

CHAPTER OVERVIEW

5: Matter Waves

Inspired by the dual nature of light, in 1923 Louis DeBroglie postulated, in his PhD thesis, that material particles also have both a particle-like and a wave-like nature. He conjectured that the frequency and wavelength of a “particle” are related to its energy and momentum in the same way as the frequency and wavelength of light are related to its energy and momentum, namely

$$E = hf \quad (5.1)$$

$$p = \frac{h}{\lambda} \quad (5.2)$$

After the experimental verification of this prediction, DeBroglie was awarded the Nobel Prize in 1929.

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Contributors and Attributions

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