PROGRAM

Sunday, 31 July 2022

17:00 – 21:00 Registration and welcome refreshment

Location: Pyramida Hotel - lobby

Monday, 1 August 2022

07:50 – 08:20 **Opening address**

Location: Pyramida Hotel Lecture Hall A

08:20 – 09:50 **1 session: Nonequilibrum physics and thermodynamics**

Location: Pyramida Hotel Lecture Hall A

08:20	– 08:50	Maciej Andrzej Lewenstein:	*To thermalize or not to thermalize, that is the question*
08:50	– 09:20	Jianshu Cao:	*Symmetry in non-equilibrium quantum processes*
09:20	– 09:50	Stefan Nimmrichter:	*Quantum advantage in the charging of batteries by repeated interactions*

09:50 – 10:10 Cofee break

10:10 – 12:10 **2 session: General physics, gravitation**

Location: Pyramida Hotel Lecture Hall A

10:10	– 10:40	Dirk Bouwmeester:	*Conformal cyclic cosmology signatures and anomalies of the CMB sky*
10:40	– 11:10	Petr Hořava:	*Non-equilibrium string theory and the Schwinger-Keldysh time contour*
11:10	– 11:40	Hartmut Abele:	*Gravity resonance spectroscopy, and a search for Lorentz violation, beyond-Riemann and entropic gravity*
11:40	– 12:10	Ron Folman:	*Realization of a complete Stern-Gerlach interferometer: Towards a test of quantum gravity*

12:10 – 13:00 Lunch

13:00 – 15:10 **3 session - A parallel: Quantum thermodynamics**

Location: Pyramida Hotel Lecture Hall A

13:00	– 13:30	Vlatko Vedral:	*Quantum cooling activated by coherently-controlled thermalisation*
13:30	– 14:00	Andreas Wacker:	*Non-resonant transitions: Insights from quantum-thermodynamics*

14:00	–	14:30	Konstantin Dorfman:	*Quantum heat engine perspective on controlling optical measurements with quantum light*
14:30	–	14:50	Saar Rahav:	*Singular optimal solutions of stochastic pumps*
14:50	–	15:10	David Edward Bruschi:	*Quantum thermodynamics of localized relativistic quantum systems*

13:00 – 15:10 **3 session - B parallel: Quantum transport**

Location: Pyramida Hotel Lecture Hall B

13:00	–	13:30	Jürgen Thomas Stockburger:	*The different guises of hierarchical equations of motion*
13:30	–	14:00	Michael Thoss:	*Simulation of quantum transport using the hierarchical equations of motion method*
14:00	–	14:30	Doron Cohen:	*Breakdown of adiabaticity in the quasi-static limit*
14:30	–	14:50	Andre Erpenbeck:	*Steady state formulation of inchworm Quantum Monte Carlo*
14:50	–	15:10	Michael Knap:	*Probing finite-temperature observables in quantum simulators with short-time dynamics*

13:00 – 15:10 **3 session - C parallel: Spin dynamics**

Location: Pyramida Hotel Lecture Hall C

13:00	–	13:30	Gergely Zaránd:	*Dynamics of negative temperature hadron formation in repulsive SU(n) Hubbard models*
13:30	–	14:00	Peter Schmitteckert:	*Automated generation of spin-bath Hamiltonians for a wide range of interacting systems*
14:00	–	14:30	Thore Posske:	*The power of the boundary: Creating quantum spin helices, quantum skyrmions, and measuring one-dimensional topological superconductivity without relying on Majorana modes*
14:30	–	14:50	Aires Ferreira:	*Emergent spin-orbit phenomena in designer 2D van der Waals materials*

