Kolloquium gemeinsam mit dem SFB1277

physikalisches Kolloquium

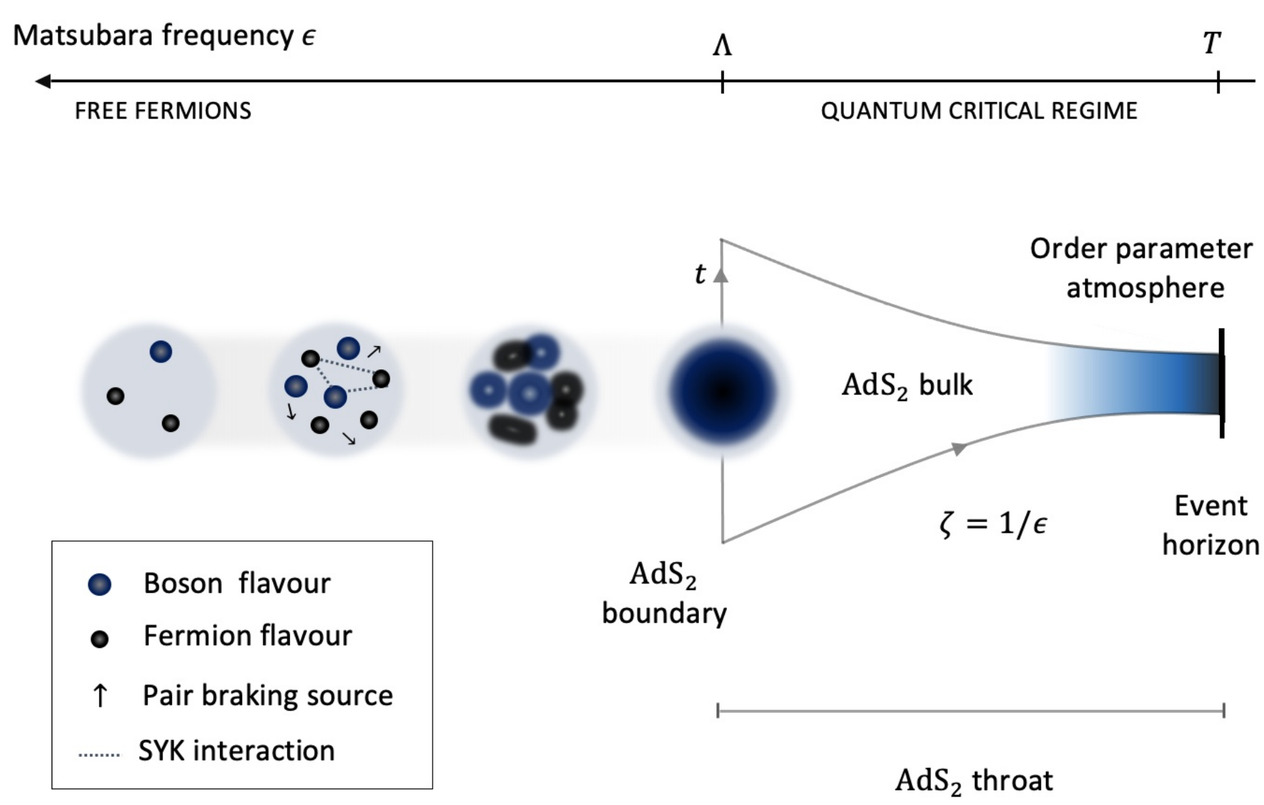
Prof. Dr. Jörg Schmalian
Karlsruhe Institute of Technology

Superconductivity without quasiparticles

Mo. 8.5.23
16:00 Uhr
Ort: H34

Superconductivity is abundant near quantum-critical points, where fluctuations suppress the formation of Fermi liquid quasiparticles and the Bardeen-Cooper-Schrieffer theory no longer applies.

Holographic superconductivity, rooted in the duality of quantum field theory and gravity theory, has been proposed to describe such systems. We derive holographic superconductivity in form of a gravity theory with emergent space-time from a quantum many-body Hamiltonian.



At low energies models of quantum critical electrons and collective bosons give rise to superconductivity. The fluctuating superconducting order parameter behaves identical to a scalar field with in an emergent gravitational space time that forms an atmosphere around a black hole event horizon.
From Inkof, GA., Schalm, K. & Schmalian, J. npj Quantum Mater. 7, 56 (2022).
https://doi.org/10.1038/s41535-022-00460-8