Workshop

Quantum Optimal Control

From Mathematical Foundations to Quantum Technologies

Schedule

May 21 (Tuesday)	**May 22** (Wednesday)	**May 23** (Thursday)	**May 24** (Friday)
8:50 – 9:00 | **Opening**			
9:00 – 9:45 | **Rouchon** *Quantum Error Correction and Feedback*	9:00 – 9:45 | **Egger** *Scaling quantum computing with dynamic circuits*	9:00 – 9:45 | **Calarco** *Quantum firmware: optimal control for quantum computers and quantum simulators*	9:00 – 9:45 | **Arenz** *Approximating Riemannian gradient flows on quantum computers for ground state problems*
9:45 – 10:30 | **Whaley** *Open loop control of continuously monitored quantum systems*	9:45 – 10:30 | **Goerz** *Modernizing the Quantum Control Stack with the QuantumControl.jl Framework*	9:45 – 10:30 | **Kuprov** *Simulation and design of shaped pulses beyond the piecewise-constant approximation*	9:45 – 10:30 | **Metelmann** *High-Purity Entanglement of Hot Propagating Modes Using Nonreciprocity*
Coffee Break	*Coffee Break*	*Coffee Break*	*Coffee Break*
11:00 – 11:20 | **Erdman** *Optimal control of quantum thermal machines with reinforcement learning*	11:00 – 11:20 | **Schulte-Herbrüggen** *Symmetry Decides Observability in Quantum Dynamics*	11:00 – 11:20 | **Sugny** *Quantum optimal control of a Bose-Einstein Condensate in an optical lattice*	11:00 – 11:20 | **Stefanatos** *Fast charging of an Ising spin pair quantum battery using optimal control*
11:20 – 11:40 | **Campbell** *Quantum work statistics of controlled evolutions*	11:20 – 11:40 | **Pozzoli** *Time-zero controllability and Lie algebraic properties of infinite-dimensional closed quantum systems*	11:20 – 11:40 | **Cuestas** *A quantum engine in the BEC-BCS crossover*	11:20 – 11:40 | **Kiely** *Universally Robust Quantum Control*
11:40 – 12:25 | **Kosloff** *Quantum control of noisy gates*	11:40 – 12:25 | **Borzì** *The Pontryagin Maximum Principle for Solving Quantum Optimal Control Problems with Sparsity Promoting Cost Functionals*	11:40 – 12:25 | **Weidner** *Controlling ultracold atoms in optical lattices: theory and practice (but mostly practice)*	11:40 – 12:25 | **Shermer** *Robust Quantum Control*
Lunch Break	*Lunch Break*	*Lunch Break*	
14:00 – 14:45 | **Tse** *Quantum Computing with Rydberg-atom quantum processors*	14:00 – 16:00 | **Social Event** Guided tour across the historic campus Berlin-Dahlem. Meeting point: Harnack Haus Tour A: 100 Years of Science at "Germany's Oxford" Tour B: "Science Heaven" Dahlem's Nobel Laureates	14:00 – 16:00 | **Tutorial**	
14:45 – 15:05 | **Hegade** *Digitized Counterdiabatic Quantum Computing*			
15:05 – 15:25 | **Grech** *Optimising Quantum Gate Fidelity with Deep Reinforcement Learning*			
15:25 – 16:10 | **Wilhelm-Mauch** *Controlling and calibrating superconducting qubits in practice*			
	Coffee Break	*Coffee Break*	
from 16:30 | **Poster-Session**	16:30 – 16:50 | **Petersson** *Mitigating scaling barriers through time-parallel multiple shooting method*	16:30 – 16:50 | **Gago Encinas** *Testing systems for universal quantum computing: a controllability test using parametric quantum circuits*	
	16:50 – 17:10 | **Schneider** *Compositional Tensor Networks*	16:50 – 17:10 | **Bruschi** *Towards exact factorization of quantum dynamics via Lie algebras*	
	17:10 – 17:55 | **Boscain** *Ensemble controllability for n-level quantum systems*	17:10 – 17:30 | **Petiziol** *Optimized Floquet engineering of many-body interactions*	
		from 18:30 | **Dinner**	

