

PHY100S - The Magic of Physics - Class 18

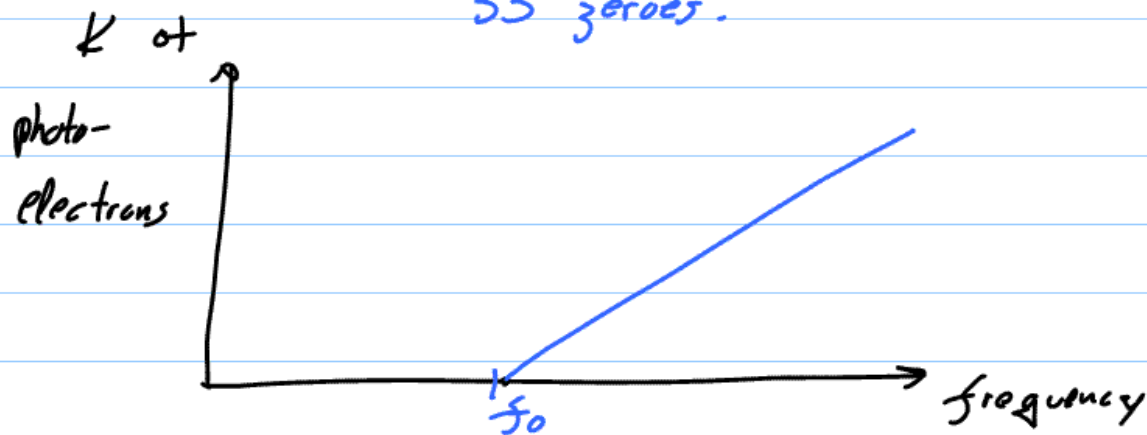
"I think it is safe to say that no one understands quantum mechanics. Do not keep saying to yourself, if you can possibly avoid it, 'But how can it be like that?' because you will go 'down the drain' into a blind alley from which nobody has yet escaped. Nobody knows how it can be like that." -- Richard Feynman (Nobel Prize in Physics, 1965)

$$E = hf$$

h "Planck's Constant"

0.00.....0066

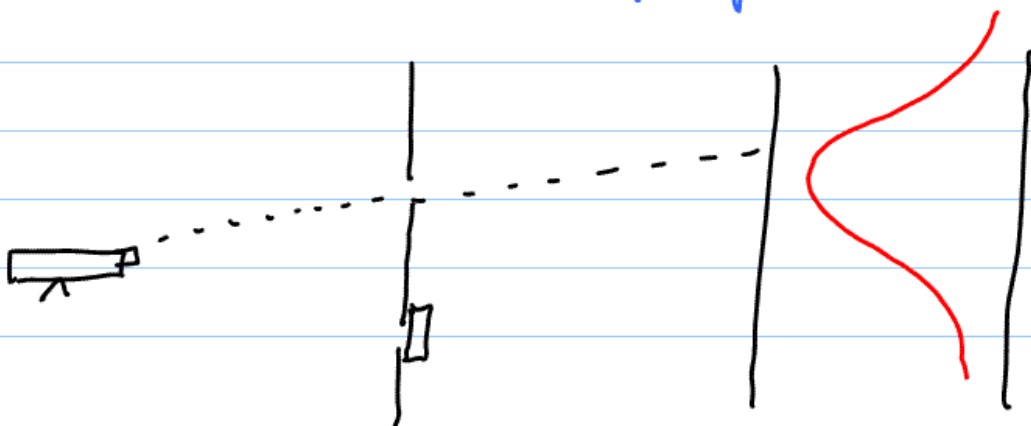
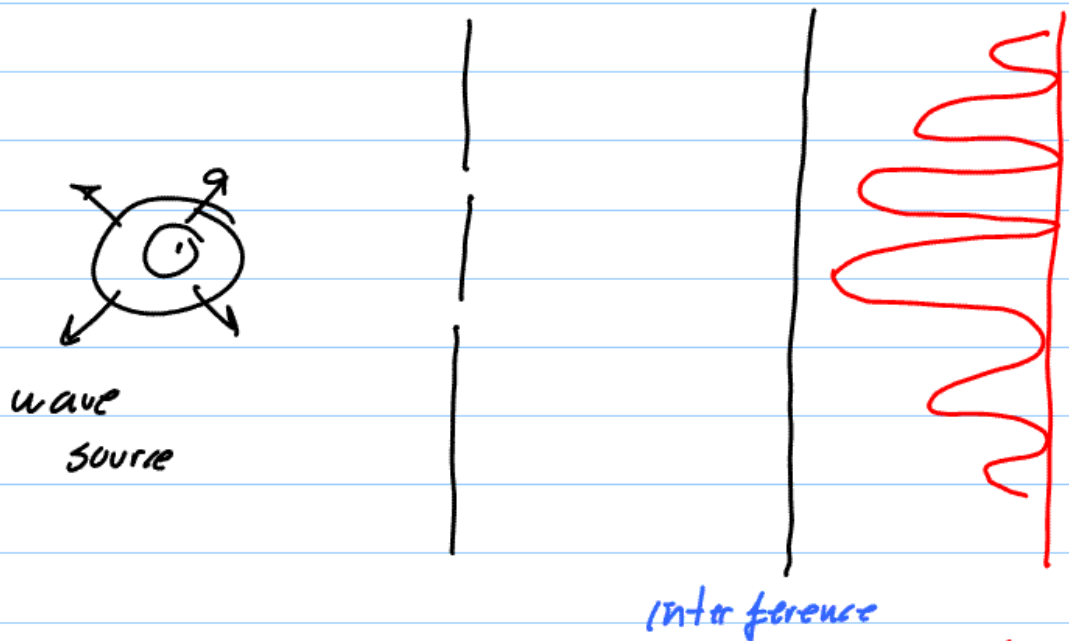
33 zeroes.

