

Twins Percolation for Qubit Losses in Topological Color Codes

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Quantum information is the generalisation of the classical information theory to quantum systems. If for a classical computer the bits are the fundamental units, quantum computers are built on an analogous concept, the quantum bits currently implemented in different physical systems (atoms, ions, molecules) due to recent experimental advances in the control of cold and ultra-cold gases. However, these experimental setups are so delicate that qubits can be corrupted by environmental noise and even be completely lost from the apparatus resulting in the partial or total loss of the information there memorised. In this talk, we will consider how losses can affect a particular class of quantum code (the so-called color codes). We introduce a protocol for dealing with losses and we show that checking whether the logical information is still recoverable is equivalent to a generalized percolation process.