Breakdown of Agenda for Individual Main Sessions

Tuesday, September 26th, 2023

10:10 - 10:50	**K1: Superconducting Qubit Quantum Computing SQQC**	**Consortium Presentation (30'+10', Session Chair: R. Gross)**
	Prof. Stefan Filipp (WMI)	Overview, 6 Qubit QPU, Fluxonium Qubits, Reset
	Prof. Michael Hartmann (FAU)	Multi qubit coupler, Multi qubit design
	Prof. Stefan Filipp (WMI)	Remote) control software
10:40 - 10:50	Discussion/ Q&A	

10:50 - 11:30	**K3: Trapped Atom Quantum Computing TAQC**	**Consortium Presentation (30'+10', Session Chair: C. Kutter)**
10:50 - 11:20	Prof. Immanuel Bloch (MPQ, LMU)	Main results related to the different central tasks
11:20 - 11:30	Discussion/ Q&A	

11:30 - 11:50	**LTP 1: Quantum Measurement & Control QuMeCo**	**Lighthouse Project Presentation (15'+5', Session Chair: S. Filipp)**
11:30 - 11:45	Prof. Christopher Eichler (FAU)	Quantum measurement and control for the enablement of quantum computing and quantum sensing
11:45 - 11:50	Discussion/ Q&A	

11:50 - 12:10	**LTP 2 : Quantum Circuits**	**Lighthouse Project Presentation (15'+5', Session Chair: S. Filipp)**
11:50 - 12:05	Prof. Dominique Bougeard (Physics, U. Regensburg)	Quantum circuits with spin-qubits and hybrid Josephson junctions
12:05 - 12:10	Discussion/ Q&A	

12:10 - 12:30	**LTP 3: Free-electron States & Qubit Dynamics**	**Lighthouse Project Presentation (15'+5', Session Chair: S. Filipp)**
12:10 - 12:25	Prof. Sascha Schäfer (Physics, U. Regensburg)	Free-electron states as ultrafast probes for qubit dynamics in solid-state platforms
12:25 - 12:30	Discussion/ Q&A	

| 12:30 - 13:30 | *Lunch Break* | |

13:30 - 14:10	**K6: Scalable Hardware & Systems Engineering SHARE**	**Consortium Presentation (30'+10', Session Chair: I. Bloch)**
13:30 - 13:35	Dr. Christoph Kutter (FhG-EMFT)	Welcome and Introduction
13:35 - 13:45	Dr. Gerd Kilian (FhG-IIS)	Scientific progress CT1: Development of electronic components & systems
13:45 - 13:55	Dr. Rui Pereira (FhG-EMFT)	Scientific progress CT2: Semiconductor technology and integration for functional and scalable QC-hardware
13:55 - 14:00	Dr. Christoph Kutter (FhG-EMFT)	Summary and beyond 1000 qubits
14:00 - 14:10	Discussion/ Q&A	

14:10 - 14:50	**C1: Superconducting QC System Integration**	**Cross-sectional Theme Presentation (30'+10', Session Chair: I. Bloch)**
	Prof. Stefan Filipp (WMI)	Overview, infrastructure, improved qubit fabrication
	Prof. Marc Tornow (TUM)	Passivation efforts
	Prof. Stefan Filipp (WMI)	TLS analysis
	Dipl.-Ing. Thomas Tönes (FAU, IIS)	SC architecture, Cross-link with FAU
	Prof. Christian Jirauschek (TUM)	Readout: TWPAs
	Prof. Alexander Holleitner (WSI)	Circulators & high-frequency circuits
	Prof. Stefan Filipp (WMI)	Multiplexed readout
	Prof. Stefan Filipp (WMI)	Outlook
14:40 - 14:50	Discussion/ Q&A	

14:50 - 15:30	**C3: Neutral-Atom System Integration**	**Cross-sectional Theme Presentation (30'+10', Session Chair: T. Wilk)**
14:50 - 15:00	Dr. Andrea Alberti (MPQ)	Overview of the collaboration between K3, K5 and K8
15:00 - 15:10	Dr. Andrea Alberti (MPQ)	Comprehensive collaboration between K3 and K8
15:10 - 15:20	Philipp Schulzen (Kirchhoff-Institute, Heidelberg)	Collaboration between K3 and K6
15:20 - 15:30	Discussion/ Q&A	

