

# Symposium Characterization and control of complex quantum systems (SYQS)

jointly organized by  
 the Quantum Optics and Photonics Division (Q),  
 the Atomic Physics Division (A),  
 the Molecular Physics Division (MO),  
 the Theoretical and Mathematical Physics Division (MP),  
 the Mass Spectrometry Division (MS), and  
 the Working Group ‘Young DPG’ (AGjDPG)

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What is ‘complex’? A question which stimulates a panoply of often quite diverse associations and answers. While in condensed matter and also macromolecular physics we are used to be forced into effective descriptions of large, multi-component, interacting quantum systems, complexity is ‘(re-)constructed’ in modern quantum optical experiments. In learning how ‘complexity’ emerges from strongly coupling few degrees of freedom (or particles), we start to contemplate how to control complex systems, and learn to distinguish what is just complicated from what is truly complex. The present symposium collects expertise and perspectives from very diverse fields - photonics, quantum information, molecular dynamics, quantum control, quantum many body physics, open/disordered quantum systems - which all share the interest in getting a better grasp of complexity. In particular, the event aims at making the current state of debate attractive and accessible for students and young researchers. For this purpose, an innovative format will blend a tutorial talk and dedicated questions & answer slots with invited and contributed talks, to foster questions and (constructive) intellectual controversy.

## Overview of Invited Talks and Sessions

(Lecture room: Audimax)

### Invited Talks

SYQS 1.1	Fri	10:30–11:15	Audimax	<b>Tutorial Complex Systems: From Classical to Quantum, from Single to Many Particle Problems</b> — ●KLAUS RICHTER
SYQS 1.2	Fri	11:30–12:00	Audimax	<b>Multiphoton random walks: Experimental Boson Sampling on a photonic chip</b> — ●IAN WALMSLEY, JUSTIN SPRING, BEN METCALF, PETER HUMPHREYS, STEVE KOLTHAMMER, XIANMIN JIN, ANIMESH DATTA, JAMES GATES, PETER SMITH
SYQS 2.1	Fri	14:00–14:30	Audimax	<b>Charge transfer and quantum coherence in solar cells and artificial light harvesting systems</b> — ●CHRISTOPH LIENAU
SYQS 2.6	Fri	15:30–16:00	Audimax	<b>Feedback control: from Maxwell’s demon to quantum phase transitions</b> — ●TOBIAS BRANDES
SYQS 3.4	Fri	17:15–17:45	Audimax	<b>Multi-photon dynamics in complex integrated structures</b> — ●FABIO SCIARRINO
SYQS 3.5	Fri	17:45–18:15	Audimax	<b>Complexity and many-boson coherence</b> — ●MALTE TICHY

### Sessions

SYQS 1.1–1.4	Fri	10:30–12:30	Audimax	<b>Characterization and control of complex quantum systems I</b>
SYQS 2.1–2.6	Fri	14:00–16:00	Audimax	<b>Characterization and control of complex quantum systems II</b>
SYQS 3.1–3.5	Fri	16:30–18:30	Audimax	<b>Characterization and control of complex quantum systems III</b>