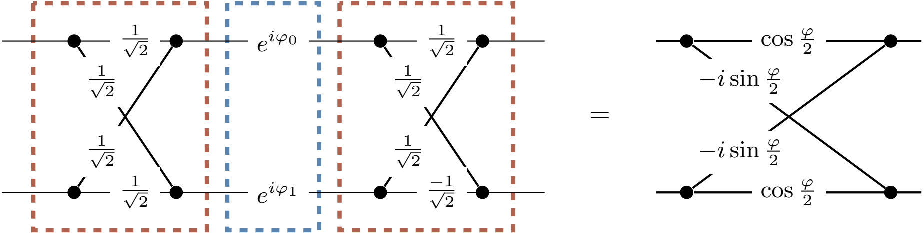

$$\begin{bmatrix}\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}}\\ \frac{1}{\sqrt{2}} & \frac{-1}{\sqrt{2}}\end{bmatrix}\begin{bmatrix}e^{i\varphi_0} & 0\\ 0 & e^{i\varphi_1}\end{bmatrix}\begin{bmatrix}\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}}\\ \frac{1}{\sqrt{2}} & \frac{-1}{\sqrt{2}}\end{bmatrix} = \begin{bmatrix}\cos\frac{\varphi}{2} & -i\sin\frac{\varphi}{2}\\ -i\sin\frac{\varphi}{2} & \cos\frac{\varphi}{2}\end{bmatrix}$$