- **Local topological order inhibits thermal stability in 2D**
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We put severe constraints on the existence of a self-correcting quantum memory made of a two-dimensional (2D) array of particles. Such a memory would passively protect the encoded information thanks to its dynamics at low temperature. To be robust to perturbation, candidates for such devices encode information in topological degrees of freedom, which are impervious to local errors on a short timescale. However, we show that, for any topologically ordered 2D local commuting projector code, thermal excitations can accumulate and corrupt the encoded information. We thus prove a no-go theorem, extending the known results to non-stabilizer codes.