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Quantum entanglement at all distances: from quantum materials to black holes

Entanglement is the strangest feature of quantum theory, often dubbed "spooky action at a distance". Quantum entanglement can occur on a macroscopic scale with trillions of electrons, leading to "strange metals" and novel superconductors which can conduct electricity without resistance even at relatively high temperatures. Remarkably, related entanglement structures arise across the horizon of a black hole, and give rise to Hawking's quantum paradox. This lecture will be designed to introduce these forefront topics in current physics research to a general audience.

Subir Sachdev was educated at the Indian Institute of Technology, Delhi, the Massachusetts Institute of Technology, and Harvard University. He has held professional positions at Bell Labs, Yale University, and Harvard where he is now the Herchel Smith Professor of Physics. He has been elected to national academies of science in India and the U.S. and is a recipient of a number of awards and honors which include the Dirac Medal from the International Center for Theoretical Physics, and the Lars Onsager Prize from the American Physical Society.

