

Lecture XIII Quantum Mechanics

In the last lecture we briefly examined the Heisenberg uncertainty principle, the idea that exact knowledge of position leads to complete lack of knowledge of momentum (and kinetic energy).

For the next few weeks we will study quantum mechanics itself - an area of knowledge connected to the Heisenberg uncertainty principle.

This theory was developed 80 years ago. Leaders in its development were Werner Heisenberg, Erwin Schrödinger, Max Born and P.A.M. Dirac.

Erwin Schroedinger

Max Born

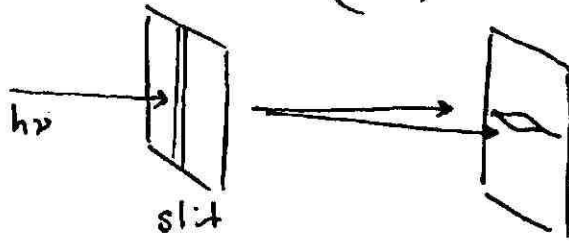
Werner Heisenberg



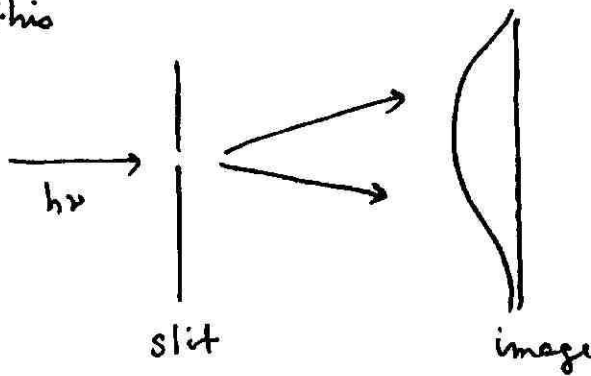




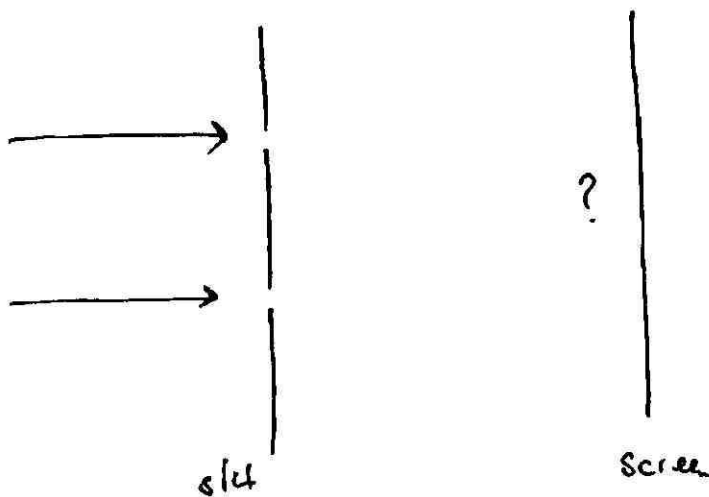
③ Diffraction ^{as a} demonstration of quantum mechanics (ie, wave characteristics of light & electrons) image



Drawn from a side-view the experiment looks like this

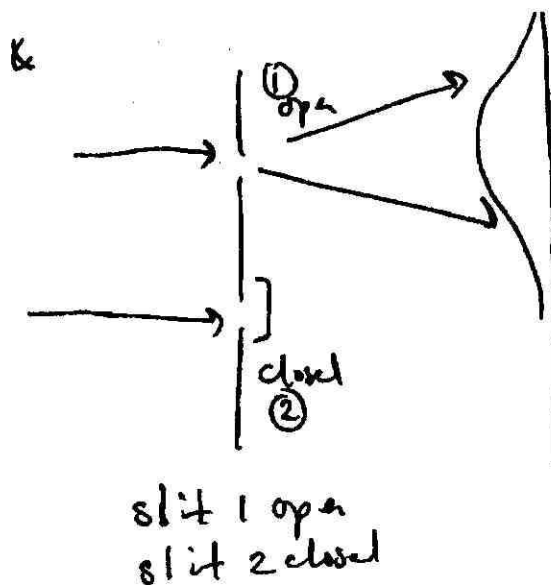
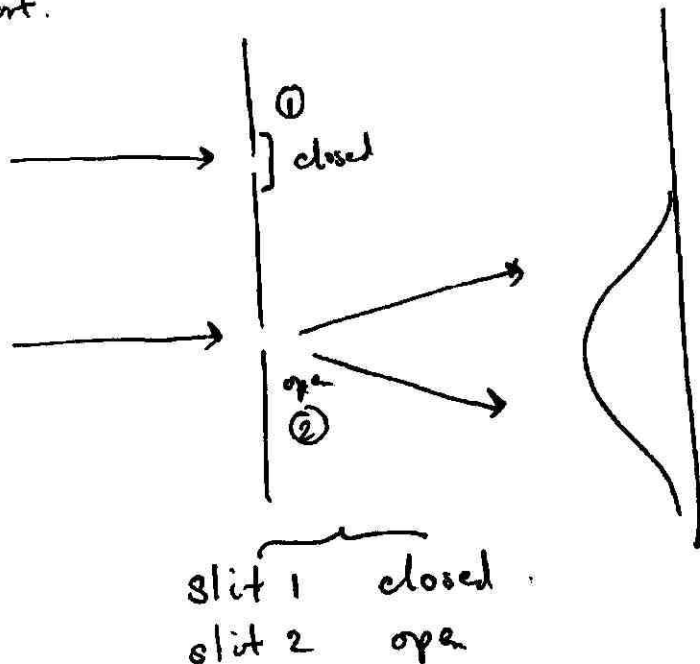


