

Abstract Submitted  
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**Highly efficient Bell state purification and GHZ preparation and purification** STEFAN KRASTANOV, LIANG JIANG, Yale University — We investigate novel protocols for entanglement purification with Bell states. Employing genetic algorithms for the design of the purification circuit, we obtain shorter circuits giving higher success rates and better final fidelities than what is available in the literature. We generalize these circuits in order to prepare GHZ states from Bell pairs and to subsequently purify these GHZ states. We provide new threshold estimates for codes using these GHZ states for fault-tolerant stabilizer measurements.

Stefan Krastanov  
Yale University

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