

Philosopher in Residence Fellowship Program

Focus Group: Quantum Logic and the Second Quantum Revolution

Seminar Series

Quantumness: from Logic to Engineering and back

The burgeoning research into quantum information and computation marks a significant milestone that can be dubbed “the second quantum revolution”. The first quantum revolution of the 20th century deeply changed the fundamental concepts of physics and our understanding of the physical world. The second quantum revolution of the 21st century is leading to dramatic technological changes in our society and shaping new conceptual and logical paradigms. Munich Quantum Valley serves as an exemplary case, bringing together fundamental research and practical application.

Organized by **Prof. Roberto Giuntini** (Philosopher in Residence) and his hosts: **Prof. Hans-Joachim Bungartz, Prof. Stefania Centrone, Prof. Klaus Mainzer**
For further information, please contact: roberto.giuntini@tum.de

December 6th 2023	IAS Faculty Club (fourth floor) First Quantum Afternoon Prof. Michael Molls (Director of TUM-IAS) Opening speech Prof. Klaus Mainzer (TUM) Introduction to the Focus Group and to the Seminars Prof. Giuseppe Sergioli (University of Cagliari), Prof. Roberto Giuntini (TUM-IAS, University of Cagliari) Quantum State Discrimination for Supervised Classification Prof. Christian Mendl (TUM) Aspects of Quantum Simulation by Digital Quantum Computer	15:00 – 15:45 14:30 – 14:45 14:45 – 15:15 15:15 – 16:00 16:00 – 16:45	Prof. Robert Wille (TUM) Design Automation for Quantum Computing Coffee break Dr. Fabienne Marco (TUM) Pathways to quantum entanglement: Responsible Research and innovation strategies Prof. Maria Luisa Dalla Chiara (University of Florence) Logics from quantum information and possible applications Prof. Klaus Mainzer (TUM) From the Quantum World to Quantum AI
March 15th 2024	IAS Room 0.004 (ground floor) Prof. Marco Giunti (University of Cagliari) Computing systems: mathematical entities or physical objects?	11:30 – 12:45	
April 10th 2024	IAS Room 1.021 (first floor) Prof. Tobias Vogl (TUM) Implementing a single photon quantum logic at room temperature	15:00 – 16:00	
April 17th 2024	IAS Faculty Club (fourth floor) Applications of Integrated High Performance Quantum Computing Dr. Luigi Iapichino (Leibniz Supercomputing Centre – LRZ)) Initial services and applications in the Quantum-accelerated Supercomputing Ecosystem Dr. Marco De Pascale (Leibniz Supercomputing Centre – LRZ)) Comparison of HPC performance of simulators on representative QC use cases	15:00 – 15:45 15:45 – 16:30	
May 16th 2024	IAS Auditorium (ground floor) Second Quantum Afternoon Prof. Michael Molls (TUM-IAS) Opening speech I Prof. Hans Bungartz (TUM) Opening speech II Prof. Urs Gasser (TUM) Opening speech III	14:15 – 14:30 14:30 – 14:45 14:45 – 15:00	
			May 21st 2024 IAS Room 0.004 (ground floor) Quantum Logic as a Logic Prof. Roberto Giuntini (TUM-IAS, University of Cagliari) From sharp to unsharp logic (I) Prof. Francesco Paoli (University of Cagliari) From sharp to unsharp logic (II)
			June 5th 2024 IAS Room 0.004 (ground floor) Foundations of Artificial Intelligence Prof. Fabio Roli (University of Genua and Cagliari) From known knowns to unknown unknowns in AI: Historical and technical issues
			June 7th 2024 IAS Room 0.004 (ground floor) Quantum Monadology Prof. Stefania Centrone (TUM) Monadology and Quantum Monadology Prof. Klaus Mainzer (TUM) Monads, brains, and Quantum Computing
			July 3rd 2024 IAS Room 0.004 (ground floor) Dr. Federico Holik (University of La Plata) Geometrical aspects of resources distribution in quantum random circuits
			July 9th 2024 IAS Room 0.004 (ground floor) Prof. Majid Khadiv (TUM) Intelligent humanoid robots and potential ethical issues

Venue:
Institute for Advanced Study
Lichtenbergstraße 2a
Garching bei München

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