Acknowledgements

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Practical information

Arrival There are several options to reach the conference site. **Standard Monday arrival:** Take the free bus shuttle from Modane train station to Aussois on Monday Dec. 3th at 11h15 in front of the station. **Arrival by car:** Take highway A43 from Chambery to Modane, then follow Aussois. The Centre Paul Langevin, located on top of Aussois, is indicated from the village center.

Departure Sessions will end at 12h00 on Thursday Dec. 6. You can either order a lunch bag or have lunch at the cafeteriat. **Departure from Chambéry:** A free bus shuttle will leave from Aussois at 12h15 (arrival at 14h00 at Chambéry train station). **Departure from Modane:** For a later departure after lunch, take a taxi to Modane (around 10 euros per person if the cab is filled by 4 persons), or try to share a car with colleagues.

Internet connection A wifi service is available throughout the center.

Booklet of abstracts In order to avoid unnecessary paper waste, the full booklet of abstracts has not been printed but sent by email to all participants. It can also be downloaded on the conference website: https://gdr-meso-ple18.sciencesconf.org.

Talks The general format will be 30 minutes, including questions. Please address at least half of your presentation to PhD students or non-specialists. Please prepare a pdf file that you will distribute to the organizers during the conference so that your slides can be made available on the conference website.

Posters Poster sessions will take place on Monday and Tuesday evening, with some refreshments. The posters can hang in place during the whole conference and will be presented at both sessions. A complete list of the posters and participants is provided at the

end of this booklet (detailed abstracts can be found in the full online booklet).

Hiking: A part of Wednesday afternoon (12:00 to 16:30) will be free, as well as Monday morning for the early arrived. It is possible to start hiking directly from the conference center, which suggests a list of short or long walking tours. Due to the likely presence of snow (and if not, of mud), bring a good pair of hiking shoes in case you would like to do some exercise. It is possible to order one day in advance a lunch bag for picnic.

Program of the oral sessions

Monday December 3 - opening

10:00-14:00 Welcome and registration at the Centre Paul Langevin
10:45 Arrival in Modane of the TGV train from Paris
11:00 Free bus shuttle from Modane to Aussois

12:00-13:30 - **Lunch** -

13:55-14:00 Opening by the organizing committee

Monday December 3 - "Ultra-fast nano-electronics"

14:00-14:30 **Gwendal Fève** (LPA, Paris)
"Quantum tomography of electrical currents"
14:30-15:00 **Ines Safi** (LPS, Orsay)
"A unified framework for time-dependent transport"
15:00-15:30 **Dario Ferraro** (Universita degli studi di Genova)
"Crystallization of Levitons in a strongly interacting background"

Monday December 3 - "Quantum oscillators I"

15:30-16:00 **Ambroise Peugeot** (SPEC, Saclay)
"Quantum microwaves with a DC-biased Josephson junction"

16:00-16:30 - **Coffee break** -

16:30-17:00 **Fabio Pistolesi,** (LOMA, Bordeaux)
"Coupling of mechanical modes to two-level systems: "topological energy transfer"
17:00-17:30 **Jérémie Viennot** (NEEL, Grenoble)
"Phonon-number-sensitive electromechanics"
17:30-18:00 **Manuel Houzet** (INAC, Grenoble)
"Microwave spectroscopy of a weakly-pinned charge density wave in a Josephson-junction chain"

18:00-18:30 **Tino Cubaynes** (LPA, Paris)
"Highly coherent spin states in carbon nanotubes coupled to cavity photons"

19:15-20:30 - **Dinner** -

20:30-22:30 - **Poster session with refreshments** -

Tuesday December 4 - "Special session: Machine learning"

09:00-09:30 **Xavier Waintal** (INAC, Grenoble)
"An Introduction to Machine Learning for physicists"
09:30-10:00 **Nicolas Regnault** (LPA, Paris)
"Machine Learning for Quantum Many-body Physics"
10:00-10:30 **Emmanuel Flurin** (SPEC, Saclay)
"Recurrent Neural Network for the Prediction of Quantum Trajectories from Raw Observations"

