Kolloquium
Theoretische Physik

Universität Konstanz

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Sandwiches and Mille-Feuilles of 2D quantum spin liquids: solid state research in the era of the 2nd quantum revolution.

The patterns of self-organization in complex quantum systems are central to quantum many-body physics. Specifically, quantum order in the absence of symmetry breaking, in particular highly entangled topologically ordered states, describes fundamentally distinct phases of matter that are of great interest both in present-day solid state research and in quantum information science. In this talk, I will spend some time reviewing the concepts of topological and non-symmetry broken quantum order and relate to quantum spin liquid states discussed in the context of quantum materials. I will then focus on the interplay of such exotic states with gapless fermions, i.e., metals, as is of relevance to heterostructures of van der Waals materials. Specifically I will discuss signatures of quantum spin liquids "sandwich" heterostructures. I will also discuss bulk 4Hb-TaS2, which was promoted as a candidate material for alternating QSL and metallic layers (a "mille-feuille") and attempt to provide theoretical insight into its unconventional superconducting properties, in particular its enigmatic magnetic memory.

Host: Prof. Zilberberg

Organisation: Prof. Dr. Javier Del Pino