

Diagrammatic equation showing the decomposition of a unitary U_g into a phase factor and a sequence of three components:

$$\begin{array}{c} \uparrow \\ \boxed{U_g} \\ \uparrow \\ \textcircled{\Gamma} \\ \leftarrow \quad \rightarrow \end{array} = e^{i\theta_g} \begin{array}{c} \leftarrow \quad \rightarrow \\ \boxed{V_{gI}} \\ \leftarrow \quad \rightarrow \end{array} \begin{array}{c} \uparrow \\ \textcircled{\Gamma} \\ \leftarrow \quad \rightarrow \end{array} \begin{array}{c} \leftarrow \quad \rightarrow \\ \boxed{V_{gI}^\dagger} \\ \leftarrow \quad \rightarrow \end{array}$$

The diagram illustrates the decomposition of a unitary U_g into a phase factor $e^{i\theta_g}$ and a sequence of three components: a unitary V_{gI} , a scattering matrix Γ , and another unitary V_{gI}^\dagger .