10:30-11:00 - **Coffee break** -

Tuesday December 4 - "Mesoscopic superconductivity I"

11:00-11:30 **Florian Vigneau** (INAC, Grenoble)
"Gate-tunable superconductivity and ballistic transport in Germanium two dimensional hole gas"
11:30-12:00 **Marcelo Goffman** (SPEC, Saclay)
"Putting a spin on the Josephson Effect"

12:00-14:00 - **Lunch** -

Tuesday December 4 - "Topological matter I"

14:00-14:45 **Andrei Bernevig** (Princeton, MPI Halle, Berlin)
"Topological quantum chemistry and finding higher order Topological Insulators"

14:45-15:15 **Sophie Guéron** (LPS, Orsay)
"High frequency probing of the topological protection of Bismuth nanowire hinge states"

15:15-15:45 **Guillaume Weick** (IPCMS, Strasbourg)
"Manipulating type-I and type-II Dirac polaritons in cavity-embedded honeycomb metasurfaces"

15:45-16:15 - Coffee break -

Tuesday December 4 - "Quantum Oscillators II"

16:15-16:45 **Ioan M. Pop** (KIT, Karlsruhe)
"Granular aluminum: A superconducting material for high-impedance quantum circuits"

16:45-17:15 **Nicolas Roch** (NEEL, Grenoble)
"Probing the influence of many-body fluctuations on Cooper pair tunneling using circuit QED"

17:15-17:45 **Clarke Smith** (Yale)
"Superconducting circuit protected by two-Cooper-pair tunneling"

17:45-18:15 **Théau Peronnin** (ENS Lyon)
"A number-resolved, non-destructive photo-counter of propagating microwave photons"

19:00-20:30 - Dinner -

20:30-22:30 - Poster session with refreshments -

21:00-23:00 - Meeting of the GDR board -

Wednesday December 5 - "Topological matter II"

09:00-09:30 **Pierre Delplace** (ENS Lyon)
"Topological geo-physical waves"

09:30-10:00 **Christophe Brun** (INSP, Paris)
"Two-dimensional topological superconductivity in Pb/Co/Si(111)"
10:00-10:30 **Denis Chevallier** (U. Basel)
"Topological Phase Detection in Rashba Nanowires"

10:30-11:00 - **Coffee break** -

Wednesday December 5 - "Strongly correlated systems"

11:00-11:30 **Frédéric Pierre** (C2N, Palaiseau)
"Circuit Quantum Simulation of a Tomonaga-Luttinger Liquid with an Impurity"
11:30-12:00 **Corentin Bertrand** (INAC, Grenoble)
"Reconstructing the underlying analytical structure of Feynman diagrams expansions"

12:00-14:00 - **Lunch** -

14:00-16:30 - **Free afternoon** -

Wednesday December 5 - "2D materials and devices I"

16:30-17:00 **Vincent Renard** (INAC, Grenoble)
"Twisted graphene layers under heterostrain"
17:00-17:30 **Gilles Montambaux** (LPS, Orsay)
"Orbital graphene: topological properties of distorted flat bands"
17:30-18:00 **Boris Brun** (UCL Louvain)
"Imaging Dirac fermions flow through a circular Veselago lens"
18:00-18:30 **Louis Veyrat** (NEEL, Grenoble)
"Magnetotransport in a graphene gate-defined saddle point constriction"

18:30-19:00 - **General discussion on the GDR**

19:00-21:00 - **Conference Dinner: Pierrade** -

Thursday December 6 - "2D materials and devices II"

09:00-09:30 **Fabien Vialla** (ILM, Lyon)
"Manipulation and transport of charge carriers and excitons in van der Waals heterostructures based on transition metal dichalcogenides"

09:30-10:00 **Raphaëlle Delagrange** (U. Basel)
"Signatures of van Hove Singularities Probed by the Supercurrent in a Graphene-hBN Superlattice"

10:00-10:30 **Romain Danneau** (KIT, Karlsruhe)
"From confining superconductivity to quantized supercurrent"

