

PROBING QUANTUM MATTER ON A LARGE SCALE ATOMIC QUANTUM SIMULATOR

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More than 30 years ago, Richard Feynman envisioned a quantum simulator for complex calculations on physical problems. Today, his dream has become a reality in laboratories worldwide.

Ultracold atoms trapped in optical lattices provide an intriguing setting for realising quantum simulators with the possibility to control and detect systems down to the level of single atoms on single lattice sites. I will discuss applications for neutral atom quantum simulators to probe quantum phases of strongly interacting electronic systems, including hidden magnetic order, topological phases as well as non-equilibrium dynamics that provide new paradigms for statistical physics. I will give an outlook on future scalability of the systems.

FRIDAY,
04.06.2021

2:00 PM

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