

Successive measurements

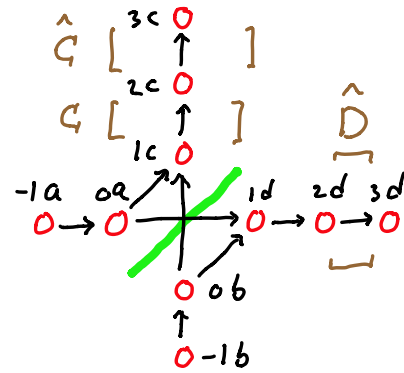
Multiple detectors

$$C^o \rightarrow C^* \quad (|1c\rangle \rightarrow |2c\rangle)$$

$$\hat{C}^o \rightarrow \hat{C}^* \quad (|2c\rangle \rightarrow |3c\rangle)$$

$$\hat{D}^o \rightarrow \hat{D}^* \quad (|2d\rangle \rightarrow |3d\rangle)$$

ready triggered



$$|\psi_0\rangle = |0a, C^o, \hat{C}^o, \hat{D}^o\rangle$$

$$|\psi_1\rangle = \frac{1}{\sqrt{2}} (|1c, C^o, \hat{C}^o, \hat{D}^o\rangle + |1d, C^o, \hat{C}^o, \hat{D}^o\rangle)$$

$$|\psi_2\rangle = \frac{1}{\sqrt{2}} (|2c, C^*, \hat{C}^*, \hat{D}^o\rangle + |2d, C^o, \hat{C}^o, \hat{D}^o\rangle)$$

$$|\psi_3\rangle = \frac{1}{\sqrt{2}} (|3c, C^*, \hat{C}^*, \hat{D}^o\rangle + |3d, C^o, \hat{C}^o, \hat{D}^o\rangle)$$

History family F:

$$Y^c = |\psi_0\rangle \circ |1c, C^o, \hat{C}^o, \hat{D}^o\rangle \circ |2c, C^*, \hat{C}^*, \hat{D}^o\rangle \circ |3c, C^*, \hat{C}^*, \hat{D}^o\rangle$$

$$Y^d = |\psi_0\rangle \circ |1d, C^o, \hat{C}^o, \hat{D}^o\rangle \circ |2d, C^o, \hat{C}^o, \hat{D}^o\rangle \circ |3d, C^o, \hat{C}^o, \hat{D}^o\rangle$$

Position/detector Correlations

$$\Pr(|3c\rangle_3 | C_2^*) = 1$$

$$\Pr(|2c\rangle_3 | C_2^o) = 1$$

$$\Pr(|1c\rangle_3 | C_2^*) = 1$$

$$\Pr(|1d\rangle_3 | C_2^o) = 1$$

$$\Pr(|2d\rangle_3 | C_2^o) = 1$$

⋮

detector/detector Correlations

$$\Pr(\hat{C}_3^* | C_2^*) = 1$$

$$\Pr(\hat{C}_3^* | C_2^o) = 0$$

$$\Pr(\hat{D}_3^* | C_2^*) = 0$$

$$\Pr(\hat{D}_3^* | C_2^o) = 1$$

⋮

Alternate history family G:

$$|\psi_0\rangle \otimes |\psi_1\rangle \otimes \begin{cases} |2c, c^*, \hat{c}^*, \hat{D}^0\rangle \otimes |3c, c^*, \hat{c}^*, \hat{D}^0\rangle & G^c \\ |2d, c^0, \hat{c}^0, \hat{D}^0\rangle \otimes |3d, c^0, \hat{c}^0, \hat{D}^0\rangle & G^d \end{cases}$$

Similar to F but cannot talk about $\Pr(|1c\rangle,)$ ^{instead} or $\Pr(|1d\rangle,)$

"Wavefunction Collapse"

$$|\psi_0\rangle = |0a, c^0, \hat{c}^0, \hat{D}^0\rangle$$

$$|\psi_1\rangle = \frac{1}{\sqrt{2}} (|1c, c^0, \hat{c}^0, \hat{D}^0\rangle + |1d, c^0, \hat{c}^0, \hat{D}^0\rangle) \quad \text{Unitary}$$

$$|\tilde{\psi}_2\rangle = \begin{cases} |2c, c^*, \hat{c}^*, \hat{D}^0\rangle \\ |2d, c^0, \hat{c}^0, \hat{D}^0\rangle \end{cases} \quad \begin{array}{l} \text{One or other randomly followed} \\ \text{Note: nonunitary - violates Schrödinger} \end{array}$$

$$|\tilde{\psi}_3\rangle = \begin{cases} |3c, c^*, \hat{c}^*, \hat{D}^0\rangle \\ |3d, c^0, \hat{c}^0, \hat{D}^0\rangle \end{cases} \quad \text{Evolve unitarily from } |\tilde{\psi}_2\rangle$$