14:50	–	15:10	Claudio Verdozzi:	*Microscopic theory of ultrafast optical skyrmion excitation in magnetic thin films*
15:10	–	15:30	Cofee break	
15:30	–	18:00	**4 session: Foundations of quantum physics**	
			Location: Pyramida Hotel Lecture Hall A	
15:30	–	16:00	Ana María Cetto:	*The quantization of radiation: role of the vacuum field*
16:00	–	16:30	Wolfgang Schleich:	*The Riemann zeta function and quantum mechanics*
16:30	–	17:00	Yuval Gefen:	*Passive vs. active quantum steering*
17:00	–	17:30	Juan Ramón Muñoz de Nova:	*Quantum information with top quarks at the LHC*
17:30	–	18:00	Gregor Weihs:	*Multiparticle Quantum Interferometry*
18:00	–	19:00	Free time and transfer to Wallenstein Palace	
19:00	–	22:00	**Welcome party**	
			Location: Wallenstein Palace and its Garden	
19:00	–	19:30	Opening	
19:30	–	22:00	Welcome party in the Wallenstein Palace Garden	

Tuesday, 2 August 2022

07:50	–	09:50	**1 session: Physics of superfluids**	
			Location: Pyramida Hotel Cinema Hall	
07:50	–	08:20	Vanderlei Salvador Bagnato:	*Production and characterization of a far from equilibrium BEC: turbulence and universality*
08:20	–	08:50	Fernando Sols:	*Superfluidity from correlations in driven boson systems*
08:50	–	09:20	Nir Navon:	*Ultracold Fermi gases in a box*
09:20	–	09:50	Frédéric Chevy:	*Fermi gases in quantum wires*
09:50	–	10:10	Cofee break	
10:10	–	12:10	**2 session: Thermodynamics, molecular machines**	
			Location: Pyramida Hotel Cinema Hall	
10:10	–	10:40	Andrew N. Jordan:	*Quantum engines based on entanglement and continuous measurement*
10:40	–	11:10	Jens Eisert:	*Quantum field thermal machines*
11:10	–	11:40	Jennifer Koch:	*Many-body effects in quantum engines*
11:40	–	12:10	Liliana Arrachea:	*Energy dynamics, heat production and heat-work conversion with qubits*
12:10	–	13:00	Lunch	
13:00	–	15:10	**3 session - A parallel: Many body physics, quantum transport**	
			Location: Pyramida Hotel Cinema Hall	
13:00	–	13:30	Sergey N. Shevchenko:	*Quantum control via Landau-Zener-Stuckelberg-Majorana transitions*
13:30	–	14:00	Takafumi Kita:	*Asymmetry of critical exponents above and below second-order transitions with continuous symmetries*
14:00	–	14:30	Björn Sothmann:	*Quantized phase-coherent heat transport of counterpropagating Majorana modes*
14:30	–	14:50	Alessandro Romito:	*Measurement-induced topological transition in a free fermion model*
14:50	–	15:10	Llorenç Serra:	*Trivial and topological confinements in bilayer graphene*

13:00 – 15:10 **3 session - B parallel: Molecular junctions**

Location: Pyramida Hotel Lecture Hall B

13:00	– 13:30	Oren Tal:	*Quantum flicker noise demonstrated in molecular junctions*
13:30	– 14:00	Elisabetta Paladino:	*Supercurrent noise in short ballistic graphene Josephson junctions*
14:00	– 14:30	Alessandro Braggio:	*Nonlocal thermoelectricity in topological Josephson junctions*
14:30	– 14:50	Olivier Maillet:	*Anomalous photonic heat transport across a Josephson junction in a highly dissipative environment*
14:50	– 15:10	Jerome Rech:	*Delta-T noise in quantum Hall junctions*

13:00 – 15:10 **3 session - C parallel: Quantum transport, superconductivity**

Location: Pyramida Hotel Lecture Hall C

13:00	– 13:30	Yaroslav M. Blanter:	*Analog quantum control of magnonic cat states on-a-chip by a superconducting qubit*
13:30	– 14:00	Pascal Simon:	*Shot noise in superconducting sub gap states*
14:00	– 14:30	Friedemann Queisser:	*Dynamically assisted tunneling in the impulse regime*
14:30	– 14:50	Ambroise Peugeot:	*Entangled beams and photon multiplets from a dc-biased superconducting circuit*
14:50	– 15:10	Thibaut Jonckheere:	*Anyonic statistics revealed by the Hong-Ou-Mandel dip for fractional excitations*

