Quantum phenomena

In quantum mechanics, the fundamental constant is the quantum of the effect, the so-called **Dirac constant** ħ = 1.05 × 10-34 J.s. Dirac's constant is related to Planck's constant (h = 6.63 × 10-34 J.s) by the conversion relation ħ = h / 2π. Both constants appear in important relations that are quantitatively connected by the dual character of matter. **Planc's constant** represents the smallest possible dose of energy emitted by a body.

Angular momentum

It is the product of the position vector r and the momentum vector p. The angular momentum of the circular orbital motion of a particle can only take values that are multiples of Dirac's constant. Similarly, the projection of orbital angular momentum into the coordinate axes of atoms.

If an electrically charged particle has orbital angular momentum, there must also be a magnetic momentum, since the motion of electric charge gives rise to a magnetic field. The orbital magnetic moment given by the rotation of a particle about its own axis is called **spin** (fermions X bosons).

Dualism

Elementary particles and systems formed from them have both corpuscular and wave properties. Thus, the motion of each particle is related to **the propagation of mass waves** ($\lambda = h / m \times v = h / \sqrt{2mE}$; de Broglie wavelength).

The corpuscular-wave character of particles has the consequence that it is impossible to accurately determine the position of the particle and its momentum at the same time: **Heisenberg uncertainty relation** $\Delta r \cdot \Delta p \geq \hbar$

The energy of the photon is tied to the wavelength of the light wave by the relation $E = h \times f = hc / \lambda$. The wavelength is the distance that light travels over a period ($\lambda = c \times T = c / f$)

Also, the longer the energy state exists, the more accurately we can determine its energy: $\Delta E \cdot \Delta t \geq \hbar$

The laws of motion in quantum mechanics are described by Schrödinger's equation, whose square of its absolute value = probability density of the occurrence of a particle.

Electron accelerated potency. by a difference of 1 V, the energy is 1 eV: 1 J = 1 C ×. 1 V => **1 eV = 1,6 × 10^{-19} J**

Links

Source

- KUBATOVA, Senta. *Biofot* [online]. [cit. 2011-01-31]. <https://uloz.to/!CM6zAi6z/biofot-doc>.
- BENEŠ, Jiří – JIRÁK, Daniel – VÍTEK, František, et al. *Základy lékařské fyziky.* 4. edition. 2015. 17, 19 pp. ISBN 9788024626451.