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Topological Decoding through Artificial Confinement[1] GUILLAUME DUCLOS-CIANCI, DAVID POULIN, Université de Sherbrooke — 2D topological stabilizer codes have attracted a lot of attention in recent years for two main reasons. First, they provide exactly solvable models which exhibit topological order and anyonic excitations. Second, they naturally lead to quantum stabilizer error-correcting codes having macroscopic minimum distance. Although these codes are robust at zero temperature, quasi-particles appear and freely diffuse in the system at any finite temperature. If this diffusion is unchecked, errors will occur. Consequently, active error-correction is needed. We want to propose a cellular automaton that would perform this correction. It would "manually" confine the quasi-particles by simulating articifial attraction between them and moving them accordingly. We obtained encouraging preliminary results for error-correction and hope to generalize them to fault-tolerance.

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