15:10 – 15:30 Cofee break

15:30 – 17:30 **4 session - A parallel: Many body physics**

Location: Pyramida Hotel Cinema Hall

15:30	– 16:00	Stephanie M Reimann:	*Droplet-superfluid compounds in binary bosonic mixtures*
16:00	– 16:30	Yoram Alhassid:	*Cold atomic Fermi gases in two dimensions: superfluidity and pseudogap effects in the strongly interacting regime*
16:30	– 17:00	Alexandre Zagoskin:	*Towards qualitative theory of large quantum coherent structures*

17:00	–	17:30	Radim Filip:	*Quantum non-Gaussian optics and mechanics*

15:30	–	17:30	**4 session - B parallel: Physics of quantum information**

Location: Pyramida Hotel Lecture Hall B

15:30	–	16:00	Thomas Walther:	*A scalable quantum key distribution network based on time-bin entanglement*
16:00	–	16:30	Yasuhiro Utsumi:	*Computation time and thermodynamic uncertainty relation of Brownian circuits*
16:30	–	17:00	Martin Ringbauer:	*Quantum computing and simulation with high-dimensional systems*
17:00	–	17:30	Wister Wei Huang:	*Quantum information processing with graphene quantum dots*

15:30	–	17:30	**4 session - C parallel: General physics, quantum structures**

Location: Pyramida Hotel Lecture Hall C

15:30	–	16:00	Joseph Maciejko:	*Hyperbolic band theory*
16:00	–	16:30	Grégoire Ithier:	*Many body density of states of a system of spinless fermions*
16:30	–	17:00	Parveen Kumar:	*Optimized steering: Quantum state engineering and exceptional points*

17:30	–	19:20	**Poster session and refreshment**

Location: Pyramida Hotel - first floor

19:20	–	20:00	Free time

20:00	–	22:00	**Jazz concert**

Location: Pyramida Hotel Lecture Hall A

Wednesday, 3 August 2022

07:50 – 09:50 **1 session: Light - matter interactions**

Location: Pyramida Hotel Lecture Hall A

07:50 – 08:20	Franco Nori:	*Quantum optics with giant atoms: Decoherence-free interaction between giant atoms in waveguide quantum electrodynamics.*
08:20 – 08:50	Ortwin Hess:	*Nanoplasmonics as enabler of room-temperature quantum nanophotonics*
08:50 – 09:20	Walter Pfeiffer:	*Emergent functionality in quantum plasmonics*
09:20 – 09:50	Norbert Kroo:	*Some applications of high field nanoplasmonics*

09:50 – 10:10 Cofee break

10:10 – 12:10 **2 session: Quantum thermodynamics**

Location: Pyramida Hotel Lecture Hall A

10:10 – 10:40	Tapio Ala-Nissilä:	*Trajectory-based approach to quantum thermodynamics for general quantum systems*
10:40 – 11:10	Amir Ordacgi Caldeira:	*Von Neumann entropy and entropy production of a damped harmonic oscillator*
11:10 – 11:40	J. Miguel Rubi:	*Negative thermophoresis in the strong coupling regime*
11:40 – 12:10	Gershon Kurizki:	*Nonlinear coherent steering of heat and work*

12:10 – 13:00 Lunch

13:00 – 14:40 **3 session - A parallel: General physics, biophysics**

Location: Pyramida Hotel Lecture Hall A

13:00 – 13:30	Warwick P. Bowen:	*Absolute quantum advantage in imaging: biological microscopy beyond the quantum limit*
13:30 – 14:00	Suzy Lidström:	*Consciousness as coherent excitation of a hybrid quantum field*

14:00	–	14:20	Václav Špička:	*On physical processes controlling biological neural networks*
14:20	–	14:40	Peter D. Keefe:	*The first order phase transition of Type I superconductors: Bardeen hysteresis explained*

13:00	–	14:40	**3 session - B parallel: Hall effect**

Location: Pyramida Hotel Lecture Hall B

13:00	–	13:30	Thomas L Schmidt:	*Supercurrent-enabled Andreev reflection in a chiral quantum Hall edge state*
13:30	–	14:00	Pavel Středa:	*Anomalous Hall conductivity and quantum friction*
14:00	–	14:20	David F. Mross:	*The fractional quantum Hall state at nu=5/2: Recent insights from theory and experiment*
14:20	–	14:40	Jiří J. Mareš:	*Hidden momentum and Hall effect*

