

SIMIS Seminar series on Quantum computing, Quantum simulation and Strongly-correlated systems**Prof. Pengfei Zhang**

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“Operator Size Dynamics: Theory & Application”**Abstract**

Information scrambling has emerged as a cornerstone in understanding thermalization in closed quantum systems. In such systems, the initial information, while fully preserved under unitary evolution, becomes scrambled—spreading from local physical observables into highly non-local ones. This process ultimately leads to the quantum thermalization of simple operators over sufficiently long timescales. In this talk, I will present our research on operator size dynamics, encompassing both the development of fundamental theories in closed and open quantum systems, as well as applications in quantum algorithms, such as quantum neural networks and classical shadow tomography.

Biography of the speaker

Pengfei Zhang is currently an associate professor at Fudan University. He earned his PhD from Tsinghua University in 2019 under the supervision of Prof. Hui Zhai. From 2019 to 2022, he served as a Burke Fellow postdoctoral researcher, collaborating with Prof. Alexei Kitaev. In 2023, he joined Fudan University as a faculty member. His research focuses on theoretical condensed matter physics and cold atom physics, with particular interests in the dynamics of quantum information, holographic quantum matter, ultracold atomic gases, and quantum machine learning.

Date and Place: February 28th 2025, 11:00h-12:00h. Room: 1410. Send comments or questions to: Miguel Tierz (Seminar organizer) to tierz@simis.cn