b>	Quantum feedback for measurement and control.

Abstracts are available on the website of the trimester «**Measurement and control of quantum systems: theory and experiments**»  
<https://sites.google.com/view/mcqs2018/pracqsys-2018>

