

オペレータ・ユニタリ

$$U = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

$$\phi = U\phi_0$$

$$U = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

$$in \gg e_0, e_1, e_2, e_3$$

$$out \gg Ue_0 = e_0, Ue_1 = e_1, Ue_2 = e_3, Ue_3 = e_2$$

$$\sigma = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

$$U = \begin{pmatrix} * & & & \\ & * & & \\ & & * & \\ & & & * \\ & & & & \sigma \end{pmatrix}$$