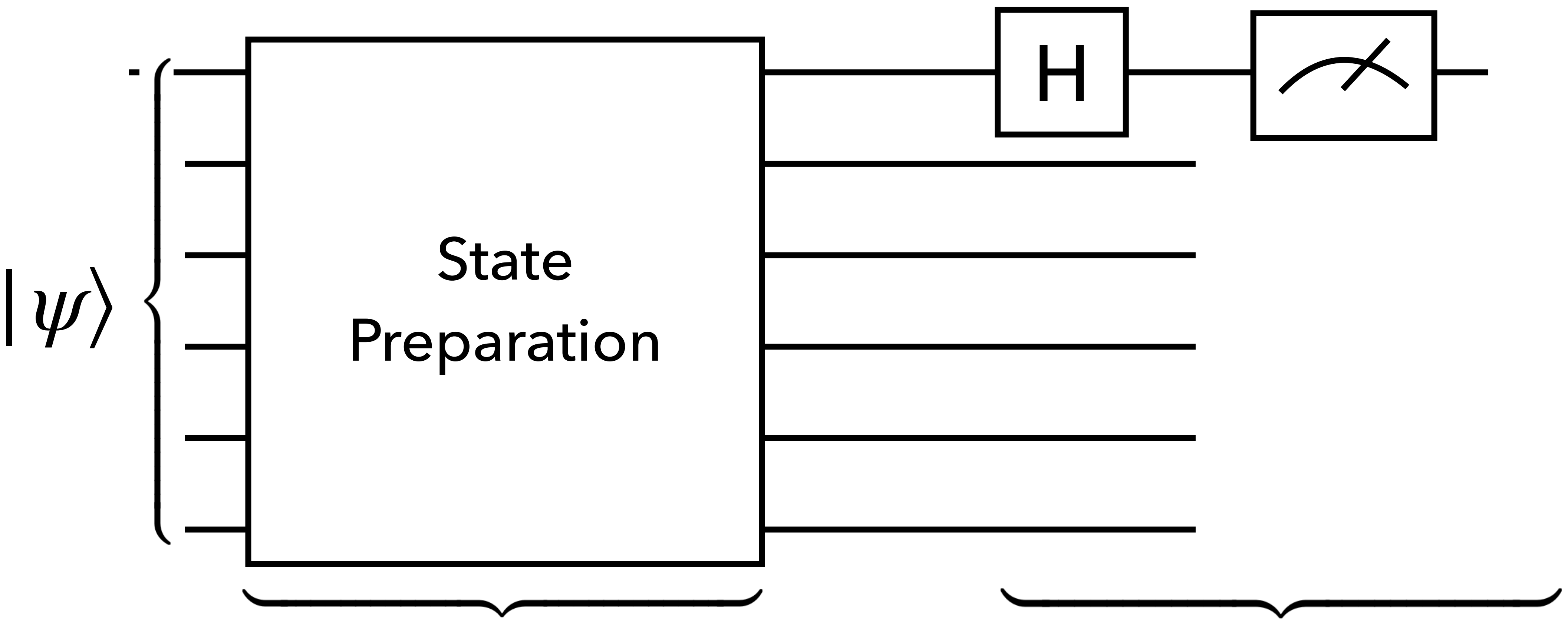

classical inputs:

$$t = (t_x, t_y)$$

$$c = (c_x, c_y)$$

$$Norm = \sqrt{t_x^2 + t_y^2 + c_x^2 + c_y^2)}$$

$$t'_x = \frac{t_x}{Norm} \quad t'_y = \frac{t_y}{Norm} \quad c'_x = \frac{c_x}{Norm} \quad c'_y = \frac{c_y}{Norm}$$

$$\downarrow$$

$$|\psi\rangle = [t'_x, t'_y, c'_x, c'_y]$$

$$|\psi_1\rangle = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & 0 & -1 \end{pmatrix} \begin{pmatrix} t'_x \\ t'_y \\ c'_x \\ c'_y \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} t'_x + c'_x \\ t'_y + c'_y \\ t'_x - c'_x \\ t'_y - c'_y \end{pmatrix} \begin{matrix} |00\rangle \\ |01\rangle \\ |10\rangle \\ |11\rangle \end{matrix}$$

$$P\,|1\rangle = \frac{1}{2}\left[(t'_x - c'_x)^2 + (t'_y - c'_y)^2\right]$$

Most
Significant
Qubit

$$dist(t, c) = Norm \; * \; \sqrt{2 * P\,|1\rangle}$$