Wednesday, September 27th, 2023

09:00 - 09:40	**K8 : Hardware Adapted Theory HAT**	**Consortium Presentation (30'+10', Session Chair: M. Knap)**
09:00 - 09:02	Prof. Steffen Glaser (TUM)	Introduction and overview of the consortia
09:02 - 09:07	Prof. Steffen Glaser (TUM)	Optimal control of single qubit quantum gates
09:07 - 09:12	Dr. Nikolas Pomplun (DLR)	Pulse design using feedback
09:12 - 09:17	Prof. Jens Eisert (FUB)	Characterization, benchmarking, and validation
09:17 - 09:22	Dr. Manuel Rispler (FZJ)	Quantum error correction
09:22 - 09:27	Prof. Michael Hartmann (FAU)	Non-equilibrium time-evolution and co-design
09:27 - 09:30	Prof. Michael Hartmann (FAU)	Introduction of new PIs and summary
09:30 - 09:40	Discussion/ Q&A	

09:40 - 10:20	**K5: Quantum Development Environment, System Software & Integration Q-DESSI**	**Consortium Presentation (30'+10', Session Chair: M. Knap)**
09:40 - 09:45	Prof. Martin Schulz (LRZ, TUM)	Introduction
09:45 - 09:55	Dr. Martin Ruefenacht (LRZ)	The Munich Quantum Software Stack
09:55 - 09:58	Prof. Robert Wille (TUM)	Connection to Cross-sectional theme C5: Platform Characteristics - Connecting experimentalists with tool/compiler developers
09:58 - 10:03	Laura Schulz (LRZ)	The QIC Build-up at LRZ and connection to other projects
10:03 . 10:10	Prof. Martin Schulz (LRZ, TUM)	Other Highlights and Conclusions
10:10 - 10:20	Discussion/ Q&A	

Time	Session	Details
10:20 - 11:00	**K4: Theoretical Quantum Computing THEQUCO**	**Consortium Presentation (30'+10', Session Chair: J.M. Lorenz)**
10:20 - 10:26	Prof. Michael Knap (TUM PH)	Introduction and overview
10:26 - 10:34	Prof. Christian Deppe (TUM EE)	Fundamental concepts in quantum computing
10:34 - 10:42	Prof. Lode Pollet (LMU PH)	Characterization, validation and verification
10:42 - 10:50	Prof. Thomas Schulte-Herbrüggen (TUM CH)	Optimized fault-tolerance, error mitigation and control
10:50 - 11:00	Discussion/ Q&A	

11:00 - 11:30   *Coffee Break*

Time	Session	Details
11:30 - 11:50	**LTP 4: Bench-QC**	**Lighthouse Project Presentation (15'+ 5', Session Chair: F. Marquardt)**
11:30 - 11:45	Dr. Johannes Oberreuter (Machine Learning Reply)	Anwendungs-getriebenes Benchmarking von Quantencomputern
11:45 - 11:50	Discussion/ Q&A	

Time	Session	Details
11:50 - 12:10	**LTP 5: NeQuS**	**Lighthouse Project Presentation (15'+ 5', Session Chair: F. Marquardt)**
11:50 - 11:57	Prof. Johanthan Finley (TUM)	Networked Quantum Systems, Part 1
11:57 - 12:05	Prof. Andreas Reiserer (TUM)	Networked Quantum Systems, Part 2
12:05 - 12:10	Discussion/ Q&A	

Time	Session	Details
12:10 - 12:30	**LTP 6: IQ-Sense**	**Lighthouse Project Presentation (15'+ 5', Session Chair: F. Marquardt)**
12:10 - 12:25	Prof. Vladimir Dyakonov (Ch. Expt. Phys, U Würzburg)	Integrated quantum sensors for imaging and tissue analysis
12:25 - 12:30	Discussion/ Q&A	

12:30 - 12:40   *Group Picture*
12:40 - 13:40   *Lunch*

Time	Session	Details
13:40 - 14:20	**C4: Quantum Algorithms**	**Cross-sectional Theme Presentation (30'+10', Session Chair: S. Glaser)**
13:40 - 13:51	Prof. Christian Schilling (LMU PH)	Introduction, Loschmidt Echos, VQE for excited states
13:51 - 13:59	Dr. Jeanette Lorenz (LMU PH)	Quantum convolutional neural networks
13:59 - 14:05	Prof. Christian Mendl (TUM IN)	Qubitization and quantum singular value decomposition
14:05 - 14:10	Prof. Jens Eisert (FU Berlin PH)	What quantum advantages can we hope for in machine learning and optimization
14:10 - 14:20	Discussion/ Q&A	

