

# Schedule NS166: Emerging quantum technologies

Thursday August 25			
Materials and devices 1	10:30 – 11:00	Arrival and coffee	
	11:00 – 11:15	Welcome	
	11:15 – 12:00	Heike Riel (overview)	<i>Computing – From Bits to Qubits</i>
	12:00 – 12:30	Michelle Simmons	<i>Engineering Qubits in Silicon with Atomic Precision</i>
	12:30 – 14:00	Lunch at High Court	
Materials and devices 2	14:00 – 14:30	Charles Marcus	<i>Topological Superconductivity in Epitaxial Hybrid Materials</i>
	14:30 – 15:00	Oskar Painter	<i>Quantum devices: extreme limits of the science and engineering of light-matter interactions</i>
	15:00 – 15:30	Qi-Kun Xue	<i>From topological insulators to quantum anomalous Hall effect</i>
	15:30 – 16:00	Break	
Quantum Thermodynamics	16:00 – 16:45	Masahito Ueda (overview)	<i>Information thermodynamics</i>
	16:45 – 17:15	Jukka Pekola	<i>Quantum thermodynamics experiments in superconducting circuits</i>
	17:15 – 17:45	Alexia Auffèves	<i>Quantum technologies need a quantum energy initiative</i>
	18:00 –	Dinner at High Court	

Friday August 26			
Quantum optics 1	9:00 – 9:45	Elisabeth Giacobino (overview)	<i>Quantum optics: from the first achievements to quantum technologies</i>
	9:45 – 10:15	Alain Aspect	<i>Quantum non-locality: fruitful intuitions for quantum technologies</i>
	10:15 – 10:45	Anton Zeilinger	<i>From Curiosity about Quantum Foundations to the Roots of Quantum Technology</i>
Quantum optics 2	10:45 – 11:15	Break	
	11:15 – 11:45	Yoshihisa Yamamoto	<i>Single photon coherent Ising machine</i>
	11:45 – 12:15	Atac Imamoglu	<i>Strongly correlated electrons in atomically thin semiconductors</i>
Quantum sensing 1	12:15 – 14:00	Lunch at High Court	
	14:00 – 14:45	Mikhail Lukin (overview)	<i>Programmable quantum systems for simulations, sensing and computing</i>
	14:45 – 15:15	Jun Ye	<i>Clock based on quantum matter</i>
Quantum sensing 2	15:15 – 15:45	Break	
	15:45 – 16:15	Jörg Wrachtrup	<i>Precision measurements of correlated electron materials</i>
	16:15 – 16:45	Paola Cappellaro	<i>Practical quantum advantage in sensing</i>
	18:15 –	Dinner at High Court	
	20:00 (approx.)	Alain Aspect (evening talk)	<i>To be or not to be complete: a short historical overview of the debate about quantum mechanics</i>

Saturday August 27			
Quantum communication	9:00 – 9:45	Jian-Wei Pan (overview)	<i>Dream or Reality? Quantum Communication: the Past, Present and Future</i>
	9:45 – 10:15	Artur Ekert	<i>Privacy for the paranoid ones - a quantum path towards the ultimate limits of secrecy</i>
	10:15 – 10:45	Nicolas Gisin	<i>From Bell non-locality to quantum comm- unication and back to network non-locality</i>
	10:45 – 11:15	Break	
Quantum computing 1	11:15 – 12:00	Steve Girvin (overview)	<i>Quantum Computation, Error Correction, and Simulation with Superconducting Qubits and Bosonic Modes</i>
	12:00 – 12:30	John Martinis	<i>System testing of a quantum computer</i>
	12:30 – 13:00	Michel Devoret	<i>Error correction of a logical qubit</i>
	13:00 – 14:00	Lunch at High Court	
	14:00 – 17:30	Excursion to Foteviken open air viking museum	
	19:00 –	Dinner at restaurant Glasklart	

