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