

The Orbital Theory

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Abstract:

As explained in the structure of an atom we came to know that there are four types of orbitals *s*, *p*, *d* and *f*. Orbitals are 3-D regions within which there is the probability of finding an electron within an atom. Electrons within them can move in a random motion so we cannot detect the movement of an electron, which is totally guided by the force of attraction due to weak nuclear force between the protons in the nucleus and the electrons. Orbitals can be merged to form hybridized orbitals such as *s* orbital and *p* orbital and make bonds between two atoms. Orbitals can accommodate only a limited number of electrons in them. Orbitals *p*, *d* and *f* also have sub parts like in *p* there is *p_x*, *p_y* and *p_z*. Orbitals have specific shapes like *p* is having lobe shape boundaries. But, this doesn't explain its working completely and we are not able to understand what it exactly is. So there were some drawbacks of the earlier idea of orbitals which are explained below.

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Drawbacks of earlier theory:

So, going according to what we know about them and some practical concepts of physics, some unexplained questions:

- Why is the shape of the orbitals (*p*, *d* and *f*) are not spherical and have specific shapes bounding them if only one force is acting in there which is pulling electrons towards the center, and
- If electrons are moving in a random motion within an orbital then it is not possible that only weak nuclear force is guiding its motion, as it can only attract the electrons but can't make them move in a random motion.

From the known theory of orbitals, we can say that the concept of orbitals and the motion of an electron within them is not properly explained and is incomplete. Because as what we know about them, we have no answers to these questions. So, we need to know more about them and with this incomplete theory we can't do that so, I researched about this and got some explanations to explain these phenomimes.

Key Words:

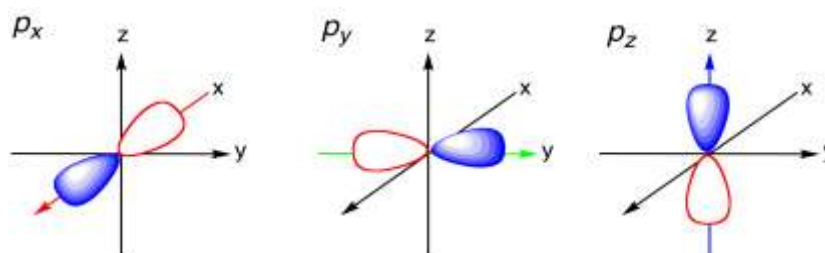
- P orbitals
- Lobe shape
- Weak nuclear force
- Random motion
- Direction of motion

Statement and Declaration:

So, as per my research I would like to conclude that orbitals are not as simple as explained earlier, they are quantum complexes formed due to force like dark matter present in space, and possibly functions the same as dark matter. It has its own force of attraction which is greater than the weak nuclear force but less than strong nuclear force.

Explanation:

Let us first consider p orbitals for the reference to study about it briefly.



The three p orbitals are aligned along perpendicular axes

Fig. 1

Now, we know that the possibility of finding an electron is within these lobes when the atom has its electrons in p orbital.

If we consider that an electron is at point P inside the orbital,

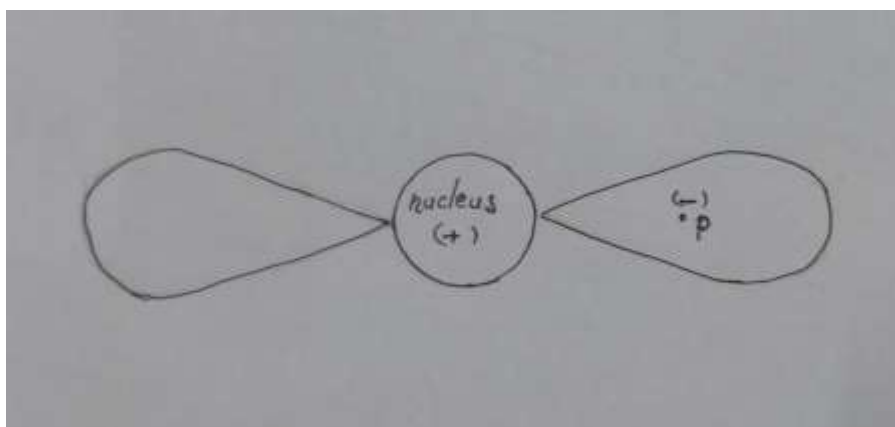


Fig. 2

And if we consider that only weak nuclear attraction is experienced by the electron, then the electron shouldn't be able to move in positive x direction as the weak nuclear force will try to pull it and will not allow it to move in opposite direction whereas if we consider that orbital has its own force of attraction which is greater than weak nuclear force then the electron will be able to move around freely inside the orbital. As the orbital force is greater than the weak nuclear force therefore, the electron be able to move in the positive x direction as well and hence will be able to exhibit random motion inside the orbital.

