

de-Broglie hypothesis for matter waves

Photoelectric effect, Compton effect and pair production effect exhibits particle aspect of radiation.

In 1923, de Broglie suggested :

All material particles should also display a dual wave particle behavior.

Material particle with non zero rest mass, of momentum \vec{p} behaves as a group of waves (matter waves) whose wavelength λ and wave vector \vec{k} are governed by the speed and mass of the particle :

$$\lambda = \frac{h}{p}, \quad \vec{k} = \frac{\vec{p}}{h}$$

Experimental confirmation of de Broglie hypothesis

* Davisson - Germer Experiment -

* Thomson Experiment -