Proof of the incompleteness of wave quantum mechanics

Second part.

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As a result of identifying the corpuscular -wave quantities (CWQ) of a non-relativistic electron (NE) as quantities associated with the equation of motion of wave quantum mechanics (WQM), it was discovered that WQM in reality is corpuscular-wave mechanics (CWM) and the fundamental differences between WQM and classical Newtonian mechanics (CNM) were established and also, the possibility of creating analogies of WQM and CNM is indicated.

1. WQM, as an incomplete part of CWM.

The fundamental difference between WQM [1] and CNM [2] is due to the fact in CNM there is equation of motion:

$$F=\frac{dP}{dt} \tag{1.1}$$

and corpuscular quantities associated with the equation of motion (1.1). At the same time, CNM is corpuscular mechanics. Unlike CNM, WQM has only the equation of motion:

$$E\psi=i\hbar\frac{\partial\psi}{\partial t} \tag{1.2}$$

And there are no quantities associated with the equation of motion of WQM (1.2).

To discover the quantities associated with the equation of motion of WQM (1.2), we turn to the newly discovered CWQ of a NE [3]:

$$m^{¿}=mi\,r \tag{1.3}$$

$$P^{¿}=\hbar=¿) \tag{1.4}$$

$$E_x^{¿}=\frac{m^{¿}v^2}{2} \tag{1.5}$$

$$U^{¿}=m^{¿}v^2 \tag{1.6}$$

where, m - mass, ***ir*** - linear wavelength, ***v*** – speed NE.

If we consider in the CWQ of a NE (1.3)...(1.6) in a fairly short time:

$$-i\frac{\partial}{\partial t} \tag{1.7}$$

Then we obtain for the CWQ of the NE (1.3)...(1.6) evolutionary formulas in time:

$$-i m^{¿} \frac{\partial}{\partial t} = -\Im \frac{\partial (ir)}{\partial t} = mv = P \qquad (1.8)$$

$$-i\hbar \frac{\partial}{\partial t} = mv^2 - (m^{¿} a) = E - F^{¿} \qquad (1.9)$$

$$-i E^{¿} \frac{\partial}{\partial t} = \frac{\vec{P} v^2}{2} - \frac{F^{¿} v}{2} - \frac{\hbar a}{2} \qquad (1.10)$$

$$-i U^{¿} \frac{\partial}{\partial t} = P v^2 - F^{¿} v - \hbar a \qquad (1.11)$$

Now, it es easy to notice that by expressing expression (1.9) regarding the energy *E*:

$$E = -i\hbar \frac{\partial}{\partial t} + F^{¿} \qquad (1.12)$$

And without taking into account the last component, we obtain the equation of motion of WQM (1.1) without the wave function symbol:

$$E = -i\hbar \frac{\partial}{\partial t} \qquad (1.13)$$

That is, the newly discovered expression (1.9) in the simplified form (1.13) is the equation of WQM (1.2) proposed by Schrödinger. Accordingly, the newly discovered CWQ (1.3)…(1.6) are those missing quantities with which the equation of motion of WQM (1.2) is related, just as the equation of motion of CNM (1.1) is related to corpuscular quantities.

Thus, up to the present day, CNM was known as a complete theory due to the fact that its equation of motion (1.1) and the corpuscular quantities associated with it were known.

Unlike CNM, in WQM only its equation of motion (1.2), was known, and the quantities associated with the equation of motion (1.2) were not discovered intil the present day. Now, the fact has become clear that the newly discovered CWQ (1.3)…(1.6) are precisely those quantities associated with the equation of motion of WQM (1.2), and WQM itself in reality is CWM, that is, there was a century-long mis conception that perceived CWM in the form of wave mechanics.

In essenc, we receive confirmation of Einstein’s assumption about the incompleteness of WQM, which, as it turned out, was caused by the undetectability of CWQ (1.3)...(1.6).

The newly discovered evolutionary formulas (1.8) and (1.9) make it possible to establish the fundamental differences between the equations of motion of CNM (1.1) and WQM (1.2).

It was noted that the equation of motion of WQM (1.2) is related to the evolutionary formula (1.9), and the equation of motion of CNM (1.1) turns out to be related to the evolutionary formula (1.8). Due to the fact that the impulse **P** arising in the evolutionary formula (1.8) appears in the equation of motion CNM (1.1), and therefore the evolutionary formula (1.8) itself corresponds to the position of Newton's first law on uniform and rectilinear motion.

Thus , Newton's first law (1.8) and the equations of motion of WQM (1.9) are on the same level and are a first-order differential equation, and the equation of motion of CNM (1.1), being a differentiation of the momentum **P** from (1.8), is a second-order differential equation order. In connection with this difference, it is possible to create an analogue of WQM for the case of a macroscopic body.

2.On the analogue of WQM for a macroscopic body.

For the case of a macroscopic body, as analogies of CWQ (1.3)…(1.6), we choose CWQ without the imaginary unit simbol:

$$m^{¿} = m r \tag{2.1}$$

$$P^{¿} = (m^{¿} v) = m(r v) \tag{2.2}$$

$$E_k^{¿} = \frac{m^{¿} v^2}{2} \tag{2.3}$$

$$U^{¿} = m^{¿} v^2 \tag{2.4}$$

where, ***r* –** radius-vector codirectional with speed ***v***, m – macroscopic body mass.

An analogue of the transforming differential operator will be the operation of differentiation:

$$k \rightarrow \frac{d}{d r} \tag{2.5}$$

Accordingly, under the influence of the differentiation operation (2.5), the CWQ (2.1)…(2.4) are transformed in the form:

$$\frac{d m^{¿}}{d \vec{r}} = m \frac{d r}{d r} = m \tag{2.6}$$

$$\frac{d P^{¿}}{d r} = m v - m(r w) \tag{2.7}$$

$$\frac{d E_k^{¿}}{d r} = \frac{m v^2}{2} - \frac{(m^{¿} w v)}{2} - \frac{(m^{¿} v) w}{2} \tag{2.8}$$

$$\frac{d U^{¿}}{d r} = m v^2 - (m^{¿} w v) - (m^{¿} v) w \tag{2.9}$$

where, on the right side of transformations (2.6)…(2.9) corpuscular, mixed and wave quantities appeared.

In turn, an analogue of (1.7) will be differentiation with respect to time t :

$$\frac{d}{dt} \tag{2.10}$$

And under the influence of (2.10) of CWQ (2.6)…(2.9) will have evolutionary formulas:

$$\frac{d\,m^{¿}}{dt}=m\frac{d\,r}{dt}=m\,v=P \qquad (2.11)$$

$$\frac{d P^{¿}}{dt} = m v^2 - (m^{¿} a) = U - F^{¿} \qquad (2.12)$$

$$\frac{d E_k^{¿}}{dt} = \frac{P v^2}{2} - \frac{(m^{¿} a) v}{2} - \frac{(mv) a}{2} \qquad (2.13)$$

$$\frac{d U^{¿}}{dt} = P v^2 - (m^{¿} a) v - (mv) a \qquad (2.14)$$

In this case, expression (2.12) will be the equation of motion of macroscopic CWM or, ot her wise, it will be a macroscopic analogue of the equation of motion of WQM (1.2). Accordingly, expression (2.11) will be the formula of Newton’s first law, and the change in momentum **P** from Newton’s first law will be expressed by Newton’s second law or, in other words the equation of motion of CNM (1.1).

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