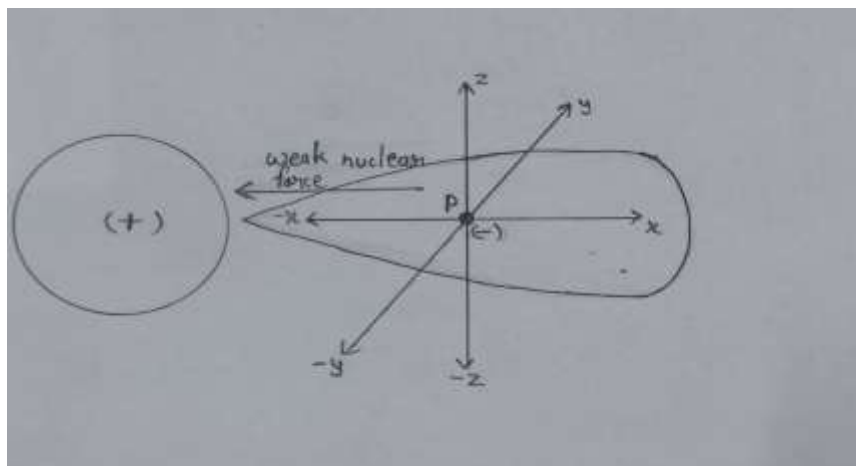


Fig. 3

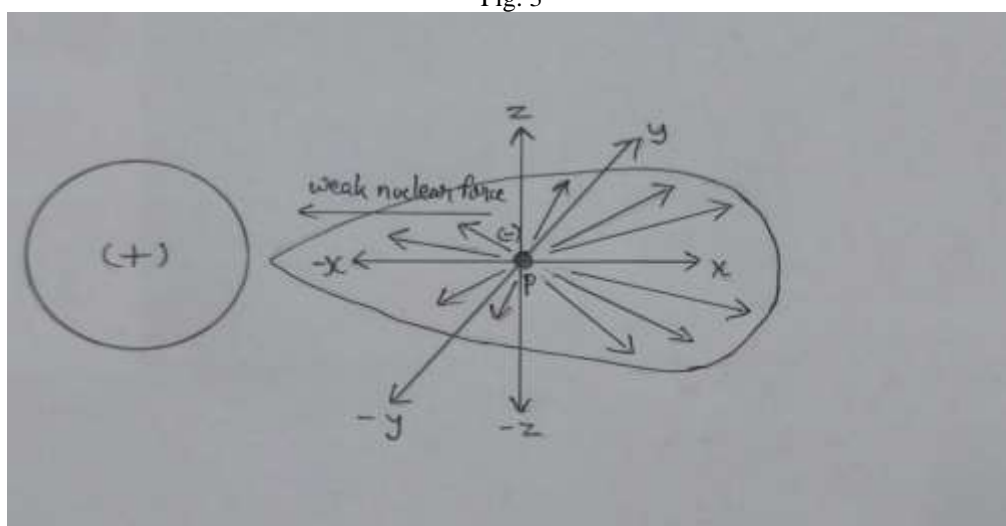


Fig. 4

As we know via experiment that the lobe shape of this orbital is bigger at the outer edge and because of its shape it is able to balance the nuclear attraction from the nucleus and hence the electron is able to move freely because of its kinetic energy within the orbital.

And as this matter exists in certain amount and has the ability to form complexes that leads to the formation of bounded shapes of orbitals. As it has the ability to form complex structures so as a result, we are able to see different variable structures of orbitals as sub orbitals of p, d and f orbitals.

The force of attraction of orbitals should be greater than the nuclear attraction so that it can form electron clouds above and below the plane during bonding between two atoms(π bonds).

Conclusion:

From all this we can conclude that:

1. Orbitals are quantum complexes formed due to force like dark matter, whose force of attraction should be greater than weak nuclear attraction.
2. It has the ability to form complexes and can be immersed together to form single structures (hybridized orbitals).
3. This thing if present in limited amount and hence form bounded shapes of different orbitals.