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The quest for self-correcting quantum memory

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A self-correcting quantum memory is a physical system whose quantum state can be preserved over a long period of time without the need for any external intervention. The most promising candidates are topological quantum systems which would protect information encoded in their degenerate groundspace while interacting with a thermal environment. Many models have been suggested but several approaches have been shown to fail due to no-go results of increasingly general scope. In this presentation, I will explain the desiderata for self-correction, review the recent advances and no-go results, and describe the current endeavours to define a self-correcting system in 2D and 3D.