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October 4, 2017

I am submitting an article titled "Halving the cost of quantum addition" for publication in Nature Quantum Information.

The article introduces a construction that can compute and later uncompute the quantum equivalent of a logical AND gate using a total of four T gates. This construction improves the T-count of many quantum circuits. T gates are the most significant cost of surface-code-based error corrected quantum computation, and opportunities to use the logical AND are quite common, so this represents a large reduction in the projected costs of quantum computing. I give several example T-count improvements in the paper, with a focus on addition as a salient example.

I believe that this article is appropriate for publication by Nature Quantum Information. The article represents original research. It fails within the journal's scope. It is a significant result. It has not been published and is not under consideration for publication elsewhere (though a preprint has been listed on the arXiv [1709.06648]).

I omitted several sections mentioned by your style guide, because their content would have been trivial. These include the methods section (the circuits can be verified with any simulator), the competing interests section (I have no conflicts of interest to disclose), the contributions section (I am the sole author), and the funding section (there were no grants to support the work).

Thank you for your consideration,

Craig Gidney