
SEMINAR: Charging power enhancement at the phase transition of a non-integrable quantum battery

DONATO FARINA

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11:00 to 11:30

Seminar Room

Exploiting many-body interaction and critical phenomena to improve the performance of quantum batteries is an emerging and promising line of research. A central question in this direction is whether quantum phase transitions can enhance the charging energy or the power. While preliminary works have addressed this problem in fine-tuned integrable models, its characterization in non-integrable systems remains limited due to the demanding numerical requirements. Here, we investigate a one-dimensional Axial Next-Nearest-Neighbor Ising model as an example of non-integrable quantum battery charged via a quantum-quench protocol. In contrast to integrable cases, we find that criticality in this setting can lead to a pronounced enhancement of the charging power. Our findings inform quantum-battery design of many-qubit systems and are amenable to experimental verification on current quantum-simulation platforms, including neutral-atom arrays.

Hosted by: Prof. Dr. Toni Acin