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Tuesday, June 2, 2020, at 10:00 (Boston)
15:00 (UK/Eire) 16:00 (C.Europe) 22:00 (China)

Mathematical Picture Language Seminar
Zoom at: <https://harvard.zoom.us/j/779283357>

Kitaev's finite group model as an error correcting code
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Abstract: Kitaev's quantum double models in 2D provide some of the most commonly studied examples of topological quantum order. In particular, the ground space is thought to yield a quantum error-correcting code. We offer an explicit proof that this is the case for arbitrary finite groups. Actually, a stronger claim is shown: any two states with zero energy density in some contractible region must have the same reduced state in that region. Alternatively, the local properties of a gauge-invariant state are fully determined by specifying that its holonomies in the region are trivial. This implies that Kitaev's model satisfies both TQO1 and TQO2 conditions of Bravyi-Hastings-Michalakis, and so it is a topological order in the sense of B-H-M. We note that the methods developed by P. Naaijken (PhD thesis, 2012) under a different context can be adapted to provide another proof of this result. We also note that more recently Q. Yang and Z. Wang proved the same result for the more general class of Levin-Wen models, but their method of proof is very different.

