$$P \in \mathcal{P}(n)$$

$$P = P_1 \otimes \cdots \otimes P_n$$

$$P_j \in \mathcal{P}(1)$$

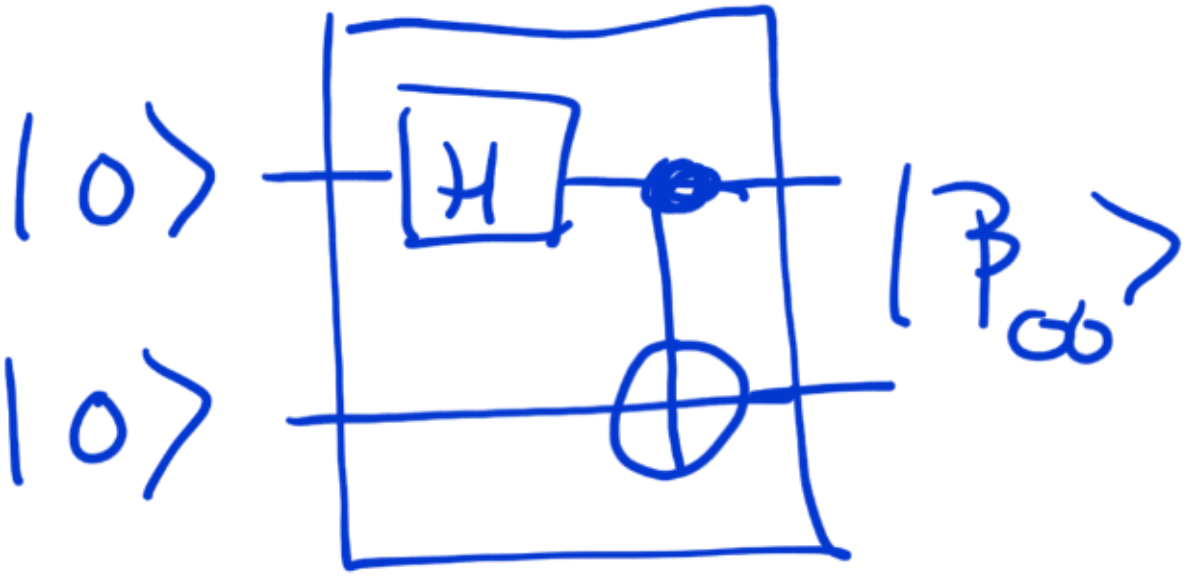
$$P_j = i^a P \qquad a \in \mathbb{Z}_4$$

$$P \in \{I, X, Y, Z\}$$

$$P = i^a (P_1 \otimes \cdots \otimes P_n)$$

$$P_i \in \{I, X, Y, Z\}$$

$q \in \mathbb{Z}_4$



$$R_1|\psi\rangle = |\psi'\rangle$$

$$R_2|\psi\rangle = |\psi'\rangle$$

$$|\psi'\rangle|\psi'\rangle - |\psi\rangle|\psi\rangle$$

$|\psi\rangle = |\psi\rangle$

$\mathrm{Stab}|\psi\rangle$
$= \{U \mid U|\psi\rangle = |\psi\rangle\}$

$|\psi\rangle$
$|\psi\rangle = \alpha|\psi\rangle$

$\mathrm{Stab}|\psi\rangle$
$=$
$\mathrm{Stab}|\psi\rangle$

$U \in \mathrm{Stab}|\psi\rangle$

$\rightarrow U|\psi\rangle = U\alpha|\psi\rangle$
$= \alpha U|\psi\rangle$
$= \alpha|\psi\rangle$

$-\alpha|\psi\rangle = |\psi\rangle$

$U \in Stab|\psi\rangle$

$U|\varphi\rangle = U\alpha^{-1}|\psi\rangle$

$= \alpha^{-1} U|\psi\rangle = |\varphi\rangle$