13:00	–	14:40	**3 session - C parallel: General physics**

Location: Pyramida Hotel Lecture Hall C

13:00	–	13:30	Marco Genovese:	*Emergence of constructor-based irreversibility in quantum systems*
13:30	–	14:00	Ofer Biham:	*The life cycle of random walks on random regular graphs*
14:00	–	14:20	Eytan Katzav:	*Convergence of contracting networks towards an asymptotic maximum-entropy structure*
14:20	–	14:40	Satoshi Ejima:	*Photoinduced pairing states in pumped excitonic insulators*

14:40	–	15:00	Cofee break

15:00	–	17:10	**4 session - A parallel: Quantum optics**

Location: Pyramida Hotel Cinema Hall

15:00	–	15:30	Yuri Rostovtsev:	*Room-temperature tunable masers based on the weakly aligned molecules*
15:30	–	16:00	Marlan Scully:	*Of Bose condensates, squeezed light and black holes*

16:00	–	16:30	Olga Kocharovskaya:	*Nuclear ensembles with controllable inhomogeneous broadening for nuclear quantum memories and spectral intensity enhancement*
16:30	–	16:50	Frank A. Narducci:	*A T-cubed atom interferometer*
16:50	–	17:10	Anil K Patnaik:	*Tabletop mixed radiation source from liquid target via extreme light interactions*

15:00 – 17:10 **4 session - B parallel: Quantum transport**

Location: Pyramida Hotel Lecture Hall B

15:00	–	15:30	Riku Tuovinen:	*Time-linear non-equilibrium Green's function approach to correlated quantum transport*
15:30	–	16:00	Michael Ridley:	*Quantum probability from causal structure*
16:00	–	16:30	Pawel Danielewicz:	*Slabs of correlated nucleons with nonequilibrium Green's functions*
16:30	–	16:50	Michael Galperin:	*Green's function methods for single molecule junctions*
16:50	–	17:10	Ivan Rungger:	*Quantum computing algorithms for Green's functions in materials science*

15:00 – 17:10 **4 session - C parallel: Quantum physics and gravitation**

Location: Pyramida Hotel Lecture Hall C

15:00	–	15:30	Michael Kopp:	*Lessons on quantum gravity from gravitationally induced entanglement*
15:30	–	16:00	Roland E Allen:	*Origin of the Bekenstein-Hawking entropy, Einstein-Hilbert action, and adark matter particle that should be detected in the next 2-5 years*
16:00	–	16:30	Giorgio Torrieri:	*The equivalence principle and inertial-gravitational decoherence*
16:30	–	16:50	Theo M. Nieuwenhuizen:	*Exact solutions for black holes with a smooth quantum core*
16:50	–	17:10	Matthias Zimmermann:	*Hawking radiation, the logarithmic phase singularity, and the inverted harmonic oscillator*

17:10 – 19:00 Free time and transfer to St. Vitus Cathedral

19:00 – 20:30 **Concert of classical music**

Location: Prague Castle - St. Vitus Cathedral and live on internet

Thursday, 4 August 2022

07:50 – 09:50 **1 session: General physics, light - matter interactions**

Location: Pyramida Hotel Cinema Hall

07:50 – 08:20	Christoph Bruder:	*Quantum synchronization*
08:20 – 08:50	Joachim Ankerhold:	*Bright sources for quantum microwaves by dc-biased superconducting circuits*
08:50 – 09:20	Vincenzo Macrì:	*Virtual and real dynamical Casimir effects in optomechanical systems*
09:20 – 09:50	Eliahu Cohen:	*Quantum clocks: time-energy uncertainty relations and the emergence of non-unitarity*