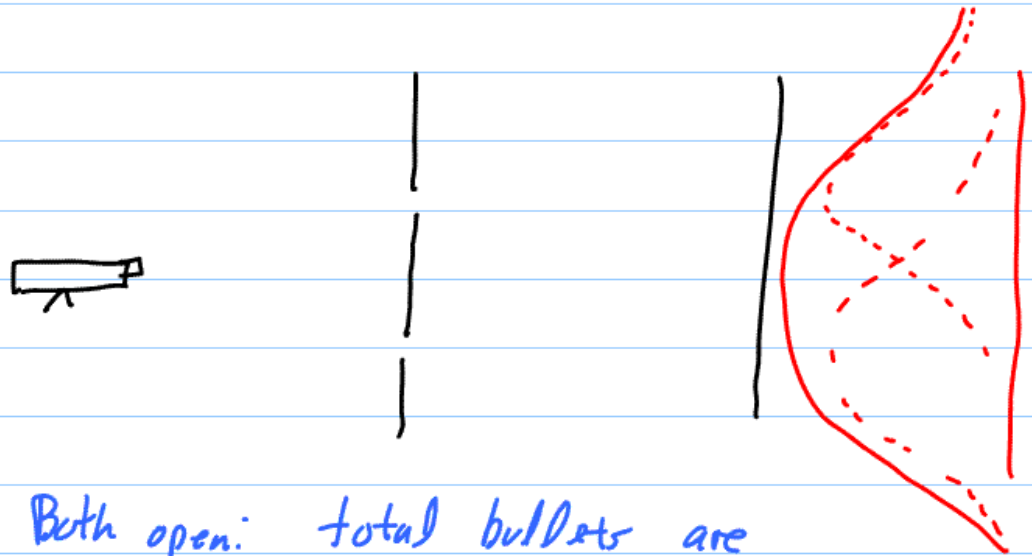
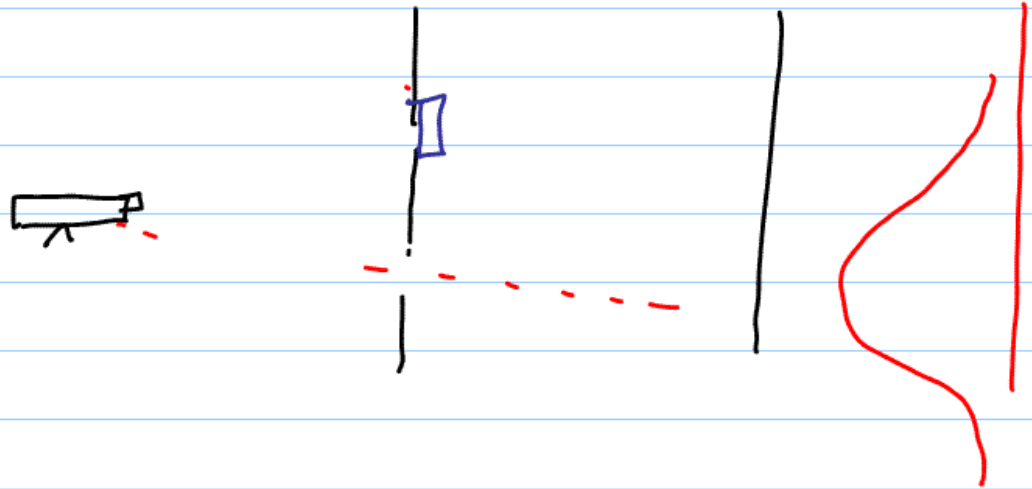


