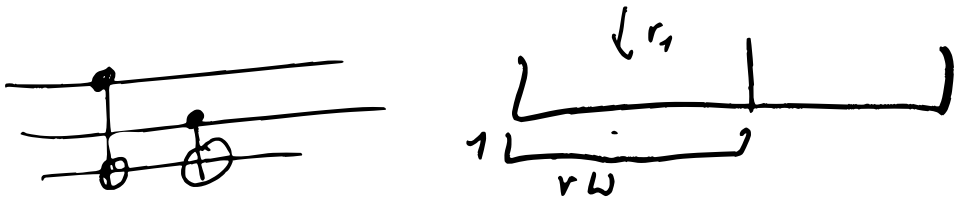$\{x_1 = x_2\} \quad x_1 \xleftarrow{\$} unif$

$\sim x_2 \xleftarrow{\$} unif \quad \{x_1 = x_2\}$



$H \gg [r_1] \cdot H \gg [q_2]$

$\cdot \left( [q_1 r_1] = EPR \quad \sqcap \right.$

$\left. [q_2 r_2] = EPR \right)$

$= \boxed{H \gg [1.r]} \cdot H \gg [2.q]$

$\cdot \left( \boxed{[1.qr] = EPR} \right.$

$\left. \wedge \quad [2.qr] = EPR \right)$

$= \left( H \gg [r] \cdot [qr] = EPR \right) \gg [1]$

$\wedge \left( H \gg [q] \cdot [qr] = EPR \right) \gg [2]$

$$= \left( H \gg \boxed{r} \cdot \lceil qr \rceil = EPR \right) \gg [1] \quad \overset{qr.Z}{}$$

$$\wedge \left( H \gg [q] \cdot [qr] = EPR \right) \gg [2]$$

$$= \left( \boxed{H \gg [2]} \cdot EPR \right) \gg [qr] \gg [1]$$

$$\wedge \left( \boxed{H \gg [1]} \cdot EPR \right) \gg [qr] \gg [2]$$

$$I \otimes H$$

$$H \otimes I$$

$$= \left( (I \otimes H) \; EPR \right) \gg [qr] \gg [1]$$

$$\left( (H \otimes I) \; EPR \right) \gg [qr] \gg [2]$$

$$\underbrace{\qquad\qquad}_{= \psi}$$

$$= \left( \psi \gg [qr] \gg [1] \right) \cap \left( \psi \gg [qr] \gg [2] \right)$$

$$\Leftarrow \quad \{1.qr\} \equiv [2.qr]$$

$$= \quad [q_1 r_1] = [q_2 r_2]$$