# PHYSICAL SCIENCES

## UNCERTAİNİTY PRİNCİPLE

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**Abstract**
Microparticles aren't similar to other particles that we see. The laws of motion of them are uncertain. To Explain this view we can apply different assumptions. It is difficult to say which of theese assumptions is absolutely true according to their properties. We can solve the solution of this problem in different ways.

**Keywords:** microparticle, uncertainity principle, multidimensional space, the new manifestation form of material.

Microparticles we mean both elementary particles (electrons, protons, neutrons, photons etc) and compound particles (molecules, atoms,nucleus of atoms and etc)which consist little amount of elementary particles. Term microparticle reflects only one propery of this object. In fact each microobject has both particle and wave properties.Thats's why it is acceptable to name them as "particle-wave". Microobject doesn't affect our feelings directly, so it's impossible to feel it by observing or touching. There is nothing in our system which is considered similar to microobjects. As shown in the third edition of the book "Feynmann lectures on physics" written by famous physics scientist Feynmann "microparticles aren't the same as the things you saw before".As the motion of atoms differs from our daily experiments , it is hard to learn it. Even well known scientists can't understand deeply and it is normal. As a reason, all human experience and intuition applied to macroparticles. We know how macroparticles will move, but we can't say same thing for little particles. For this reason, in the way of learning microparticles we have to use different types of abstracts and we need relate them with direct experiences in our life. Each visual model works according to classical physics, so it is useless to represent quantum processes. For this reason, the correct way is to reject the preparation of models of motion of quantum objects. The absence of visuality results in nonsatisfaction, as time passes this feeling passes away and everything will be ok. Although microparticles has corpuscular and wave properties, according to Feynmann"they act neither as wave nor as particle" . The difference of microparticles from wave is that it is always observed as indivisible. For instance, nobody observed half of electron. At the same time, we can divide wave into parts (for example, incide light wave through the surface of translucent mirror)and then we can learn it seperately. The difference between microparticles and macroparticles is that,we can't calculate the coordinate and momentum of microparticles at same time so, it results in lost of meaning of trajectory of microparticles . Problem about the nature of microparticles remains unresolved. The main difficulty is that, to explain experimental facts we need to use particle and wave properties. Similar objects such as electrons which are done by Vilson's camera make marks in experiments,it means they acts as bullet which move along certain trajectory, crossing through microcrystallic foils they gives dark and light interference circles, it means they act like waves which obey superposition principle.As particles and wave properties aren't similar and electrons have unique nature, electrons are neither particles nor waves [1]. Because, from one side wave and particle view are similar, from other side they are different.We can understand electrons and photons as new manifestation form of matter. Matter consists of substance and physical field. Electrons, photons and other particles are in the middle place [2]. As the Properties of microparticles is so special that we can't find example for microparticles. For the explaination of this view, it is possible to accept them either as new manifestation form of matter or accepting by their crossing from multidimensional space to our space. The question is that, both of theese assumptions can solve problems.It is very difficult to say which of theese two is absolutely true. It is difficult for a human to learn theese assumptions. Let's observe the solution of this problem differently . İn classical mechanics, material point is characterized by position and momentum .Real microparticles are more compound objects from this view. So, it is impossible to determine instant position of microparticle to chacterize position and momentum at same time. The reason is each particle has both corpuscular and wave properties. For this reason, we can't say anything about position of particle after some time t. In 1927, Heisenberg gave uncertainity principle for microsystem. According to this principle it is not possible to determine momentum and coordinate at the same time with same accuracy . For wave pocket, the distance between minimums:

$$\Delta x \cdot \Delta k/2 \geq \pi \text{ və } \Delta x \cdot \Delta k \geq 2\pi \quad (1)$$

if we multiply both side to $\hbar$

$$\Delta x \cdot \Delta k \cdot \hbar \geq h \text{ and we get } \Delta x \cdot \Delta P \geq h \quad (2)$$

equation (2) is Heisenberg's uncertainity principle [3]. For other coordinates :

$$\Delta x \cdot \Delta P_x \geq h \; ; \; \Delta y \cdot \Delta Py \geq h \; ; \; \Delta z \cdot \Delta Pz \geq h \quad (3)$$

For uncertainty principle if coordinate is known,X1= X2 ⇒ ΔX=0. then according to (2)equation:

$$\Delta P=h/\Delta x=h/0=\infty \quad (4)$$

It means,momentum is uncertain.If momentum is certain, it will be P1=P2⇒ΔP=0. So, according to (2)

$$\Delta x=h/\Delta P=h/0=\infty \quad (5)$$

It means, coordinate is uncertain. It is easy to show the explaination of uncertainity problem. This explaination will differ from the explaination above. We can't determine coordinate and momentum at the same time with the same accuracy, because we don't know the initial coordinate of particle. İf initial coordinate is certain, we can get a little information about the motion of the particle. In other hand, according to scientist Bohr from Denmark, size changes everything. We can say that the size of microparticles is very small, but the devices learning them are in macro size. It causes some problems in measuring them. It is inaccurate to say which of theese assumptions is absolutely true.

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