

Niels Bohr

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Niels Bohr won the Nobel Prize in physics in the year 1922. He won it for “his services in the investigation of the structure of atoms and of the radiation emanating from them”. He helped introduce the pioneering of atomic structure which, despite the correction over time, can still be used in modern chemistry and physics.

Niels Henrik David Bohr was born on October 7, 1885 in Copenhagen to Christian and Ellen Bohr. Niels and his younger brother Harald were able to grow up in a scientific atmosphere. His father was a Professor of Physiology at Copenhagen University and was largely responsible for awakening Niels’s interest in physics while he attended school. His mother also came from an educated family. Following in his father’s footsteps, Niels held a Lectureship in Physics at Copenhagen University and the Victoria University in Manchester. He then proceeded to be a Professor of Theoretical Physics at Copenhagen University in 1916. From 1920 to his death in 1962 he was the head of the Institute for Theoretical Physics.

The Nobel Prize that Bohr received in 1922 was given to him for his contribution to the model of the atom. Before the Rutherford-Bohr model was produced, many scientists struggled to understand the actual structure of the atom. It was previously known that an electron, which has a negative charge, exists somewhere and that an atom has a neutral charge. This meant that a positive charge must exist somewhere within the atom. Rutherford’s gold foil experiment proved that most particles pass through an atom but some come off at odd angles as if they were deflected. From this, Rutherford and Bohr depicted that each atom is mostly empty space, but also contains a dense region, a central mass. Also this mass must contain a positive charge.

Bohr, with his theoretical physics, included that electrons must somehow orbit the central mass. This central mass must contain the positive charge for this to work. Each orbit around the nucleus represents an energy level, and electrons cannot exist in between orbits. This idea replaced Thompson's 'plum pudding model' which had everything stationary, the Saturnian model, and the Rutherford model. With this theory, the atom was able to be understood in a clearer sense. Even though it had flaws, this was basically the ideal model of the atom and is still taught to students today.

Flaws of Bohr's work include the fact that electrons don't have a specific orbit that they follow. A German scientist, Erwin Schrodinger, thought that the problem of the electrons might be that they shouldn't be limited to specific orbits. An idea that electromagnetic energy acting in a wave was developed and that electrons could work in the same manner. This developed the idea that the electrons move in a cloud, not an actual orbit. They move randomly but in a specific energy level.

The Rutherford-Bohr model is still shown in school text books today because it shows an easy to approach idea of the atom while covering many of its basics. Bohr's theory was just a primitive example of the hydrogen atom but can theoretically cover other atoms. Rutherford and Bohr didn't work together, however Bohr's theory used Rutherford's model which then created the Rutherford-Bohr model/theory. Bohr's theories help to understand the structure of the atom and he went off to theorize radiation. Bohr helped interest and push other scientists to look into what an atom really is, and discoveries are still being made today.