Sunday August 28			
Quantum computing 2	9:00 – 9:45	Peter Zoller (overview)	<i>Programmable Quantum Simulators with Atoms and Ions</i>
	9:45 – 10:15	Chris Monroe	<i>Quantum Computing with Atoms</i>
	10:15 – 10:45	Immanuel Bloch	<i>Large Scale Quantum Simulations using Ultracold Atoms in Optical Lattices</i>
	10:45 – 11:15	Break	
Quantum computing 3	11:15 – 11:45	Matthias Steffen	<i>From Error Mitigation to Error Correction: A Continuous Path</i>
	11:45 – 12:15	Rainer Blatt	<i>Quantum Computation and Quantum Simulation with Trapped Ca<sup>+</sup> Ions</i>
	12:15 – 13:15	Lunch at High Court	
Theory and software 1	13:15 – 14:00	John Preskill (overview)	<i>Making predictions in a quantum world</i>
	14:00 – 14:30	David DiVincenzo	<i>Transmon platform for quantum computing challenged by chaotic fluctuations</i>
	14:30 – 15:00	Break	
Theory and software 2	15:00 – 15:30	Krysta Svore	<i>Quantum at Scale</i>
	15:30 – 16:00	Ignacio Cirac	<i>Quantum Information Theory and Many-body Physics</i>
	16:00	Closing remarks	

# List of participants NS166: Emerging quantum technologies

Alain	Aspect	invited speaker	Institut d'Optique-Université Paris-Saclay
Alexia	Auffèves	invited speaker	CNRS
Anders	Irbäck	Observer	Lund University
Andreas	Walther	Observer	Lund University
Anne	L'Huillier	Organizer	Lund University
Anton	Zeilinger	Invited speaker	Austrian Academy of Sciences/University of Vienna
Artur	Ekert	Invited speaker	University of Oxford
Atac	Imamoglu	Invited speaker	ETH Zurich
Charles	Marcus	Invited speaker	University of Copenhagen
Chris	Monroe	Invited speaker	Duke University
Claes	Fahlander	Observer	Lund University
David	DiVincenzo	Invited speaker	Juelich Research Center
Elisabeth	Giacobino	Invited speaker, IPC	CNRS
Eva	Lindroth	Observer	Stockholm University
Göran	Johansson	Observer	Chalmers
Gunnar	Björk	Organizer	KTH
Heike	Riel	Invited speaker, IPC	IBM
Heiner	Linke	Organizer	Lund University
Ignacio	Cirac	Invited speaker	Max Planck Institute of Quantum Physics
Igor	Abrikosov	Observer	Linköping University
Immanuel	Bloch	Invited speaker	Max Planck Institute of Quantum Optics
Jan-Åke	Larsson	Observer	Linköping University
Janine	Splettstösser	Observer	Chalmers
Jian-Wei	Pan	Invited speaker, IPC	University of Science and Technology of China
John	Martinis	Invited speaker	UCSB
John	Preskill	Invited speaker	Caltech
Jörg	Wrachtrup	Invited speaker	University of Stuttgart/MPI for Solid State Research
Jukka	Pekola	Invited speaker	Aalto University
Jun	Ye	Invited speaker	JILA/NIST/University of Colorado
Krysta	Svore	Invited speaker	Microsoft
Lars	Samuelson	Organizer	Lund University
Lars	Rippe	Observer	Lund University
Markus	Hennrich	Observer	Stockholm University
Martin	Leijnse	Organizer	Lund University
Masahito	Ueda	Invited speaker, IPC	The University of Tokyo
Matthias	Steffen	Invited speaker	IBM
Michel	Devoret	Invited speaker	Yale University
Michelle	Simmons	Invited speaker	Silicon Quantum Computing
Mikhail	Lukin	Invited speaker, IPC	Harvard University
Mohamed	Bourennane	Organizer	Stockholm University

Nicolas	Gisin	Invited speaker	University of Geneva
Niels	Obers	Observer	NORDITA
Oskar	Painter	Invited speaker	Caltech
Paola	Cappellaro	Invited speaker	MIT
Per	Delsing	Organizer	Chalmers
Peter	Samuelsson	Observer	Lund University
Peter	Zoller	Invited speaker, IPC	University of Innsbruck
Qi-Kun	Xue	Invited speaker	SUSTech/Tsinghua University
Rainer	Blatt	Invited speaker	University of Innsbruck
Simone	Gasparinetti	Observer	Chalmers
Stefan	Kröll	Organizer	Lund University
Stephanie	Matern	Observer	Lund University
Steve	Girvin	Invited speaker, IPC	Yale University
Thors			
Hans	Hansson	Observer	Stockholm University
Tõnu	Pullerits	Observer	Lund University
Val	Zwiller	Observer	KTH
Ville	Maisi	Observer	Lund University
Yoshihisa	Yamamoto	Invited speaker	NTT Research, Inc.