10:30-11:00 - **Coffee break** -

Thursday December 6 - "Mesoscopic Superconductivity II"

11:00-11:30 **Denis Feinberg** (NEEL, Grenoble)
"Tuning the topology of Andreev bound states in two and three-terminal Josephson junctions with a quantum dot"

11:30-12:00 **Anil Murani** (SPEC, Saclay)
"Absence of dissipative quantum phase transition in Josephson junctions"

12:15 - **Departure for Chambéry with the free bus shuttle (with lunch bag)**

12:00-13:00 - **Lunch** -

Poster titles (alphabetical list of first authors)

Romain Albert *"On-demand anti-bunched microwave photons from inelastic Cooper-pair tunneling"*
David Alspaugh *"Proximity-induced superconductivity at nonhelical topological insulator interfaces"*
Carles Altimiras *"Wide-band amplification and squeezing with a dc biased SIS junction parametrically pumped"*
Anthony Amisse *"Split-gate devices in silicon CMOS: tunable coupling and RF-reflectometry"*
Pacôme Armagnat *"How fast does a voltage pulse travel through a quantum conductor ?"*
Hugo Bartolomei *"Microwave photons emitted by fractional charges"*
Pierre Bonnet *"Superconducting Silicon Resonators"*
Nicolas Bourlet *"Microscopic charged fluctuators as strong source of decoherence in disordered superconductor devices"*
Pierre Bruneel *"Confinement and correlations at the LAO/STO (111) interface"*
Philippe Campagne-Ibarcq *"Grid states for quantum error correction in superconducting circuits"*
Francesca Chiodi *"Superconductivity in ultra-thin SOI by Pulsed Laser Induced Epitaxy"*
Lauriane Contamin *"Synthetic spin orbit interaction for Majorana devices"*
Remy Dassonneville *"Single-shot high fidelity qubit readout using a transmon molecule in a 3D cavity"*
Sophie Djordjevic *"Towards an improved programmable quantum qurrent generator"*
Hadrien Duprez *"Coulomb enforced preservation of electronic coherence across a metallic island"*
Clément Dutreix *"Single-molecule non-reciprocal topological actuation of electromechanical modes"*
Clément Dutreix *"Berry's phase atomic interferometers in graphene"*
Francois Fernique *"Theory of plasmonic metasurfaces of near-field coupled metallic nanoparticles"*
Keith Fratus *"A Classical Mechanism for Branching in the Scanning Gate*

Response of Two-Dimensional Electron Gases with Smooth Disorder"
Keith Fratus *"Does a Single Eigenstate Encode the Critical Behaviour of a Hamiltonian?"*
Maxime Garnier *"Majorana flat band at the edge of magnetic skyrmions"*
Mauricio Gómez Viloria *"Orbital magnetism in ensembles of gold nanoparticles"*
Joël Griesmar *"A mesoscopic spectrometer based on the Josephson effect"*
Efe Gumus *"Calorimetric Detection of Single Tunneling Electrons"*
Loic Herviou *"Entanglement clusters through the Many-Body Localization phase transition"*
Stefan Ilic *"Density of states in Ising superconductors"*
Thomas Jalabert *"STM and STS of superconducting nanowires driven out of equilibrium"*
Aleksandr Kadykov *"Topological Phase Transition Driven by Temperature in HgTe/CdHgTe QWs"*
Vardan Kaladzhyan *"Magnetotransport in Weyl Nanowires"*
Baptiste Lamic *"Topological signatures in voltage-biased conventional Josephson junctions"*
Mireille Lavagna *"Emission Noise in an Interacting Quantum Dot: Role of Inelastic Scattering and Asymmetric Coupling to the Reservoirs"*
Raphaël Lescanne *"Towards the exponential suppression of dephasing in a superconducting quantum bit"*
Xin Lu *"Magneto-optical spectroscopic signatures of topological hetero-junction"*
Danial Majidi *"Thermopower signature of the Kondo effect in a quantum dot junction"*
Corneliu Malciu *"Braiding Majorana zero modes using quantum dots"*
David Mele *"Ultra-long wavelength Dirac plasmons in graphene capacitors"*
Régis Mélin *"Floquet-Tomasch mechanism for long-range correlations between Cooper pairs in a BCS three-terminal Josephson junction"*
Gerbold Ménard *"Suppression of quasiparticle poisoning by hard gap filtering"*
Shuo Mi *"Electron waiting times in hybrid junctions with topological superconductors"*
Pierre Nataf *"Topological classification for multiterminal Josephson Junctions"*
Léo Peyruchat *"A tunable, high-precision voltage source for mesoscopic physics"*
Bernard Plaçais *"Landau Velocity for Collective Quantum Hall Breakdown*

