Statistical or Classical Reality

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ABSTRACT: It has been demonstrated that the thermodynamic quantities are the derivatives of potentials like classical quantities. As the argument for the classical reality the cloud track of particle has been interpretad.
The by Einstein postulated hidden paramethers have been presented as the additional dimensions. It has been suggested that a more general theory exists, for which the classical and statistical theories are the particular cases.
In the end the philosophical consequences of this attitude have been reflected.

1. Introduction

The successes of classical mechanics and classical electrodynamics in the 19th century seemed to suggest that the reality is determined.
Next successes of Relativity (both General and Special) seemed to confirm this idea.
The situation changed in the 20th century becouse of two theories with the probabilistic character: quantum mechanics and statistical physics.
Nevertheless the doubts remainded and they were expressed in the famous A.Einstein's statement ' God doesn't play dicing '.
This work is an attempt at the demonstration at the complementarity of this two attitudes using previous works of the author.

2. Thermodynamical and classical potentials

The thermodynamical quantities are the derivatives of potentials like classical quantities. The J.Mrzigod's experiment manifests it [1], [2].

So we have:

$$T = \operatorname{div} \vec{R} \qquad (1)$$

$$R = \frac{1}{3}\left[\int T(x,y,z)dxdy + \int T(x,y,z)dxdz + \int T(x,y,z)dydz \right] + C \qquad (2)$$

So the temperature and other thermodynamical quantities are the derivatives of the potentials. The fact that both in classical and statistical theories the potentials are expressed by the derivatives or integrals of other poten-potentials manifests that both types of theories are in fact this same model and that there exists one theory containing both classical and statistical aspect.
The fact that the chemical potential difference (chemical potential is an analog of gravitational potential) implcates the electric potential difference, has the comcequences that the unification of classical and statistical theories is possible.
The chemical potential is nevertheless the statistical quantity and the interactions can be unified in the classical way.
If we put two different temperatures into to different junctions of different metals in a circuit, the flow of current arises, so the difference of the electric potentials (Zeebeck's effect).
So the difference of electric potentials is equivalent to the difference of the temperatures (gradient).
It is the testimony of an equiponderance of the statistical and classical theories (here: electrodynamics and thermodynamics).
In the Zeebeck's effect an additional structure intermediates - the circuit with two junctions - but in many other effects an unempty vacuum intermadiates.

Born's probabilistic interpretation of wave function and and Schrödinger's interpretation are the analogs of the situation in chemistry where the structure of particle is described by two or more resonance structures [3] and the mechanism of the specific chemical reaction is explained by only one resonance structure.
The similar situation occurs in quantum mechanics where two interpretations of a wave function exist and where the nature of the wave function is described by two interpretations but the Dirac - Einstein equation corresponds only with Schrödinger's interpretation of the wave function.
Centures old problem; is the reality determined or not?
Dirac - Einstein equation and Einstein - Schwinger - Rarita equations are classical, but wave function which appears in them has both classical Schrödinger's interpretation and probabilistic Born's interpretation.
This situation is analogical to two resonance structures of molecule in chemistry.
The reality is neither determined (classical) nor undetermined (statistical) and two described situations are only the limiting situations.
Next, Special Relativity prevues the possibility of the foreseeing of the future without the possibility of disturbing it [4].

3. Consequences of cloud track

The cloud track of elementary particle manifests that the real theory of Nature is, at least to some degree, classical.
It is described by the Dirac- Einstein equation or Einstein-Rarita-Schwinger equation [5] .
Quantum mechanics has however the reasonable essence in the shape of Dirac equation and Schrödinger's interpretation of wave function.
The Dirac equation for the single particle must take under consideration its connection with unempty vacuum, which the potential member has to contain. It is implicated by the fact that the particle passes through the Dirac's sea creating the wave.

