Everyone can understand quantum mechanics

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We show that everyone can understand quantum mechanics, only if he rejects the following prejudice, namely classical continuous motion (CCM) is the only possible and objective motion of particles.

I think I can safely say that nobody today understands quantum mechanics. ——Feynman (1965)

When people talk about motion, they only refer to CCM, its uniqueness is taken for granted absolutely but unconsciously, people never dream of another different motion in Nature, but to our surprise, as to whether or not CCM is the only possible and objective motion, and whether CCM is the real motion or apparent motion, no one has given a definite answer up to now.

In classical mechanics, CCM is undoubtedly the leading actor, while in quantum mechanics, CCM is rejected by the orthodox interpretation from stem to stern, but why did people never guess what quantum mechanics describes is just another different motion from CCM? as we think, this is the most direct and natural idea, since classical mechanics describes CCM, then correspondingly quantum mechanics will describe another kind of motion.

The only stumbling block is just the huge prejudice rooted in the mind of people, it is that classical continuous motion (CCM) is the only possible and objective motion of particles, now let's see it more clearly through looking back to the history.

Bohr [2] and his enthusiastic supporters held this prejudice strong, they insisted that Copenhagen interpretation is the only possible interpretation of quantum mechanics, since CCM can no longer account for the phenomena in quantum mechanics, we must essentially discard it, the only possible and objective motion, then it is evident that quantum mechanics provides no objective description of Nature at all, but only our knowledge about Nature.

Einstein [3] held this prejudice stronger, he believed that if the objective picture of classical continuous motion contradicts with quantum mechanics, the wrong side can only be quantum mechanics, not classical continuous motion, since in any case we can not lose the reality, while classical continuous motion is the only reality of Nature, thus he became the strongest opponent of Copenhagen interpretation, but his acerbic comments did not help him so much, he failed in persuading Bohr, as well as his contemporary.

Bohm [1] also held this prejudice, his cleverness lies in that he provided a compromise hidden-variable picture between those of Bohr and Einstein, but neither one was satisfied with his way, and he himself was also tortured by the dualistic monster he created.

Everett [4] still held this prejudice, even though he presented a crazy many worlds interpretation for quantum mechanics, his interpretation is still in the framework of CCM, only for every branch of the expensive many worlds, and no supporters would like to attempt quantum suicide to convince themselves the many worlds interpretation is right, let alone convince anyone else.

More and more followers have been trying to understand quantum mechanics, but they still held this prejudice firmly and unconsciously, they are doomed to fail, this is their destiny due to the prejudice.

Then why cling to it till death like a miser? unloosen it! please reject it! and don't walk along this wrong way any more, it only leads to the blind alley, the impasse, no way out there.

In our previous paper [5], from the clear logical and physical analyses about motion, we have shown that the natural motion in continuous space-time is not CCM, but one kind of essentially discontinuous motion, and Schrödinger equation in quantum mechanics is just its simplest nonrelativistic motion equation; while in the real discrete space-time, the natural motion is also discontinuous, and it will result in the collapse process of the wave function, this brings about the appearance of CCM in macroscopic world, thus CCM is by no means the real motion in Nature, let alone be the only possible and objective motion, it is just one kind of ideal apparent motion in the macroscopic world where we live, while the real motion is essentially discontinuous.

Once we reject the apparent CCM, and find the real motion in Nature, understanding quantum mechanics is just an easy task, we can safely say that everybody can understand quantum mechanics easily from now on, nobody will be plagued by its weirdness any more, since quantum mechanics is just the theory describing the real motion in Nature, even though the real motion is more complex than CCM, it also has a clear picture just like CCM, its weirdness results only from its particular existence and evolution, in fact, from a logical point of view, its existence and evolution are more natural than those of CCM, only because we are unfamiliar with it, it looks very bizarre for us.

Concretely speaking, the wave function $\psi(x,t)$ in quantum mechanics is an indirect mathematical complex to describe the state of the real motion of particle, the direct description quantities are $\rho(x,t)$ and $j(x,t)$, their relation is $\psi(x,t) = \rho^{1/2} \cdot e^{iS(x,t)/\hbar}$, where $S(x,t) = m\int_{-\infty}^{x} j(x^{'},t)/\rho(x^{'},t)dx^{'} + C(t)$, the apparent wave-like form of $\psi(x,t)$ results essentially from the discontinuity of the real motion, not from any objective existence of wave or field.

The evolution of the real motion includes two parts, one is the linear evolution part, it results in the interference pattern, which is usually the display of classical wave, but the pattern is undoubtedly formed by a large number of particles undergoing the real motion; the other is the nonlinear stochastic evolution part, it results in the collapse process of the wave function, during measurement this process happens very soon, and the wave function of the particle collapses into a local region, this brings about the appearance of single event in measurement, this process is stochastic and indeterministic due to the essential discontinuity and randomicity of the real motion itself.

Certainly, one point needs to be stressed, even though the wave function does provide a complete description of the state of the real motion, present quantum theory does not provide a complete description of the evolution of the real motion, and needs to be revised to include the stochastic evolution part.

Now we may also understand why people haven't understood quantum mechanics yet after they found it more than seventy years ago, the reason is very simple, because people always discuss and picturize it in the framework of CCM, they can only see the sky of CCM, some of them would ruthlessly reject the reality in the quantum world rather than give another possible motion a glance, the others would never ever give up CCM, this is indeed the sorriness of science, but the most heart-struck is that people are always very complacent about their own choices, and care little about the ideas of others, all these will be fundamentally changed from now on.

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