Now imagine one has a two slit screen.



What does image look like?

② cont.



we might expect:

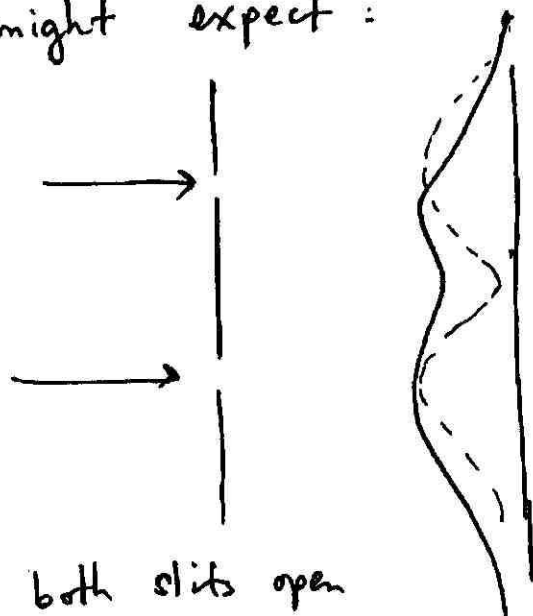
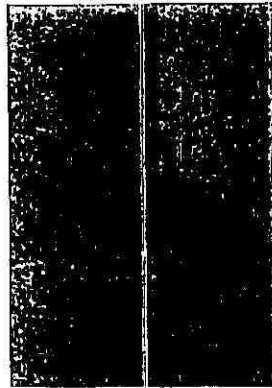
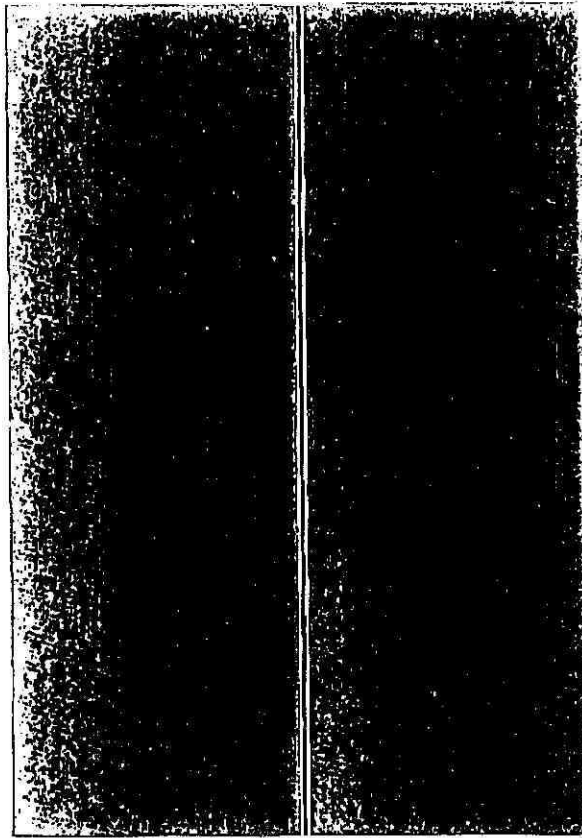


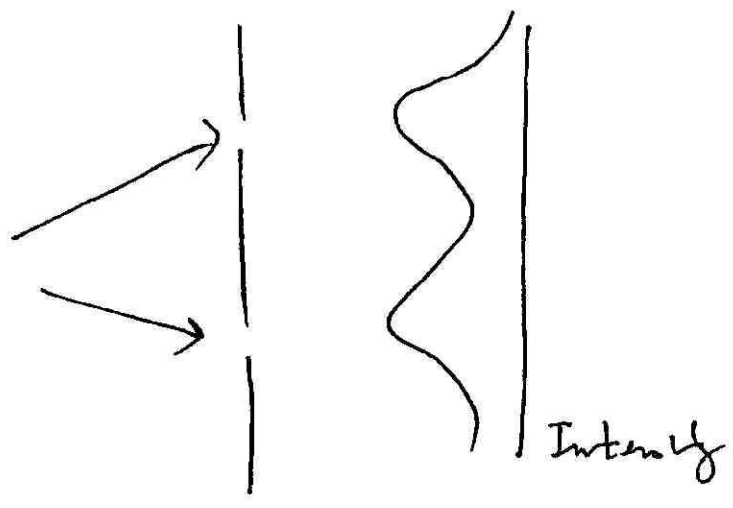
image -

Might expect a double humped image.

