$$\frac{1}{\sqrt{2}} \qquad e^{i\varphi_0} \qquad \frac{1}{\sqrt{2}} \qquad = \qquad \cos \frac{\varphi}{2} \\
-i\sin \frac{\varphi}{2} \qquad = \qquad -i\sin \frac{\varphi}{2} \\
\frac{1}{\sqrt{2}} \qquad \frac{1}{\sqrt{2}} \qquad e^{i\varphi_1} \qquad \frac{1}{\sqrt{2}} \qquad = \qquad \left[ \frac{1}{\sqrt{2}} \qquad \frac{1}{\sqrt{2}} \qquad -i\sin \frac{\varphi}{2} \\
\frac{1}{\sqrt{2}} \qquad \frac{1}{\sqrt{2}} \qquad 0 \qquad 0 \qquad e^{i\varphi_1} \right] \qquad = \qquad \left[ \frac{\cos \frac{\varphi}{2} \qquad -i\sin \frac{\varphi}{2}}{0 \qquad e^{i\varphi_1}} \right] \qquad = \qquad \left[ \frac{\cos \frac{\varphi}{2} \qquad -i\sin \frac{\varphi}{2}}{-i\sin \frac{\varphi}{2} \qquad \cos \frac{\varphi}{2}} \right]$$