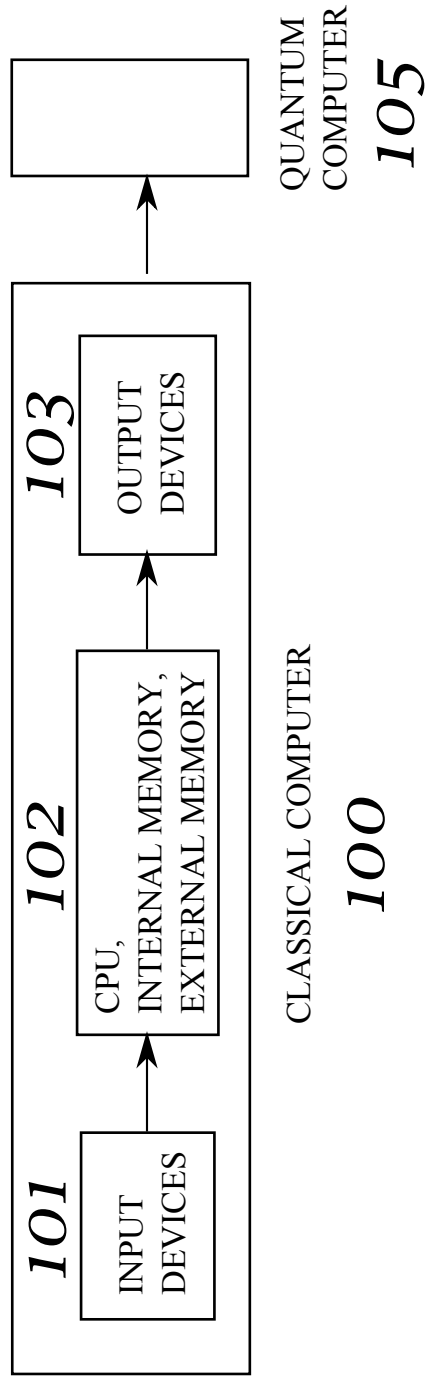


*Figure 1*



## *Figure 2*

$$|z_0|^2 + |z_1|^2 + \langle \chi | \chi \rangle = 1 \quad \mathbf{201}$$

$$p = |z_0|^2 + |z_1|^2, \quad q = 1 - p \quad \mathbf{202}$$

$$|s\rangle_{\mu,\nu,\omega} = \begin{array}{c} z_0 |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} z_1 |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} |\chi\rangle_{\mu,\nu} \\ |1\rangle_\omega \end{array} \quad \mathbf{203}$$

$$|t\rangle_{\mu,\nu,\omega} = \frac{1}{\sqrt{p}} \left[ \begin{array}{c} z_0 |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} z_1 |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{array} \right] \quad \mathbf{204}$$

$$\begin{aligned} [|t\rangle \langle t|]_{\mu,\nu,\omega} |s\rangle_{\mu,\nu,\omega} &= \sqrt{p} |t\rangle_{\mu,\nu,\omega} \\ [|0\rangle \langle 0|]_\omega |s\rangle_{\mu,\nu,\omega} &= \sqrt{p} |t\rangle_{\mu,\nu,\omega} \end{aligned} \quad \mathbf{205}$$

$$\begin{aligned} [|t\rangle \langle t|]_{\mu,\nu,\omega} |t\rangle_{\mu,\nu,\omega} &= |t\rangle_{\mu,\nu,\omega} \\ [|0\rangle \langle 0|]_\omega |t\rangle_{\mu,\nu,\omega} &= |t\rangle_{\mu,\nu,\omega} \end{aligned} \quad \mathbf{206}$$

$$\langle t | s \rangle = \sqrt{p} \quad \mathbf{207}$$

$$\text{tr}_{\mu,\omega} \left\{ |t\rangle \langle t|_{\mu,\nu,\omega} \right\} = P(0) |0\rangle \langle 0|_\nu + P(1) |1\rangle \langle 1|_\nu \quad \mathbf{208}$$

