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Percolation bounds for decoding thresholds with correlated erasures in quantum LDPC codes[1] KATHLEEN HAMILTON, None, LEONID PRYADKO, University of California, Riverside — Correlations between errors can dramatically affect decoding thresholds, in some cases eliminating the threshold altogether. We analyze the existence of a threshold for quantum low-density parity-check (LDPC) codes in the case of correlated erasures. When erasures are positively correlated, the corresponding multi-variate Bernoulli distribution can be modeled in terms of cluster errors, where qubits in clusters of various size can be marked all at once. In a code family with distance scaling as a power law of the code length, erasures can be always corrected below percolation on a qubit adjacency graph associated with the code. We bound this correlated percolation transition by weighted (uncorrelated) percolation on a specially constructed cluster connectivity graph, and apply our recent results [1] to construct several bounds for the latter.

[1] K. E. Hamilton and L. P. Pryadko, "*Algebraic bounds for weighted percolation on directed and undirected graphs*," arXiv:1505.03963 (2015).

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Kathleen Hamilton
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