

# Light-induced emergent phenomena in low-dimensional materials (Bali Conference 2025)

2025/06/15-06/20 Bali, Indonesia

Recent decades have witnessed a rapid growth in the frontier of ultrafast nonequilibrium dynamics and light-induced emergent phenomena in quantum materials. In particular, with the development of advanced ultrafast pump-probe techniques enabled by high-power lasers and free-electron lasers, scientists can now capture the ultrafast electronic, structural dynamics as well their transient optical, nonlinear optical and transport properties with unprecedented temporal and spatial resolutions when materials are driven to a highly nonlinear, far-from-equilibrium regime by ultrafast lasers. This opens up new opportunities for utilizing light-matter interaction as a control knob in the time domain, inducing exotic new states-of-matter without equilibrium counterparts. The experimental discoveries also call for new theoretical understanding that goes beyond the conventional paradigm of physics in equilibrium. In-depth collaboration between experimentalists and theorists, and between experimentalists/theorists with different expertise is beneficial for this rapidly-developing field.

This conference will convene a diverse and expansive international community of experts in the field, offering a dynamic platform for extensive interactions and in-depth discussions. It will not only facilitate the exchange of cutting-edge ideas and advances, but also serve as an inspiring and invaluable forum for the new generation of young scientists, offering the opportunity to engage directly with leading experts and shape the trajectory of their careers.

**Organizing committee:** Shuyun Zhou, Luyi Yang, Zhiyuan Sun, Renkai Li, Peizhe Tang, Qihua Xiong, Xi Dai



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The topics will include, but are not limited to, the following:

- Floquet engineering of low-dimensional materials and many-body phases
- Nonequilibrium dynamics and light-induced emergent phenomena, such as new charge/spin order, magnetism, exciton condensation, superconductivity, ferroelectricity, etc
- Ultrafast detection of collective excitations and nonlinear optical response
- Cavity engineering of quantum materials
- Other exotic nonequilibrium states (Floquet-topological crystal, time crystals, attosecond science etc)

**Venue:**

This conference will be held in Bali, Indonesia, at the TSEA (<https://tsea.asia/>). It is a beautiful building located on a small private island Kura Kura (Turtles in Indonesian), which is connected by a bridge to the main island of Bali.

The architecture is very conducive for structured and unstructured discussions. Accommodations will be in hotels in Sanur, which is a relatively quiet part of Bali. The hotels are within a very short walk from the Sanur beach. Transportations between the contract hotel and conference site and lunch will be provided.

**Contact:**

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