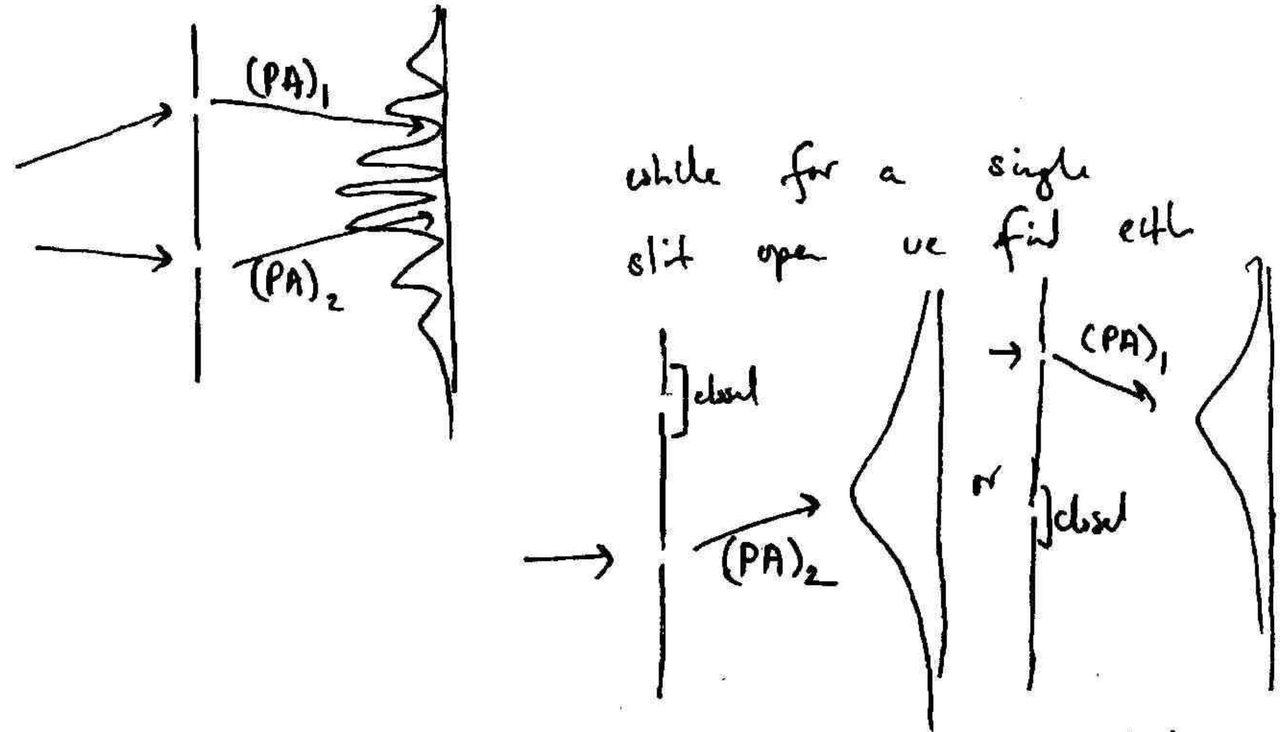
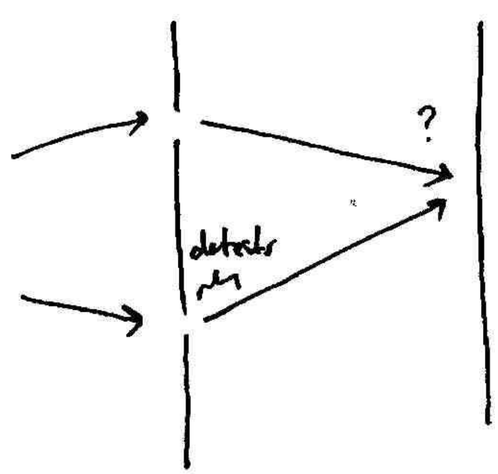
① The reading (which follows in the course pack) gives some insight into the distinction between probability amplitudes and probabilities. In doing so it explains more clearly the roles of the measurer (the observer) & the system.