09:50 – 10:10 Cofee break

10:10 – 12:10 **2 session: Quantum transport, spin systems**

Location: Pyramida Hotel Cinema Hall

10:10 – 10:40	Christian D Glattli:	*Two-particle time-domain interferometry in the fractional quantum Hall effect regime*
10:40 – 11:10	Jan van Ruitenbeek:	*On the problem of chirality-induced spin selectivity (CISS)*
11:10 – 11:40	E.K.U. Gross:	*Non-linear spin dynamics, the OISTR effect, and the birth of atto-magnetism*
11:40 – 12:10	Shmuel Gurvitz:	*Non-standard Hubbard model and two-electron pairing*

12:10 – 13:00 Lunch

13:00 – 14:30 **3 session: Light - matter interactions**

Location: Pyramida Hotel Cinema Hall

13:00 – 13:30	Giuseppe Falci:	*Detection of virtual photons in ultrastrongly coupled quantum systems*
13:30 – 14:00	Omar Di Stefano:	*Gauge principle and gauge invariance issues in the ultrastrong coupling regime*
14:00 – 14:30	Roberto Stassi:	*Unveiling and veiling an entangled light-matter quantum state from the vacuum*

14:30	–	14:50	Cofee break	
14:50	–	16:20	**4 session: Quantum optics**	
			Location: Pyramida Hotel Cinema Hall	
14:50	–	15:20	Alistair James Brash:	*Quantum optics in the solid state*
15:20	–	15:50	Evgenii Narimanov:	*Ghost exchange: Ferromagnetic-antiferromagnetic phase transition in linear optics of non-magnetic dielectrics*
15:50	–	16:20	Tamar Seideman:	*Insights from high harmonic generation. Toy models*
16:20	–	17:00	Free time	
17:00	–	22:00	**Evening session: Public lectures of Guy Consolmagno, Harrison Schmitt and concert**	
			Location: Pyramida Hotel Lecture Hall A	
17:00	–	17:15	Music introduction and opening address	
17:15	–	18:30	Public lecture	
17:15	–	18:15	**Guy J. Consolmagno:**	***Astronomy, God, and the Search for Elegance***
18:15	–	18:30	Discussion after the lecture of Guy Consolmagno	
18:30	–	18:45	Cofee break	
18:45	–	20:00	Public lecture	
18:45	–	19:45	**Harrison H Schmitt:**	***From Coyotes to Moonbeams***
19:45	–	20:00	Disscusion after the lecture of Harrsion Schmitt	
20:00	–	20:30	Cofee break	
20:30	–	22:00	**Concert of classical music**	

Friday, 5 August 2022

07:50 – 09:50 **1 session: General physics, biophysics**

Location: Pyramida Hotel Lecture Hall A

07:50	–	08:20	Cristiane de Morais Smith:	*Time glasses, imaginary time crystals, and all that*
08:20	–	08:50	Lev Mourokh:	*Physical models of mitochondrial proton-pumping complexes*
08:50	–	09:20	Yutaka Shikano:	*Quantum computer health check via quantum random number generation*
09:20	–	09:50	Karl John Friston:	*Me and my Markov blanket*
09:50	–	10:10	Cofee break	

10:10 – 12:10 **2 session - A parallel: Quantum transport, spin dynamics**

Location: Pyramida Hotel Lecture Hall A

10:10	–	10:40	Sebastian Deffner:	*Assessing nonequilibrium excitations in quantum annealers*
10:40	–	11:10	Lea F. Santos:	*Experimental detection of the correlation Renyi entropy in the central spin model*
11:10	–	11:40	Jaroslav Fabian:	*Spintronics with van der Waals heterostructures*
11:40	–	12:10	Branislav Nikolic:	*What is quantum spin torque: Spintronics meets nonequilibrium strongly correlated and long-range entangled quantum matter*

10:10 – 12:10 **2 session - B parallel: Foundations of quantum physics**

Location: Pyramida Hotel Lecture Hall B

10:10	–	10:40	Denys I. Bondar:	*Experimental classical optical analogues of open quantum systems: Quantum discord, violation of the Leggett-Garg inequality, and decoherence enhanced tunneling*
10:40	–	11:10	Georgi Gary Rozenman:	*Emulating black holes using surface gravity waves*
11:10	–	11:40	Fabrizio Piacentini:	*Extracting (anomalous) weak values by detecting a single photon*

