Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Potts glass reflection of the decoding threshold for qudit quantum error correcting codes[1] YI JIANG, University of California, Riverside, ALEXEY A. KOVALEV, University of Nebraska—Lincoln, LEONID P. PRYADKO, University of California, Riverside — We map the maximum likelihood decoding threshold for qudit quantum error correcting codes to the multicritical point in generalized Potts gauge glass models, extending the map constructed previously for qubit codes [1]. An n-qudit quantum LDPC code, where a qudit can be involved in up to m stabilizer generators, corresponds to a Z_d Potts model with n interaction terms which can couple up to m spins each. We analyze general properties of the phase diagram of the constructed model, give several bounds on the location of the transitions, bounds on the energy density of extended defects (non-local analogs of domain walls), and discuss the correlation functions which can be used to distinguish different phases in the original and the dual models.

[1] A A Kovalev and L P Pryadko, Quant. Inf. & Comp. **15**, 0825 (2015).

[1]This research was supported in part by the grants: NSF PHY-1415600 (AAK), NSF PHY-1416578 (LPP), and ARO W911NF-14-1-0272 (LPP)

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Date submitted: 06 Nov 2015 Electronic form version 1.4