Abstract

The present approach is an advancement of the author's former attempts to develop an atom model of Helium with well-defined electron trajectories. Thus it calls in question the traditional quantum mechanics which assume – in contrast and as a consequence of Heisenberg's uncertainty principle – electronic probabilities of presence.
Its basic idea consists in the assumption that the motions of the two electrons are influenced by their spins exhibiting the value $h/2\pi$, but in two different ways: on the one hand, one spin induces a rotation, and on the other hand, the other spin induces a harmonic oscillation.
A second important relation is given by the fact that the retroactive force of the oscillation process is due to the centrifugal force when the process runs along the surface of a sphere, whereas in usual oscillation processes – such as the one of a spring pendulum – it is due to a permanent shift between potential and kinetic energy. Therefore, in the present case the potential energy remains constant since the distance between the nucleus and the – diametrically positioned – electrons remains constant.
Considering these two conditions and the usual physical relations such as Coulomb attraction, centrifugal force, and the conservation laws of the angular momentum and of the energy, it was possible to compute the respective key values. Thereby, the deflection of the oscillation angle $\psi = 45°$ is remarkable.
Finally, the process is described using a Cartesian coordinate system with z as the rotation axis, a variable oscillation distance d and variable rotation velocities r_{rot}. Thereby, the projections onto the x-axis and on the y-axis are not identically equal, leading to an elliptic projection shape. Thus this system is anisotropic, in contrast to the isotropic array of the conventional quantum mechanics according to Schrödinger, where the 1s-orbital is spherically symmetrical. This anisotropy explains the existence of interatomic Van der Waals forces which enable the condensation of Helium, even though the condensation temperature is very low.
But in particular, it exhibits well defined electron waves, thus finally delivering the explanation of the hypothesis of Louis de Broglie which has been established 100 years ago.