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# On Infinite Tensor Networks, Complementary Recovery and Type II Factors

We initiate a study of local operator algebras at the boundary of infinite tensor networks, using the mathematical theory of inductive limits. In particular, we consider tensor networks in which each layer acts as a quantum code with complementary recovery, a property that features prominently in the bulk-to-boundary maps intrinsic to holographic quantum error-correcting codes. In this case, we decompose the limiting Hilbert space and the algebras of observables in a way that keeps track of the entanglement in the network. We apply this framework to the HaPPY code, networks prepared by stabilizer circuits, MERA and use it to provide a novel perspective on topological order and its relation to quantum computation.

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