Binding energy of electron
in metal B

$$B = hf_0$$

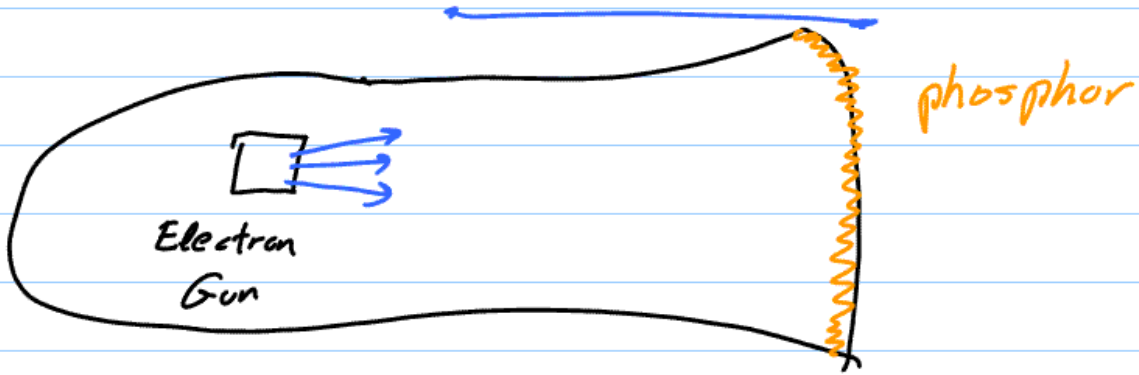
§13.4 - Double Slit for Electrons



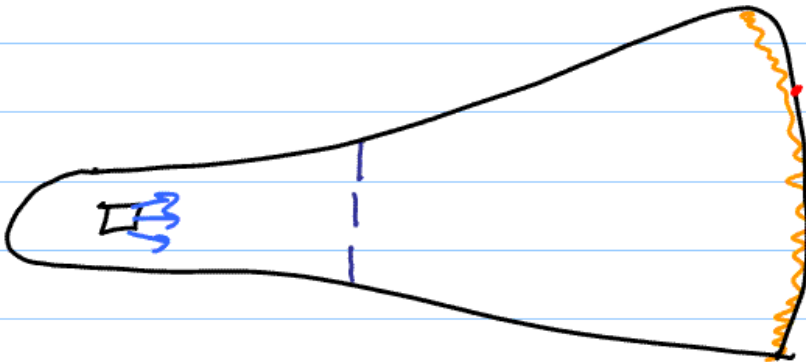


Both open: total bullets are

those from upper slit plus
those from lower slit



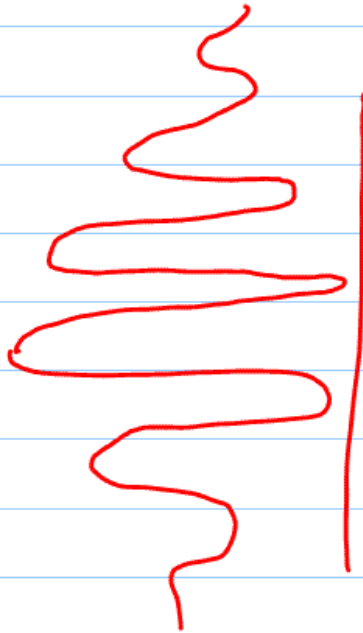
electron leaves gun
fraction of a second later,
flash of light in phosphor.



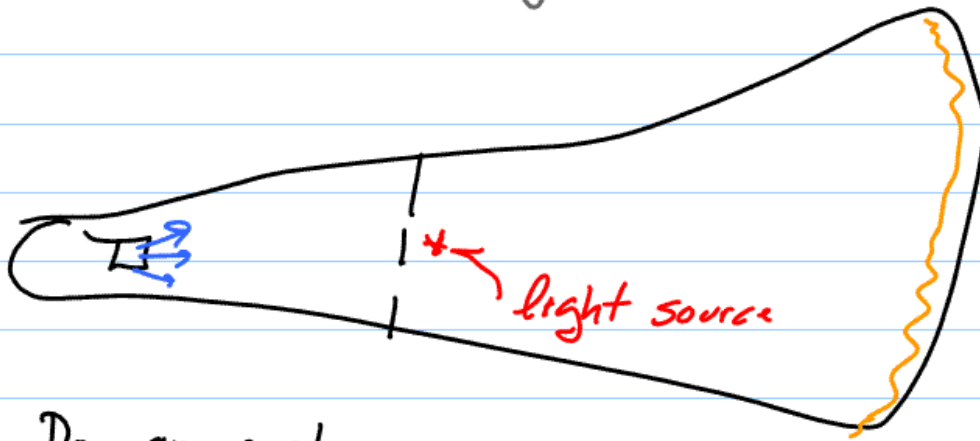
Are electrons through upper slit
interfering with those
through the lower slit? NO

Fire one electron at a time.

Still get an interference pattern.



What is happening at the slits?



Do an expt.

All expts give same result

Result: each electron either goes through upper slit or the lower slit.

See interference pattern!

Heisenberg: "Path [of electron] only comes into existence when we observe it."