

$$U_{\rho(g)}U = \begin{pmatrix} 0 & U^\dagger \\ U & 0 \end{pmatrix} \begin{pmatrix} e^{iT^a\omega^a} & 0 \\ 0 & e^{-iT^{aT}\omega^a} \end{pmatrix} \begin{pmatrix} 0 & U^\dagger \\ U & 0 \end{pmatrix} = \begin{pmatrix} U^\dagger e^{-iT^{aT}\omega^a}I & 0 \\ 0 & Ue^{iT^a\omega^a}U^\dagger \end{pmatrix}$$