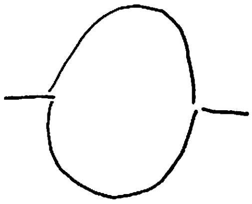
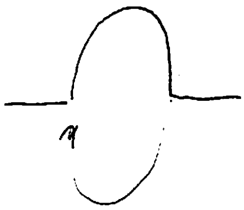
SEŠTEVANJE VSEH AMPLITUD V AHARONOV BOHM-u

$$S = \begin{pmatrix} -1/2 & 1/2 & 1/\sqrt{2} \\ 1/2 & -1/2 & 1/\sqrt{2} \\ 1/\sqrt{2} & 1/\sqrt{2} & 0 \end{pmatrix}$$



$$t = \frac{1}{\sqrt{2}}(t_g + t_d)\frac{1}{\sqrt{2}}$$



$$t_g = e^{i x_1} e^{i l_1} + \overbrace{\left(-\tfrac{1}{2}\right)}^{e^{i x_1} e^{i l_1}} e^{+ i x_1} e^{-i l_1}\left[\left(-\tfrac{1}{2}\right) t_g + \tfrac{1}{2} t_d\right]$$

$$+ e^{i x_1} e^{i l_1} \tfrac{1}{2} e^{i x_2} e^{-i l_2}\left[\left(-\tfrac{1}{2}\right) t_d + \tfrac{1}{2} t_g\right]$$

$$t_g = e^{i x_1} e^{i l_1} + \tfrac{1}{4} e^{2 i x_1}(t_g - t_d)$$

$$+ \tfrac{1}{4} e^{-i l} e^{i x_1} e^{i x_2}(t_g - t_d)$$

$e^{i l_1} e^{-i l_2}$

$l_2 - l_1 = l$

$$t_g = e^{i x_1} e^{i l_1} + \overbrace{\tfrac{1}{4}\left(e^{2 i x_1} + e^{i(x_1+x_2)} e^{-i l}\right)}^{a}(t_g - t_d)$$

$$t_d = e^{i x_2} e^{i l_2} + \underbrace{\tfrac{1}{4}\left(e^{2 i x_2} + e^{i(x_1+x_2)} e^{+i l}\right)}_{b}(t_d - t_g)$$

$$t_g - t_d = \left(e^{i x_1} e^{i l_1} - e^{i x_2} e^{i l_2} + a(t_g - t_d) - b(t_d - t_g)\right)$$

$$= e^{i x_1} e^{i l_1} - e^{i x_2} e^{i l_2} + (a+b)(t_g - t_d)$$

$$\boxed{t_g - t_d = \frac{e^{i x_1} e^{i l_1} - e^{i x_2} e^{i l_2}}{1 - (a+b)}}$$

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$x_1 = x_2 = x/2$

$$t_g - t_d = \frac{e^{ix/2} e^{i\ell_1} (1 - e^{i\ell})}{1 - (a+b)}$$

$$\cancel{t_g = e^{ix/2} e^{i\ell_1} \left(1 + \frac{1}{4} e^{ix/2}\right.}$$

$$t = \frac{1}{2}(t_g + t_d)$$

$$t_g + t_d = e^{ix_1} \ell_1 + e^{ix_2} e^{i\ell_2} + (a-b)(t_g - t_d)$$

$$= e^{ix/2} e^{i\ell_1} \left[(1 + e^{i\ell}) + \frac{a-b}{1-(a+b)} (1 - e^{i\ell}) \right]$$

$$a = \tfrac{1}{4} e^{ix} (1 + e^{-i\ell}) \qquad a - b = \frac{1}{4} e^{ix} (e^{-i\ell} - e^{i\ell})$$

$$b = \tfrac{1}{4} e^{ix} (1 + e^{i\ell})$$

$$[\ ] = \frac{[(1+e^{i\ell})(1-(a+b)) + (a-b)(1-e^{i\ell})]}{1-(a+b)} =$$

$$= \frac{1 + e^{i\ell} - (a+b) - (a+b)e^{i\ell} + (a-b) - (a-b)e^{i\ell}}{1-(a+b)}$$

$$= \frac{1 - 2b + (1-2a)e^{i\ell}}{1-(a+b)} = \frac{1 - \frac{1}{2} e^{ix}(1+e^{i\ell}) + \left(1 - \frac{1}{2} e^{ix}(1+e^{-i\ldots}\right.}{1-(a+b)}$$

$$\frac{1-\frac{1}{2}e^{ix}(1+e^{i\varphi})+\left(1-\frac{1}{2}e^{ix}(1+e^{-i\varphi})\right)e^{i\varphi}}{1-(a+b)}=$$

$$=\frac{1-\frac{1}{2}e^{ix}(1+e^{i\varphi})+e^{i\varphi}-\frac{1}{2}e^{ix}e^{i\varphi}-\frac{1}{2}e^{ix}}{1-(a+b)}$$

$$=\frac{1-e^{ix}+e^{i\varphi}-e^{i(x+\varphi)}}{1-(a+b)}$$

$$t=\frac{1}{2}\left(\frac{1-e^{ix}+e^{i\varphi}-e^{i(x+\varphi)}}{1-\frac{1}{2}e^{ix}-\frac{1}{4}e^{ix}(e^{i\varphi}+e^{-i\varphi})}\right)$$

$$|t|^2=\frac{1}{4}\frac{(1-e^{ix}+e^{i\varphi}-e^{i(x+\varphi)})(1-e^{-ix}+e^{-i\varphi}-e^{-i(x+\varphi)})}{|1-\frac{1}{2}(e^{ix}(1+\cos\varphi)|^2}$$

$1+\cos\varphi=2\cos^2\varphi/2$

$$=\frac{1}{4}\frac{}{|1-e^{ix}\cos^2\varphi/2|^2}=\frac{1}{4}\frac{}{(1-e^{ix}\cos^2\varphi/2)(1-e^{-ix}\cos^2\varphi/2)}$$

$$=\frac{1}{4}\frac{4-e^{ix}-e^{-ix}-e^{i(x+\varphi)}-e^{-i(x+\varphi)}+e^{i\varphi}+e^{-i\varphi}-e^{i(x-\varphi)}-e^{-i(x-\varphi)}+e^{-i\varphi}}{4(1+\cos^4\varphi/2-2\cos x\cos^2\varphi/2)}$$

$-e^{+ix}+e^{i\varphi}-e^{ix}$

3.

$$= \frac{4 - 4\cos x + 4\cos \ell - 4\cos\ell\cos x}{4\left(1+\cos^4 \ell/2 - 2\cos x \cos^2 \ell/2\right)}$$

$$e^{i(x+\ell)} + e^{-i(x+\ell)} + e^{i(x-\ell)} + e^{-i(x-\ell)} = e^{i\ell}\left(e^{ix}+e^{-ix}\right) + e^{-i\ell}\left(e^{ix}+e^{-ix}\right)$$

$$= 4\cos\ell\cos x$$

$$= \frac{1-\cos x + \cos\ell - \cos\ell\cos x}{1+\cos^4 \ell/2 - 2\cos x\cos^2 \ell/2} = \frac{(1-\cos x)(1+\cos\ell)}{1+\cos^4 \ell/2 - 2\cos x \cos^2 \ell/2}$$

$$\boxed{T = \frac{(1-\cos x)(1+\cos\ell)}{1+\cos^4 \ell/2 - 2\cos x\cos^2 \ell/2}}$$