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**Determining individual gate error models from the output of quantum error detection circuits** AUSTIN FOWLER, JOHN MARTINIS, University of California, Santa Barbara — There are many different ways of determining an error model for a quantum gate, including process tomography and randomized benchmarking. These techniques focus on individual gates. A frequently discussed concern is whether any given error model accurately reflects how errors will compose and propagate when multiple gates are applied in a practical circuit. We approach the error model problem in a new manner, starting with the experimental output of a complete quantum error detection circuit, and determine error models for all gates from this single source of data. We argue that these error models are the most appropriate for predicting the error suppression performance of larger quantum circuits.

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