

$$\rightarrow |\psi_0\rangle = |0\rangle \otimes |c_0\rangle \quad C|c_0\rangle = c_0|c_0\rangle$$

$$|\psi(t)\rangle = U^t |\psi_0\rangle$$

$$\text{Tr}_P(|\psi(t)\rangle \langle \psi(t)|) = \frac{1}{2} \begin{pmatrix} 1+z(t) & x(t) - iy(t) \\ x(t) + iy(t) & 1-z(t) \end{pmatrix}$$

$$\frac{1}{2}(1+z(t)) = \frac{1}{2}(1+z_0) \Rightarrow z(t) = z_0$$

genérico: $|\psi_0\rangle = |0\rangle \otimes (a|c_0^+\rangle + b|c_0^-\rangle)$ $C|c_0^+\rangle = c_0|c_0^+\rangle, C|c_0^-\rangle = -c_0|c_0^-\rangle$
 DTQW: $C \in \text{SU}(2)$
 $C = \sum \alpha_i \sigma_i$

$$|\psi(t)\rangle = aU^t|0\rangle \otimes |c_0^+\rangle + bU^t|0\rangle \otimes |c_0^-\rangle \quad \downarrow$$

$$\text{Tr}_P(|\psi(t)\rangle \langle \psi(t)|) = |a|^2 \text{Tr}_P(U^t|0, c_0^+\rangle \langle 0, c_0^+|(U^t)^\dagger) + a\bar{b} \text{Tr}_P(U^t|0, c_0^+\rangle \langle 0, c_0^-\|(U^t)^\dagger) + \bar{a}b \text{Tr}_P(U^t|0, c_0^-\rangle \langle 0, c_0^+|(U^t)^\dagger) + |b|^2 \text{Tr}_P(U^t|0, c_0^-\rangle \langle 0, c_0^-\|(U^t)^\dagger)$$

$$|a|^2 \begin{pmatrix} 1+z_0^+ & 0 \\ 0 & 1-z_0^+ \end{pmatrix} + |b|^2 \begin{pmatrix} 1+z_0^- & 0 \\ 0 & 1-z_0^- \end{pmatrix} \quad \forall t$$

$$p + (1-p) \neq t$$

$$\rightarrow C_1^m C_2^n$$

$$C_1^m C_2^n = A$$

$$C_1, C_2 \in \text{SU}(2)$$

$$\rightarrow C(x)$$

$$\langle x^2 \rangle = \langle x \rangle^2 = \sum p_i x_i^2 - \left(\sum p_i x_i \right)^2$$