

# Symposium Designing Quantum Materials with Light: From Floquet to Cavity Engineering (SYFC)

jointly organised by  
the Semiconductor Physics Division (HL),  
the Surface Science Division (O), and  
the Low Temperature Physics Division (TT)

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This symposium focuses on how tailored light fields and optical cavities can be used to design and control novel phases of quantum matter far from thermal equilibrium or even in the dark. Building on rapid progress in ultrafast experiments – including time-resolved momentum microscopy and high-quality 2D/3D materials – Floquet and cavity engineering now enable the creation of engineered band structures, correlated and topological phases, and emergent “polaritonic quantum matter.” In parallel, ab initio and advanced many-body theory have matured to the point of providing quantitative guidance and interpretation for these experiments. The symposium will bring together leading international experts from theory and experiment to discuss current breakthroughs and future directions towards optoelectronic and quantum-information devices based on light-designed quantum materials.

## Overview of Invited Talks and Sessions

(Lecture hall HSZ/AUDI)

### Invited Talks

SYFC 1.1	Mon	9:30–10:00	HSZ/AUDI	<b>Subcycle videography of strong-field controlled band structures</b> — ●RUPERT HUBER, MANUEL MEIERHOFER, ULRICH HÖFER
SYFC 1.2	Mon	10:00–10:30	HSZ/AUDI	<b>Engineering Quantum Materials through Structured Cavity Vacuum Fluctuations</b> — ●ANGEL RUBIO
SYFC 1.3	Mon	10:30–11:00	HSZ/AUDI	<b>Floquet engineering of quantum materials: from semiconductors to semimetals</b> — ●SHUYUN ZHOU
SYFC 1.4	Mon	11:15–11:45	HSZ/AUDI	<b>(Quantum) Light Control of Materials</b> — ●DANTE KENNES
SYFC 1.5	Mon	11:45–12:15	HSZ/AUDI	<b>Lightwave-driven electrons in a Floquet topological insulator</b> — DANIEL LESKO, TOBIAS WEITZ, WEIZHE LI, SELINA NÖCKER, CELINA HÜTTNER, TAMARA PRÖBSTER, SIMON WITTIGSCHLAGER, CHRISTIAN HEIDE, OFER NEUFELD, ●PETER HOMMELHOFF

### Sessions

SYFC 1.1–1.5	Mon	9:30–12:15	HSZ/AUDI	<b>Designing Quantum Materials With Light: from Floquet to Cavity Engineering</b>
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