

$\text{QNC}_1 \subset \text{noisy-BQP}$

Michael Benor David Ponnarovsky

September 15, 2024

1 Notations.

C_g - good qLDPC, C_{ft} - concatenation code (ft stands for fault tolerance). For a code C_y we use Φ_y, E_y, D_y to denote the maps circuits into the circuits compute in the code space, the encoder, and the decoder.

2 The Noise Model

3 Fault Tolerance (With Resets gates) at Linear Depth.

Claim 3.1. *There is $p_{th} \in (0, 1)$ such that if $p < p_{th}$ then any quantum circuit C with depth D and width W can be computed by p -noisy, resets allowed, circuit C' , with a depth at most $\max\{D, \log(WD)\}$.*

3.1 Initializing Magic for Teleportation gates and encodes ancillaries.

Claim 3.2. *There is prot*

1. Initializing Magic for Teleportation gates and encodes ancillaries.
2. Each gate is replaced by gate teleportation.
- 3.