$$|\psi\rangle_{\text{in}} = |T_1, \dots, T_m\rangle$$

$$\hat{a}_i^{\dagger} \to \sum_{j=1}^m U_{i,j} \hat{a}_j^{\dagger}$$

$$\psi\rangle_{\text{out}} = \sum_{j=1}^m \gamma_{S,T} |S_1, \dots, S_m\rangle$$