11:40	–	12:10	Ehtibar Dzhafarov:	*A general proof that context-independent mapping (or local causality) and free choice are equivalent*

10:10	–	12:10	**2 session - C parallel: Foundations of quatum physics, transport theory**

Location: Pyramida Hotel Lecture Hall C

10:10	–	10:40	John Goold:	*Taking the temperature of a pure quantum state*
10:40	–	11:10	Jakub Spiechowicz:	*Arcsine law and multistable Brownian dynamics in a tilted periodic potential*
11:10	–	11:40	Eugene Sukhorukov:	*Transmission line approach to transport of heat in chiral and drift-diffusion systems with dissipation*
11:40	–	12:10	Sungguen Ryu:	*Photoassisted chiral transport beyond the Carnot limit*
12:10	–	13:00	Lunch	

13:00	–	15:00	**3 session: Space exploration**

Location: Pyramida Hotel Lecture Hall A

13:00	–	13:30	Harrison H Schmitt:	*50 Years and counting: Major science from Apollo 17 mission to Taurus-Littrow on the Moon*
13:30	–	14:00	Guy J. Consolmagno:	*What's surfacing about Bennu?*
14:00	–	14:30	Hansjörg Dittus:	*Quantum sensors - A necessity on modern spacecraft*
14:30	–	15:00	Ernst M Rasel:	*Twin lattice interferometry - a tool for gyros and gravitational-wave detection*
15:00	–	15:20	Cofee break	

15:20	–	16:20	**4 session: Many body physics, magnetism**

Location: Pyramida Hotel Lecture Hall A

15:20	–	15:50	Wolfgang Belzig:	*Quantum properties of squeezed magnons in ferro- and antiferromagnets*
15:50	–	16:20	Thomas Vojta:	*Controlling the stripe order in a diluted frustrated magnet*
16:20	–	17:30	Free time and transfer to Strahov monastery	

17:30	–	23:00	**Guided tour, conference dinner and concert**
			Location: Strahov Monastery
17:30	–	19:00	Guided tour through Strahov monastery
19:00	–	19:20	Welcome
19:20	–	20:30	First part of the conference dinner
20:30	–	21:30	Concert of classical music in the Basilica of Assumption of Our Lady
21:30	–	23:00	Second part of the conference dinner

Saturday, 6 August 2022

08:20 – 10:20 **1 session: Foundation of quantum physics**

Location: Pyramida Hotel Lecture Hall A

08:20	–	08:50	Howard M. Wiseman:	*Can a qubit be your friend? Why experimental metaphysics needs a quantum computer.*
08:50	–	09:20	James Freericks:	*How do we measure the momentum of a quantum particle*
09:20	–	09:50	Gerard Kennedy:	*Energetics of quantum vacuum friction*
09:50	–	10:20	Federico Cerisola:	*Quantum-classical correspondence in spin-boson equilibrium states at arbitrary coupling*

10:20 – 10:40 Cofee break

10:40 – 12:10 **2 session: Physics of superfluids**

Location: Pyramida Hotel Lecture Hall A

10:40	–	11:10	Jeff Steinhauer:	*Analogue cosmological particle creation in an ultracold quantum fluid of light*
11:10	–	11:40	Thomas Gasenzer:	*Instantons in far-from-equilibrium spinor gases*
11:40	–	12:10	Peter V. E. McClintock:	*Quantum turbulence in superfluid He-4: creation, evolution and decay in novel geometries*

12:10 – 13:00 Lunch

13:00 – 15:00 **3 session: Thermodynamics and statistical physics**

Location: Pyramida Hotel Lecture Hall A

13:00	–	13:30	Rudolf Hilfer:	*Foundations of statistical mechanics for unstable interactions*
13:30	–	14:00	Jerzy Łuczka:	*Quantum counterpart of energy equipartition theorem - General case*
14:00	–	14:30	Gert-Ludwig Ingold:	*Casimir interaction in colloidal and biophysical systems*

14:30 – 15:00 Mario Arnolfo Ciampini: *Spatiotemporal control of levitated nanoparticles for nonequlibrium thermodynamics*

15:00 – 15:30 **Closing remarks**

Location: Pyramida Hotel Lecture Hall