4. Hidden parameters

The problem of hidden parameters can be probably solved by the consideration the additional dimensions (number of dimensions is bigger than 4). These additional dimensions are hidden parameters.
We had to use the calculus of probability becouse we saw only the projection of the trajectory of the particle on the 4-dimensional space and not the whole trajectory.
So knowing 4 coordinates we hadn't garanteed that this particle exists on this 4-dimensional path.
An additional factor creating the possibility of the explanation the hidden parameters is the motion backwards the time.
Even if we assume that only one time parameter exists, the thermodynamics doesn't determine the direction of elapsing the time , becouse

$$\frac{\partial S}{\partial t} \geqslant 0 \qquad (3)$$

means that $\partial S \geqslant 0$ and $\partial t > 0$, or

$$\partial S \leqslant 0 \text{ and } \partial t < 0 \qquad (4)$$

The latter possibility means that the entropy of the motion forwarts the time increases and the entropy of the motion rearwards the time decreases. It is an effect of the film running back.
It appears that the present is determined not only by the past, but by the future, too. This effect must be taken under consideration. The lack of this consideration makes impossible an achieving of the certainty and enables to refer to the probability.
But quantum mechanics has good core - Dirac equation.

5. The lack of electrons falling onto the center

The fact that in quantum mechanics electron doesn't radiate the energy and doesn't fall onto the center can be connected with the motion and the radiation of energy in other dimensions.

It can be both 8 relativistic dimensions (consequently: 16, 44 , 104) and Ashtekar's dimensions weaving the space [6] .
This effect is connected with the possibility of the circulation of energy around the circle loop dimensios and next with the reabsorption of this energy before the particle has time to walk away.
This is possible next becouse of lack of upper limit of the velocity [7] .
The velocities of moving particle and emitted quantüm are connected with principle of concervation but there is the possibility of evolution of loop at time becouse the radius of the loop can be freely small. The last-mentioned fact is the reason of the continuity of Ashtekar's[1] space (woven with Ashtekar's loops) becouse there are always with the diameter smaller than the resolütion (ε) of space points. (Always such natüral n exists that

$$R = \frac{r}{2^n} < \varepsilon \text{ for every } \varepsilon \text{)}.$$

The loops can be deformed, it means they have the topological character what corresponds with the curvature of the space-time.
Another description of the lack of emission of energy by electron is so that electron moves along the straight line but the space-time is curved.

6. General consequences

The Schrödinger's cat paradox has something common with the fact that it is impossible to know the füture withoüt the possibility of changing it. So it has something common with Relativity.
Each result of an experiment, each physical situation can seem accidental if we don't know the laws which rule it.
The problem of Schrödinger's cats (so called paradox) is related to the perturbation of the past by the recognition of the füture.

Next, this problem can be explained using the path integral.
If an event F1 in the future is transformed to an event P in the past and P implicates an event F2 in the future, then the trajectories composing F1 and F2 in the future give an event corresponding to resultant trajectory after taking an integral.
If we know the future, we can't change it becouse we can sent the signal into the future only on one from trajectories which are integrated in the process of the creation of the event and this way the most probable trajectory is elected.
Becouse of the same reasons we can't disturbe the past from the future.
There is certain suctorial force causing that an effect of the motion in the time is directed only onto the trajectory relatively near to the most probable trajectory.
We act on the spacetime and the spacetime acts on us.
Similarly, Newton explained why people on the antipods didn't fall down, for the price of gravitational force.
The existence of an interaction of the carrier of the free volition with the spacetime means that the potential of this interaction exists, in which certain objects - namely the carriers of free volition - can be confined during certain time.
Next, argumentation supports the idea of the existence of the theory, whose particular cases are the theory of the determination and the theory of the ptobability:
Too much liberty means constraint (for example dependence on drugs) and too many commands means liberty, becouse one doesn't comply then with the orders.
So, the freedom of choice means constraints - it means determination and the determination means freedom.
It is a seeming paradox.
It is an analogy with the wave-particle dualism and with the particle-hole dualism, too.

References:

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[6] Ashtekar A., Rovelli C., Smolin L. ; Phys. Rev. D vol. 44 no. 6 p. 1740

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