A neural decoder for topological codes GIACOMO TORLAI, ROGER MELKO, University of Waterloo — Topological codes are the leading candidate for a practical implementation of fault-tolerant quantum computing hardware. The quantum information is protected through an error correction protocol, which is implemented by a "decoder" – a classical algorithm running on conventional computers. I will introduce a new decoder for generic degenerate stabilizers codes that exploits modern machine learning techniques. The error correction is performed by a neural network, which has no specialization regarding the noise model, nor does it rely on the code geometry or stabilizer group. I will show the neural decoder's performances for the prototypical example of the 2-dimensional toric code.

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