$$P(0) = |z_0|^2/p, \quad P(1) = |z_1|^2/p \quad \mathbf{209}$$

$$|z_1|^2 = \frac{P(1)}{P(0)} |z_0|^2 \quad \mathbf{210}$$

Figure 3

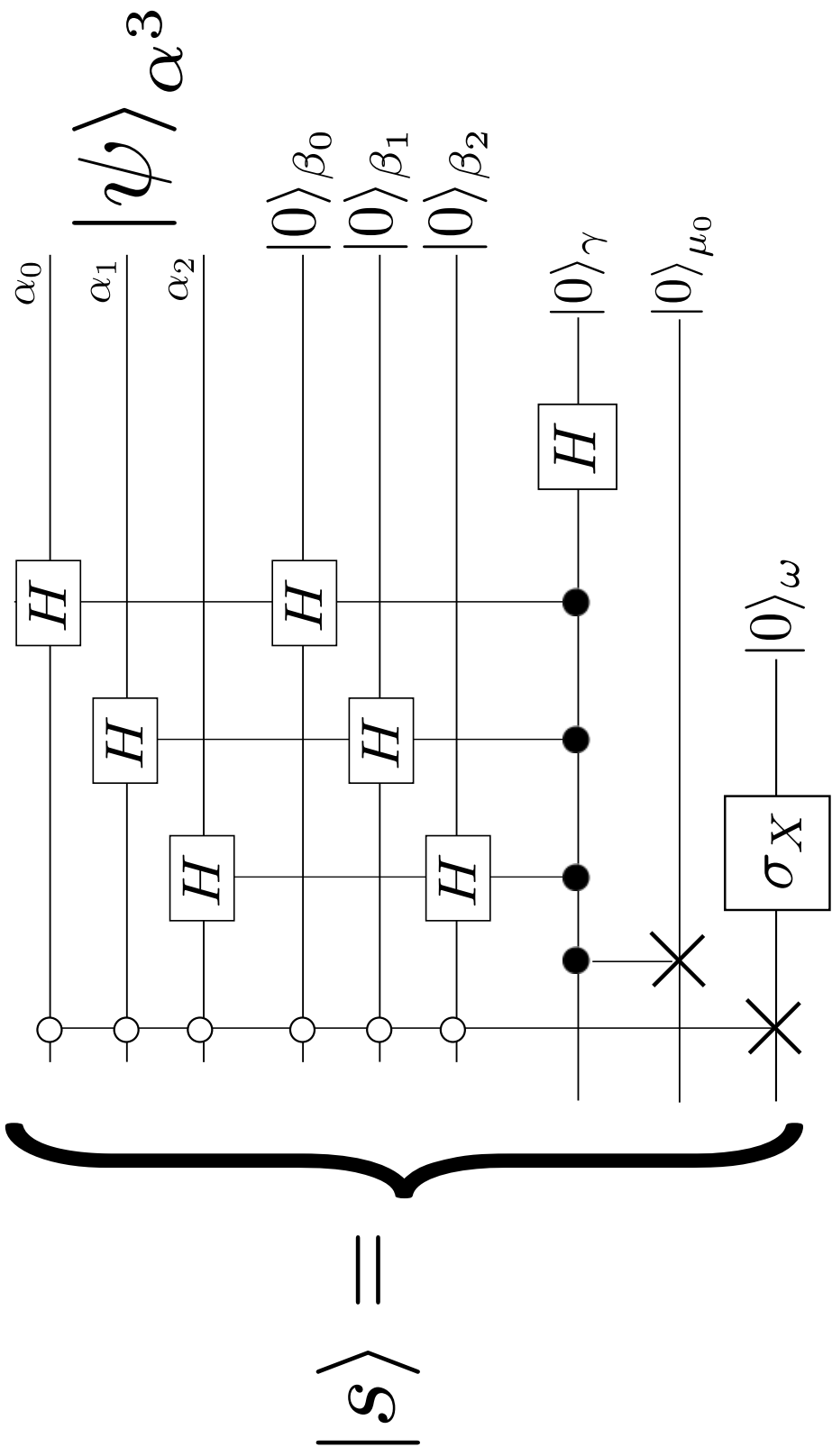


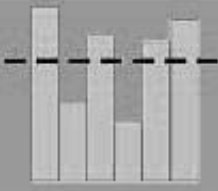
Figure 4

$$\begin{aligned}
 |s\rangle_{\mu,\nu,\omega} &= z_1 \begin{bmatrix} |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{bmatrix} + z_0 \begin{bmatrix} |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{bmatrix} + \begin{bmatrix} |\chi\rangle_{\mu,\nu} \\ |1\rangle_\omega \end{bmatrix} & 401 \\
 |\psi_1\rangle_\mu &= \begin{bmatrix} |0^3\rangle_\alpha \\ |1\rangle_{\mu_0} \end{bmatrix} & \\
 |1\rangle_\nu &= \begin{bmatrix} |0^3\rangle_\beta \\ |1\rangle_\gamma \end{bmatrix} & \\
 z_1 &= \frac{1}{\sqrt{2}} \left[ \frac{1}{2^3} \sum_{x^3} \langle x^3 | \psi \rangle \right] & \\
 \frac{|z_1|}{|z_0|} &= \sqrt{\frac{P(1)}{P(0)}} & 405
 \end{aligned}$$

$$\begin{aligned}
 |\psi_0\rangle_\mu &= \begin{bmatrix} |0^3\rangle_\alpha \\ |0\rangle_{\mu_0} \end{bmatrix} & 402 \\
 |0\rangle_\nu &= \begin{bmatrix} |0^3\rangle_\beta \\ |0\rangle_\gamma \end{bmatrix} & 403 \\
 z_0 &= \frac{1}{\sqrt{2}} \langle 0^3 | \psi \rangle & 404
 \end{aligned}$$

# Figure 5

## *qMean*



Ver. 1.6

**Inputs**  
File Prefix   
Number of  $|\psi\rangle$  qubits   
Estimate of  $|z_1|^2 / |z_0|^2$    
Maximum Number of Grover Steps   
Gamma Tolerance (degs)   
Delta Lambda (degs)

**Outputs**  

$ z_0 ^2$	<input type="text"/>
Starting Gamma (degs)	<input type="text"/>
Final Gamma (degs)	<input type="text"/>
Number of Grover Steps	<input type="text"/>
Number of Qubits	<input type="text"/>
Number of Elem. Ops.	<input type="text"/>