

Following your study of this chapter, you should be able to:

* explain in simple terms how Laue proved the wave nature of x-rays
* state the two conditions for constructive interference, and the equation associated with each
* calculate wavelength of x-rays or inteplanar spacing of a crystal using Bragg's equation
* give the relation of a particle to a wavelength, known as the de Broglie wavelength
* derive the quantization of angular momentum using the de Broglie relation
* follow the discussion of Davisson and Germer's electron diffraction experiment
* analyze the general expression for a wave, Y(x,t) = A sin [2p/l (x - ut)], identifying the amplitude, wavelength and period
* define wave number *k*, angular frequency *w*, and phase constant, *f*
* know the important property of a wave packet
* understand and write down the equations for phase velocity, uph, and group velocity, ugr
* discuss the following experiments and their results: Young's double-slit and electron double-slit experiments
* state Bohr's principle of complementarity
* explain the solution of the wave-particle duality problem
* know what is meant by probability density, |Y|2
* perform the process of normalization on simple wave functions and explain why it is done
* discuss in your own words Heisenberg's uncertainty princple
* write down the equations for the uncertainty principle for momentum and displacement, and for energy and time