in Bilayer Graphene"
Phillipp Reck *"Time-dependent thermoelectric transport with the t-kwant software"*
Ramiro Rodriguez *"Ballistic electrons splashing down in a Fermi sea"*
Benoit Rossignol *"Toward flying qubit spectroscopy"*
Emile Sivré *"Strong electronic quantum interferences between two 0.1 mm long quantum Hall edge paths"*
Ariane Soret *"A Casimir Effect in Quantum Mesoscopic Physics"*
Imen Taktak *"Caractérisation des lévitons en effet Hall fractionnaire"*
Vincent Talbo *"Conductance and charge susceptibility of a double quantum dot"*
Rene-Jean Tarento *"Magnetoplasmon of 2D fermion on a sphere"*
Clemens Winkelmann *"Influence of microwave radiation on an STM Josephson junction"*
Cécile Yu *"NbN microwave superconducting resonators for silicon quantum spintronics"*

Complete list of participants

Romain Albert (ENS, Lyon)
David Alspaugh (LPS, Orsay)
Carles Altimiras (SPEC CEA, Saclay)
Anthony Amisse (PHELIQS CEA, Grenoble)
Pacôme Armagnat (PHELIQS CEA, Grenoble)
Hugo Bartolomei (LPA ENS, Paris)
Alexandre Bernard (LPS, Orsay)
Andrei Bernevig (Princeton, MPI Halle, Freie Uni Berlin)
corentin bertrand (PHELIQS CEA, Grenoble)
Pierre Bonnet (C2N, Saclay)
Edouard Boulat (MPQ, Paris)
Nicolas Bourlet (SPEC CEA, Saclay)
Landry Bretheau (LSI Polytechnique, Palaiseau)
Boris Brun (IMCN, Louvain)
Christophe Brun (INSP, Paris)
Pierre Bruneel (LPS, Orsay)
Philippe Campagne-Ibarcq (Yale University)
David Carpentier (ENS, Lyon)
Denis Chevallier (University of Basel)
Francesca Chiodi (C2N, Saclay)
Lauriane Contamin (LPA ENS, Paris)
Hervé Courtois (Institut Néel, Grenoble)
Tino Cubaynes (LPA ENS, Paris)
Romain Danneau (KIT, Karlsruhe)
Raphaëlle Delagrange (C2N, Saclay)
Pierre Delplace (ENS, Lyon)
Sophie Djordjevic (LNE, Trappes)
Hadrien Duprez (C2N, Saclay)
Clément Dutreix (LOMA, Bordeaux)
Denis Feinberg (Institut Néel, Grenoble)
François Fernique (IPCMS, Strasbourg)
Dario Ferraro (IIT, Genova)
Gwendal Fève (LPA ENS, Paris)
Emmanuel Flurin (SPEC CEA, Saclay)
Keith Fratus (IPCMS, Strasbourg)

