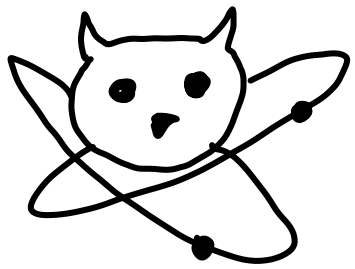
# QSAIL 23



QUANTUM SPEED STEERING

(A) (B)

$$\rho^{B}_{a|Y} \overset{LHS}{=} \sum_{\lambda} \frac{p(\lambda)\, p(a|Y,\lambda)\, \sigma^{B}_{\lambda}}{p(a|Y)}$$

$$\Delta O^{BIA} = \sqrt{\sum_{a} p(a|Y) (\Delta O)^{2}_{\rho_{a|Y}}}$$

$$(\Delta H)^{BIA} (\Delta M)^{BIA} \geq \frac{|\langle [H,M] \rangle_{\rho}|}{2}$$

$$\Delta E \Delta t \geq \frac{\hbar}{2}$$

$$\frac{\partial \langle M \rangle}{\partial t} = \frac{i}{\hbar} \langle [H, M] \rangle$$

$$\Delta H \Delta M \geq \frac{|\langle [H, M] \rangle|}{2} = \frac{\hbar}{2} \left| \frac{\partial \langle M \rangle}{\partial t} \right|$$

$$\Delta \tau_M := \frac{\Delta M}{\left| \frac{\partial \langle M \rangle}{\partial t} \right|}$$

$$\Delta \tau \, \Delta H \geq \frac{\hbar}{2}$$

$|\psi_0\rangle \quad M = |\psi_0 \times \psi_0|$

$$t_\perp \geq \frac{\pi \hbar}{2 \Delta H}$$

$$\Delta \tau_M^{BIA} := \frac{\Delta M^{BIA}}{\left| \frac{\partial \langle M \rangle}{\partial t} \right|}$$

$$\Delta \tau_M^{BIA} \geq \frac{\hbar}{2 \Delta H^{BIA}}$$

$$I^{BIA} \leq 4\,\Delta^2 H^{BIA}$$

$$D(\rho, \sigma) = \arccos\left[F(\rho, \sigma)\right]$$

$$\lim_{\delta t \to 0} \frac{D\left[\rho(t+\delta t, t)\right]}{\delta t} = \frac{1}{2\hbar}\sqrt{I(\rho)}$$

$$V(t) := \frac{1}{2\hbar}\sqrt{I}$$

$$\hbar^2 \langle V^2 \rangle_{BIA} \leq (\Delta H^2)^{BIA}$$

$$\Delta t \geq \sqrt{\frac{\langle [D(\rho_g, \rho_0)]^2 \rangle^{BIA}}{\Delta^2 H^{BIA}}}$$

FINE :)

$$|\psi\rangle = \frac{|0\rangle^{\otimes N} + |1\rangle^{\otimes N}}{2}$$

$$\rho = p|\psi\rangle\langle\psi| + (1-p)\frac{\mathbb{1}}{4}$$