14:20 - 15:00	**C5: Platform Characteristics - Connecting experimentalists with tool/compiler developers**	**Cross-sectional Theme Presentation (Lead/Moderation: R. Wille)**
14:20 - 14:22	Prof. Robert Wille	Introduction
14:22 - 14:28	Prof. Steffen Glaser	Main motivation and concept of the "matrix"
14:28 - 14:34	Jorge C	Overview of the implementation plans
14:34 - 14:40	Ludwig, Johannes	Selected examples from hardware
14:40 - 14:43	Prof. Robert Wille	Pointer to "spreadsheet", Wrap-up
14:43 - 15:00	Discussion/ Q&A	Moderation by Robert Wille

15:00 - 15:40	**C6: Integration and Control**	**Cross-sectional Theme Presentation (30'+10', Session Chair: S. Glaser)**
		K6 (CT2) and K1 cross-sectional topics
15:00 - 15:05	Simon Lang, FhG EMFT	Fabrication of superconducting resonator chips on 8" silicon wafer
15:05 - 15:10	Dr. Lars Nebrich, FhG EMFT	Interposer based on structured Si and In bumps for heterogeneous Integration of superconducting qubits
15:10 - 15:15	Prof. Jonathan Finley (WSI, TUM)	Integration of 2D-materials with paramagnetic color centres into superconducting waveguides
		K6 (CT1) and K3 cross-sectional topics
15:15 - 15:22	Hans Adel, FhG-IIS	Shielding structures for neutral atoms
15:22 - 15:30	Robert Koch, FhG-IIS	Optical multi-channel switches
15:30 - 15:40	Discussion/ Q&A	

Thursday, September 28th, 2023		
09:00 - 09:40	**K7: Quantum Algorithms for Application, Cloud & Industry QACI**	**Cross-sectional Theme Presentation (30'+10', Session Chair: J. v. Delft)**
09:00 - 09:06	Pascal Debus (FhG-AISEC)	Introduction & Summary
09:00 - 09:12	Pascal Debus (FhG-AISEC)	CT1 - QC Application Algorithms for Industry Use-Cases
09:12 - 09:21	Prof. Christian Mendl (TUM)	CT2 - Supporting Software Tools and Processes
09:21 - 09:30	Dr. Luigi Iapichino (LRZ)	CT3 - Infrastructure Access & User Support
09:30 -09:40	Discussion/ Q&A	

09:40 - 10:00	**LTP 7: QuKomIn**	**Lighthouse Project Presentation (15'+ 5', Session Chair: J. v. Delft)**
09:40 - 09:55	Prof. Christoph Marquardt (FAU)	Quantenkommunikationsinfrastruktur
09:55 - 10:00	Discussion/ Q&A	

10:00 - 10:30	**K9: Quantum Science and Technology Education in Bavaria QST-EB**	**Consortium Presentation (25'+05', Session Chair: M. Schulz)**
10:00 - 10:13	Prof. Alex Holleitner / Prof. Jan von Delft/ Prof. Florian Marquardt	Teaching domain
10:13 - 10:25	Dr.Tatjana Wilk	Outreach domain
10:25 - 10:30	Discussion/ Q&A	

10:30 - 11:00	**K10: Quantum Technology Park & Entrepreneurship QTPE**	**Consortium Presentation (25'+05', Session Chair: M. Schulz)**
10:30 - 10:50	Christopher Trummer	Overview of ongoing activities
10:50 - 11:00	Discussion/ Q&A	

11:00 - 11:30   Coffee Break

11:30 - 12:10	**C7: Benchmarking of quantum hardware from application perspective**	**Cross-sectional Theme Presentation (30'+10', Session Chair: M. Hartmann)**
11:30 - 11:45	Dr. Jeanette Lorenz (FhG-IKS)	Introduction + summary (Importance of application-driven benchmarking, Example in projects, Highlights & learnings, Connection to international activities
11:45 - 11:55	Dr. Luigi Iapichino (LRZ)	Benchmarking activities at the LRZ
11:55 - 12:00	Dr. Max Werninghaus (WMI)	Impact of benchmarking on K1
12:00 - 12:10	Discussion/ Q&A	

12:10 - 12:50	**C8: Quantum Control and Co-design**	**Cross-sectional Theme Presentation (30'+10', Session Chair: J. M. Lorenz)**
12:10 - 12:14	Prof. Steffen Glaser (TUM)	Introduction and overview + pulse design for cold atoms
12:14 - 12:21	Dr. Max Werninghaus (TUM/WMI)	Optimal control for superconducting quantum computers
12:21 -12:28	Prof. Florian Marquardt (FAU)	Optimization of error correction protocols via feedback GRAPE
12:28 - 12:38	Prof. Michael Hartmann (FAU)	MQV hardware modeling and co-design
12:38 - 12:40	Prof. Michael Hartmann (FAU)	Outlook
12:40 - 12:50	Discussion/ Q&A	