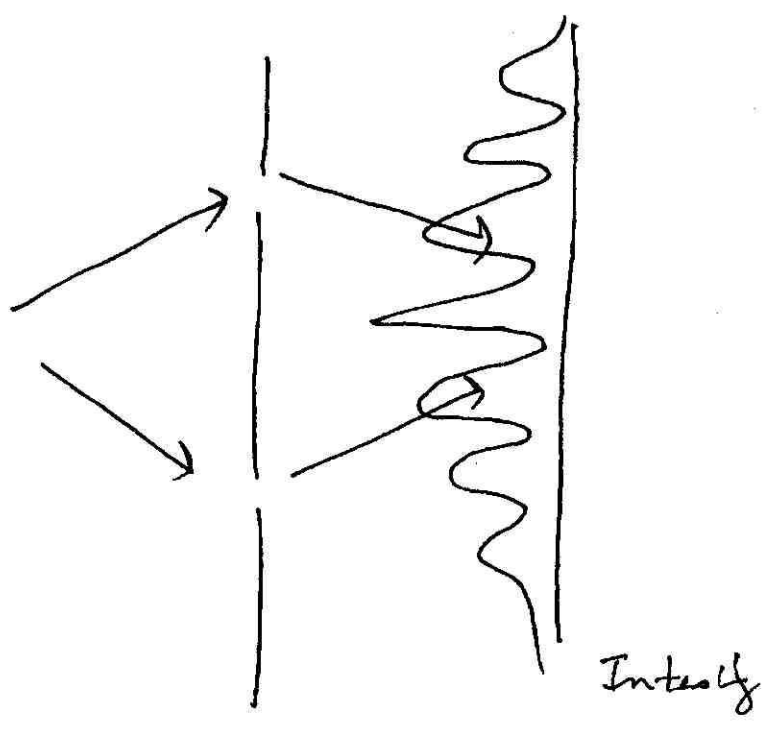


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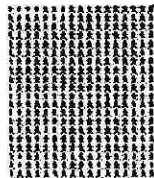
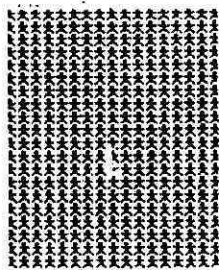
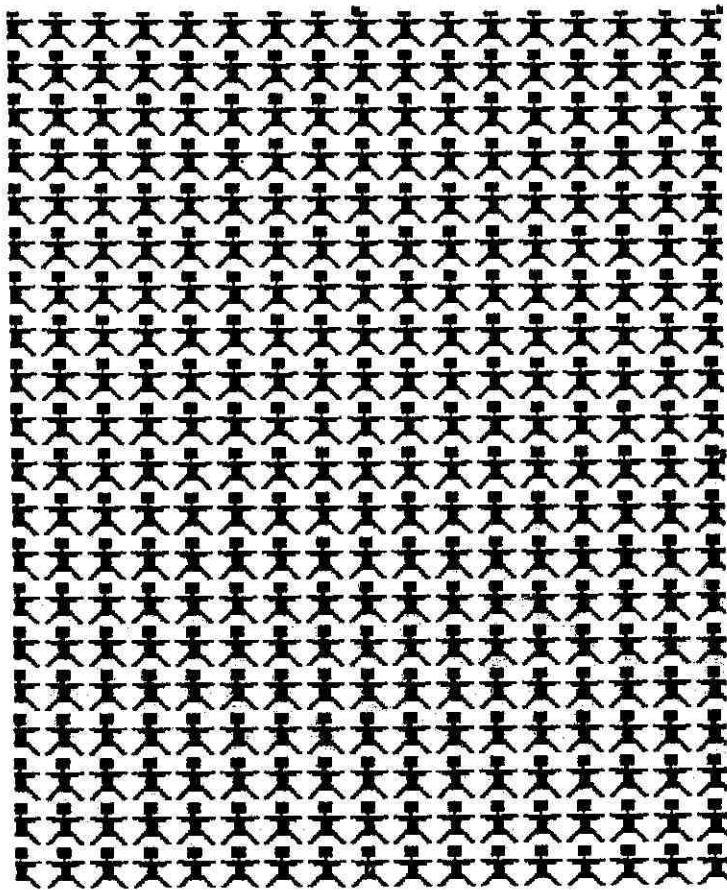
Instead of finding



we find



Probability does not add. Even more complicated screens do the same thing. Electrons also do not add.



Crystals of Sm_2Te_5 in the reaction container.

