

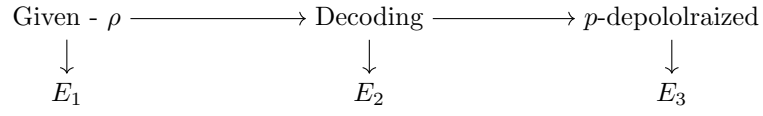
# Memory.

Michael Ben-Or   David Ponnarovsky

August 7, 2025

## 0.1 Definitions.

## 0.2 Idea.



$$\Pr[\mathbf{Sup}E_2 = S] \leq \Pr[\text{any bit } v \in S_{c_1} \text{ sees majority of unstatisfied stabilizers}] \leq q^{\Delta|S|_{c_1}}$$

$$\begin{aligned}
 \Pr[\mathbf{Sup}E_3 = S] &= \sum_{S' \subset S} \Pr[E_2 \mathbf{Sup}S' \cap E_3 / E_2 \mathbf{Sup}S / S'] \\
 &\leq \sum_{S' \subset S} q^{\Delta|S'_{c_1}|} p^{|S/S'_{c_1}|} \leq \sum_{S' \subset S} q^{\Delta|S'_{c_1}|} p^{|S_{c_1}| - |S'_{c_1}|} \\
 &\leq (q^\Delta + p)^{|S_{c_1}|} \leq \begin{cases} (q^\Delta + p)^{\frac{1}{4}|S|} & \text{if } |S_{c_1}| \geq \frac{1}{4}|S| \\ \star & \text{else} \end{cases}
 \end{aligned}$$

Let  $S^t = \mathbf{Sup}E$  at time  $t$  and denote by  $\mathcal{P}_t$  the probability that  $|S_{c_1}^t| > \frac{1}{4}|S_t|$ .