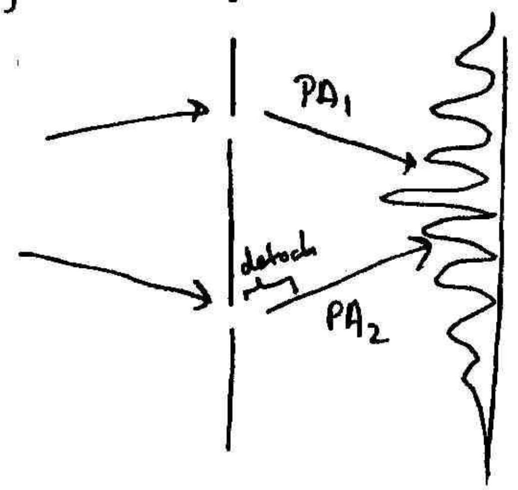


② The interesting point explained in Feynman is the situation where a detector which records the passing of the particle (photon or electron) is placed next to one of the two open slits. The detector is the smallest detector possible.



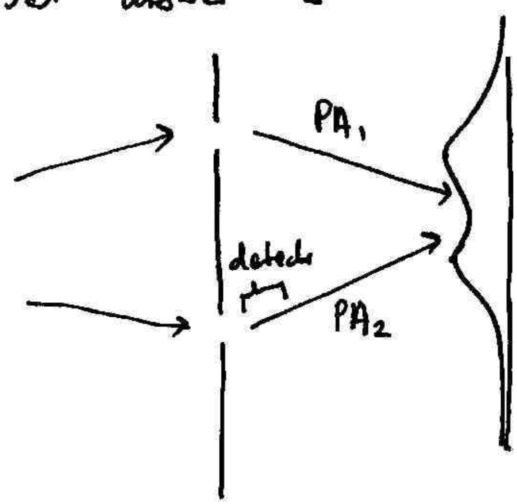
What does the image on the screen look like?

③ The answer is surprising. While we might have expected the final image to be:



Expected image

the actual answer is:



④ Feymann explains this result using the postulates of quantum mechanics. He points out that if we __know__ which path was taken then

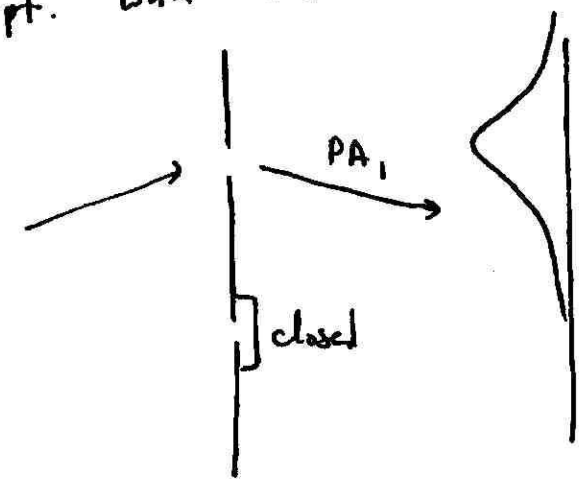
$$\text{Probability} = (PA)_1^*(PA)_1 + (PA_2)^*(PA)_2$$

but if we don't know which path was taken

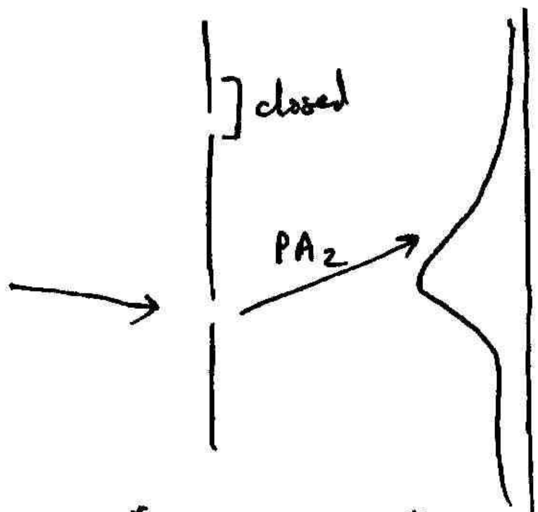
$$\text{Probability} = (PA_1 + PA_2)^*(PA_1 + PA_2)$$
$$= (PA_1)^*(PA_1) + (PA_2)^*(PA_2)$$
$$\underline{+ (PA_1)^*(PA_2) + (PA_2)^*(PA_1)}$$

⑤ This will account for the results.

We know what $(PA)_1^*(PA)_1$ looks like from the expt. with the 2nd slit closed.



Like-wise we know $(PA)_2^*(PA)_2$ from the experiment with the first slit closed.



So $(PA)_1^*(PA)_1 + (PA)_2^*(PA)_2$ looks like:

& this is the result of the experiment with the detector.