Maxime Garnier (LPS, Orsay)
Georgiou Giorgos (Institut Néel, Grenoble)
Mark Oliver Goerbig (LPS, Orsay)
Marcelo Goffman (SPEC CEA, Saclay)
Mauricio Gómez Viloria (IPCMS, Strasbourg)
Joël Griesmar (Collège de France)
Christoph Groth (PHELIQS CEA, Grenoble)
Sophie Gueron (LPS , Orsay)
Efe Gumus (Institut Néel, Grenoble)
Loic Herviou (KTH Royal Institute of Technology)
Max Hofheinz (Institut Quantique, Sherbrooke)
Manuel Houzet (PHELIQS CEA, Grenoble)
Benjamin Huard (ENS, Lyon)
Stefan Ilic (PHELIQS CEA, Grenoble)
Mathieu Istas (PHELIQS CEA, Grenoble)
Thomas Jalabert (PHELIQS CEA, Grenoble)
Aleksandr Kadykov (LNE, Trappes)
Vardan Kaladzhyan (KTH Royal Institute of Technology)
Adel Kara Slimane (SPEC CEA, Saclay)
Romaine Kerjouan (LPA ENS, Paris)
Baptiste Lamic (PHELIQS CEA, Grenoble)
Mireille Lavagna (PHELIQS CEA, Grenoble)
François Lefloch (PHELIQS CEA, Grenoble)
Zaki Leghtas (LPA ENS, Paris)
Raphaël Lescanne (LPA ENS, Paris)
Xin Lu (LPS, Orsay)
Marjan Macek (PHELIQS CEA, Grenoble)
Dominique Mailly (C2N, Saclay)
Danial Majidi (Institut Néel, Grenoble)
Corneliu Malciu (LPA ENS, Paris)
Marie-France Mariotto (LPS, Orsay)
David Mele (LPA ENS, Paris)
Régis Mélin (Institut Néel, Grenoble)
Gerbold Ménard (SPEC CEA, Saclay)
Cyril Metzger (SPEC CEA, Saclay)
Julia Meyer (PHELIQS CEA, Grenoble)
Shuo Mi (PHELIQS CEA, Grenoble)

Gilles Montambaux (LPS, Orsay)
Christophe Mora (LPA ENS, Paris)
Iouri Moukharski (SPEC CEA, Saclay)
Anil Murani (SPEC CEA, Saclay)
Pierre Nataf (PHELIQS CEA, Grenoble)
François Parmentier (SPEC - CEA Saclay)
Théau Peronnin (ENS, Lyon)
Ambroise Peugeot (SPEC CEA, Saclay)
Léo Peyruchat (Collège de France)
Frédéric Pierre (C2N, Saclay)
Jean-Damien Pillet (LSI Polytechnique, Palaiseau)
Fabio Pistolesi (LOMA, Bordeaux)
Bernard Placais (LPA ENS, Paris)
Ioan Pop (KIT, Karlsruhe)
Hugues Pothier (SPEC CEA, Saclay)
Jérôme Rech (CPT, Marseille)
Nicolas Regnault (LPA ENS, Paris)
Vincent Renard (PHELIQS CEA, Grenoble)
Nicolas Roch (Institut Néel, Grenoble)
Patrice Roche (SPEC CEA, Saclay)
Ramiro Rodriguez (SPEC CEA, Saclay)
Benoit Rossignol (PHELIQS CEA, Grenoble)
Ines Safi (LPS, Orsay)
Martin Schalk (Institut Néel, Grenoble)
Emile Sivré (C2N, Saclay)
Clarke Smith (Yale University)
Ariane Soret (CPHT Polytechnique, Palaiseau)
Imen Taktak (SPEC CEA, Saclay)
Vincent Talbo (PHELIQS CEA, Grenoble)
René-Jean Tarento (LPS, Orsay)
Leandro Tosi (LPS, Orsay)
Tom Vethaak (PHELIQS CEA, Grenoble)
Louis Veyrat (Institut Néel, Grenoble)
Fabien Vialla (ILM, Lyon)
Jérémie Viennot (Institut Néel, Grenoble)
Florian Vigneau (PHELIQS CEA, Grenoble)
Marius Villiers (LPA ENS, Paris)

Vincent Vinel (LPA ENS, Paris)
Xavier Waintal (PHELIQS CEA, Grenoble)
Guillaume Weick (IPCMS, Strasbourg)
Dietmar Weinmann (IPCMS, Strasbourg)
Clemens Winkelmann (Institut Néel, Grenoble)
Cécile Yu (PHELIQS CEA, Grenoble)