EINSTEIN Foundation.de
Einstein Stiftung Berlin
Einstein Foundation Berlin

Berlin Mathematics Research Center
MATH+

List of Posters

P1	Davide Lonigro (FAU Erlangen-Nürnberg) *Global approximate controllability of quantum systems by form perturbations*
P2	Omar Kebiri (BTU Cottbus-Senftenberg) *Deep learning methods for stochastic optimal control*
P3	Juhi Singh (Forschungszentrum Jülich) *Optimal control methods for two-qubit gates in optical lattices*
P4	Robert de Keijzer (Eindhoven University of Technology) *Do qubits like Metallica?*
P5	Mirko Consiglio (University of Malta) *Variational Gibbs State Preparation on NISQ devices*
P6	Thomas Reisser (Forschungszentrum Jülich) *Closed-loop gate-set optimization via quantum optimal control for an ensemble of nitrogen vacancy centers in diamond*
P7	Boxi Li (Forschungszentrum Jülich) *Analytical pulse design for crosstalk and leakage suppression*
P8	Robert Zeier (Forschungszentrum Jülich) *Symmetry obstructions to the quantum approximate optimization algorithm*
P9	Ressa Said (University of Ulm) *Optimal control using phase-modulated driving fields in diamond*
P10	Lukas Tarra (TU Wien) *Adaptive nonlinear stabilization of ultrashort laser pulses*
P11	William Steadman (Qruise GmbH) *Adaptive system characterization and quantum optimal control competitive with closed loop calibration*
P12	Emanuel Malvetti (Technical University Munich) *Reduced Control Systems for Optimal Cooling and Entangling*
P13	Lasse Ermoneit (Weierstrass Institute for Applied Analysis and Stochastics, Berlin) *Optimal Control of a Si/SiGe Quantum Bus for Scalable Quantum Computing Architectures*
P14	Jingjun Zhu (Université de Bourgogne) *Optimal control and ultimate bounds of 1:2 nonlinear quantum systems*
P15	Shimshon Kallush (Holon Institute Technology, Hebrew University) *Controlling the uncontrollable: Quantum control of open-system dynamics*
P16	Alejandro Ramos (University of Rostock) *Shaping Laser Control Pulses by an Automatic Differentiation Direct Optimal Control Approach*
P17	Cristina Cicali (Forschungszentrum Jülich) *Atom transport optimization: theoretical frameworks, algorithms, and experimental integration*
P18	Qi Zhang (Kipu Quantum) *Analog Counterdiabatic Quantum Computing to Push the Boundaries of Neutral Atom Hardware Towards Quantum Usefulness*
P19	Ashutosh Mishra (Forschungszentrum Jülich) *Superconducting Qubit Reset by Demolition Measurement*
P20	Adrian Köhler (Free University of Berlin) *Optimal control of arbitrary perfectly entangling gates for open quantum systems*
P21	Matthias Krauss (Free University of Berlin) *Parameter Optimization of Transmon Arrays and Crosstalk Mitigation*
P22	Anton Halaski (Free University of Berlin) *Quantum Feedback Control for Quantum Error Correction on Superconducting Qubits*
P23	Roberto Sailer (University of Ulm) *Implementing control optimization strategy for decoherence protected quantum register in diamond*
P24	Yannick Strocka (Humboldt University of Berlin) *Optimal Control Aspects for Cluster State Generation with Group-IV Color Centers in Diamond*
P25	Monika Leibscher (Free University of Berlin) *A graph-theoretical approach to analyze controllability of driven quantum systems*

P26 Mohammad Abedi (Forschungszentrum Jülich)
Reinforcement learning entangling operations for spin qubits

P27 Armin Römer (Forschungszentrum Jülich)
JuMPO: A Quantum Optimal Control Library for Open System Magnetic Resonance Experiments with Arbitrary Inhomogeneities

P28 Nicolas Wittler (Forschungszentrum Jülich)
Co-design of quantum computing devices with optimal control

P29 Dirk Heimann (University of Bremen)
Synthesizing optimal pulse sequences with an iterative linear quadratic regulator (iLQR) for IBM superconducting qubits

P30 Alexander Simm (Forschungszentrum Jülich)
Control of analog qubit-resonator gates in the strong coupling regime

P31 Martino Calzavara (Forschungszentrum Jülich)
Quantum control landscapes of piecewise-constant pulses

P32 Luke Visser (Eindhoven University of Technology)
Simulating the stochastic Schrödinger equation with semi-martingale noise

P33 Maurice Beringuier (Max Planck Institute for Nuclear Physics)
Measuring and predicting the performance of atomic-scale systems as quantum classifiers

P34 Tangyou Huang (Chalmers University of Technology)
High-fidelity superconducting two-qubit gate with optimal control

P35 Kapil Goswami (Zentrum für Optische Quantentechnologien, University of Hamburg)
Solving optimization problems on quantum systems.

P36 Aviv Aroch (Hebrew University of Jerusalem)
Mitigating controller noise in quantum gates using optimal control theory