

PhD-Symposium - Optimal Control Theory in the Leading Domains of Quantum Technology (SYPS)

organised by Working Group young DPG (AKjDPG)
supported by all divisions of the section AMOP

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A term frequently used in recent years is the "second quantum revolution". It describes the promise of accelerating the development of Quantum Computation, Encryption, Sensing, and generally making quantum physics an intrinsic part of technology. These so-called Quantum Technologies hold the promise to improve state-of-the-art classical technologies beyond their current, classically limited capabilities. They intrinsically harness quantum effects which are simply not present in the classical world. In general, these Quantum Technologies can be divided into four different pillars, namely Quantum Simulation, Quantum Communication, Quantum Computing and Quantum Metrology. Although all these fields strive to solve different technological challenges and differ in experimental and theoretical complexity, they have one crucial necessity in common: they require control over the respective quantum systems in use. Control over these quantum systems is thereby mediated by a set of external, experimentally accessible control fields and parameters. How these control fields should be chosen for optimal performance, i.e., such that the respective task in question is solved optimally, is tackled by Quantum Optimal Control Theory (OCT). However, since the fundamental idea of OCT is very general, its application ranges far beyond Quantum Technologies, as it can, for instance, also be used to control all kinds of atomic or molecular systems. Nevertheless, the field of Quantum Technologies serves as an excellent example to highlight the vast amount of possibilities emerging from OCT. In our symposium we bring together leading experts in experiment and theory from all four pillars of Quantum Technology to give a general introduction to the field of OCT and a broad overview of what has and can be done

Overview of Invited Talks and Sessions

(Lecture room U Audimax)

Invited Talks

SYPS 1.1	Mon	14:00–14:30	U Audimax	Optimal control of many-body quantum systems — ●SIMONE MONTANGERO
SYPS 1.2	Mon	14:30–15:00	U Audimax	Light matter quantum interface based on single colour centres in diamond — ●FEDOR JELEZKO
SYPS 1.3	Mon	15:00–15:30	U Audimax	Principles of Quantum Systems Theory and Control Engineering — ●THOMAS SCHULTE-HERBRÜGGEN
SYPS 1.4	Mon	15:30–16:00	U Audimax	Quantum metrology with Rydberg atoms — ●SEBASTIEN GLEYZES, ARTHUR LARROUY, REMI RICHAUD, SABRINA PATSCH, JEAN-MICHEL RAIMOND, MICHEL BRUNE, CHRISTIANE KOCH

Sessions

SYPS 1.1–1.4	Mon	14:00–16:00	U Audimax	PhD - Symposium: Optimal Control Theory in the Leading Domains of Quantum Technology
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