

Atomic nucleus has a charge +ve, and electrons around it have a total charge –ve. Why they don't attract each other?

Answer: Electrons are attracted to the nucleus, because they have opposite electric charges. The question is – why do electrons move in the space around the nucleus, and do not collide with it?

Simple mechanics with electromagnetism do not work in atomic dimensions, particularly with the charged electrons. Classical electromagnetism states that electrons should radiate electromagnetic waves because of the continuous acceleration of a circular path and finally fall in the nucleus.

In the microscopic world nature follows laws of quantum mechanics instead of classical physics principles. Quantum mechanics equations of electron movement around the nucleus include electromagnetic fields, and their solutions are revealing that such movement is stable and explain the existence of atoms.

When physicists first encountered to this problem, they postulated, that electrons are allowed to move steady around the nucleus only on certain specific orbits on which electrons do not emit energy. Electron will radiate or absorb energy only when jumping from one orbit to another one, that's why they aren't falling in the nucleus.

Later was discovered, that all subatomic particles possess wave properties. Such electron-wave, moving in particular stationary orbit, stays where it is because the quantum-mechanical resistance exactly balances out the Coulomb force. Such resistance can be explained by uncertainty principle, which forbids electron to exist in the space as small as an atomic nucleus.