Magic state distillation protocols with noisy Clifford gates[1] PETER BROOKS, California Institute of Technology — A promising approach to universal fault-tolerant quantum computation is to implement the non-universal group of Clifford gates, and to achieve universality by adding the ability to prepare high-fidelity copies of certain "magic states". By applying state distillation protocols, many noisy copies of a magic state ancilla can be purified into a smaller number of clean copies which are arbitrarily close to the perfect state, using only Clifford operations. In practice, the Clifford gates themselves will be noisy, which can limit the efficiency of state distillation and put a floor on the achievable fidelity with the desired state. Recently, a number of new state distillation protocols have been proposed that have the potential to reduce the required resource overhead. I analyze these protocols and explore the tradeoffs between these different approaches to magic state distillation when noisy Clifford gates are taken into account.

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Date submitted: 09 Nov 2012   Electronic form version 1.4