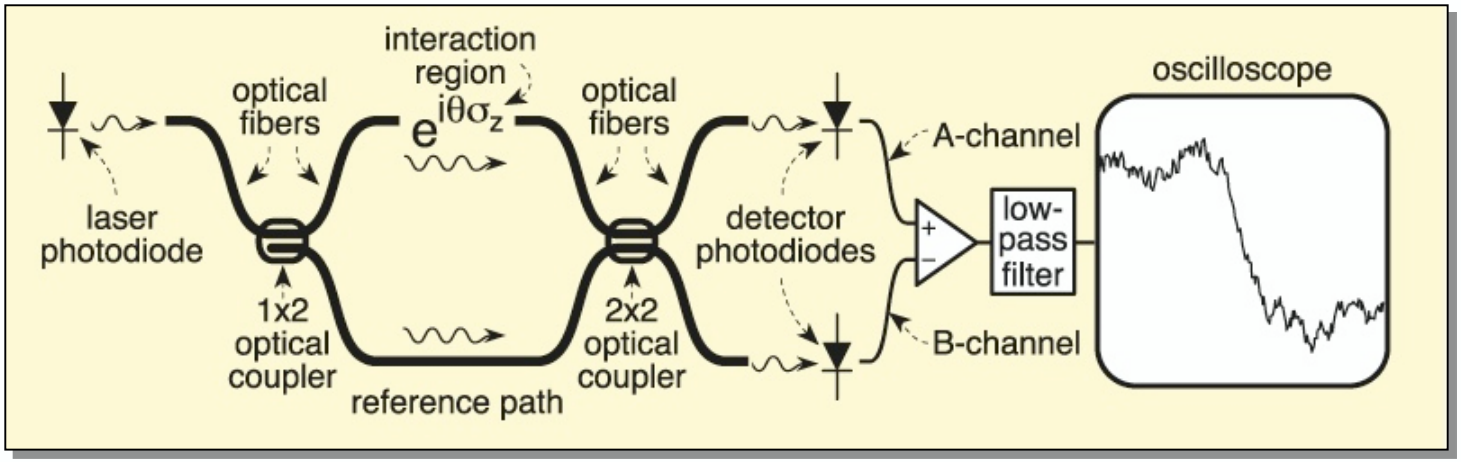
# From *"Mike and Ike: The Missing Manual"* -- UW Spinometer Seminar Notes




- **Construct A and B operators from optical transfer matrices**

$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} \cdot \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix} \cdot \begin{pmatrix} e^{i\theta\sigma_{\rm op}} & 0 \\ 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ 0 & e^{i\phi} \end{pmatrix} \cdot \begin{pmatrix} \cos\psi & \sin\psi \\ -\sin\psi & \cos\psi \end{pmatrix} \equiv \begin{pmatrix} A_{\rm op} \\ B_{\rm op} \end{pmatrix}$$

- **Recognize that A and B are *Kraus operators* (which generate POVMs)**

$$\rho_{n+1} = A_{\rm op}\rho_n A_{\rm op}^\dagger + B_{\rm op}\rho_n B_{\rm op}^\dagger \;\Rightarrow\; A_{\rm op}A_{\rm op}^\dagger + B_{\rm op}B_{\rm op}^\dagger = \boldsymbol{I}$$

- **Recognize that interferometer "tuning invariance" is just *Choi's Theorem***

$$A_{\rm op}\rho_n A_{\rm op}^\dagger + B_{\rm op}\rho_n B_{\rm op}^\dagger = A'_{\rm op}\rho_n A_{\rm op}^{'\dagger} + B'_{\rm op}\rho_n B_{\rm op}^{'\dagger} \;\Leftrightarrow\; \begin{pmatrix} A_{\rm op} \\ B_{\rm op} \end{pmatrix} = \boldsymbol{S} \cdot \begin{pmatrix} A'_{\rm op} \\ B'_{\rm op} \end{pmatrix}$$