

Quasicrystals in discrete-holographic tensor networks

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Holographic dualities relate the physics of a higher-dimensional bulk theory to that of a lower-dimensional theory on its boundary. Tensor network models, which express a quantum state's entanglement in terms of a graph, describe many aspects of these dualities but discretize their geometry: While the negatively curved bulk is represented by a regular hyperbolic tiling, its boundary exhibits quasiperiodic symmetries. In this talk, I will show how such quasicrystal structures manifest themselves in holographic tensor-network states, resulting in discrete analogues of the symmetry relationships in holographic dualities. These symmetries give rise to a new type of disordered critical phase with long-range entanglement and correlations, showing how discrete holography leads to surprising implications for the field of quantum many-body physics.