

Dynamic structure of atoms

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Abstract

The paper discusses the fundamental problem of electron structure of atoms. It was suggested a dynamic structure of atoms based on experimental data about polarizabilities, ionization potentials, effective radii of atoms, etc. Conceptual base for this dynamic structure is the dipole-shell model of atoms. The paper gives an analysis and a foundation of an electrical origin and mechanisms of forming electron configurations of atomic shells. There is a logic chain of forming atoms into groups and periods in the periodic table. In the basis of understanding the dynamic structure of multielectron atoms is a hydrogen atom and a helium atom. Electrons move in atoms in elliptical orbits. These orbits are result from perturbation of circular orbits of cores of hypothetical atoms by valence electrons in the process of forming atoms. Thanks to that, the stability of atoms and the relative independence of the electron orbits were reached. The atoms are a system of nested quasi-spherical shells, like Russian dolls. In the basis of understanding the shell structure of atoms are the principle of maximum potential energy of the system and the principle of symmetry. The electron shells of atoms are the regular geometrical figures with of different symmetry, including point, mirror, trigonal, tetrahedral, hexahedral, etc. The ellipticity of the orbits gives these figures the dynamic nature, due to the periodically varying sizes of semi-major and semi-minor axis of the electron orbits. For a better understanding of the electronic structure of atoms and for better visual perception of the proposed models of atoms the article gives electron configuration of atoms that correspond to the main groups of the periodic table. The solution of the equation of motion of the electrons was given in frameworks of the Kepler's tasks. The formulas for describing and calculating the main parameters of atoms were obtained. In the paper were determined and systematized in tables the main parameters of atoms – constants of shielding, eccentricities and semi-major and semi-minor axis of elliptical orbit, effective radii of atoms and their cores. This paper discusses their behavior in groups and periods in the periodic table. There are examples to illustrate the effectiveness of the developed by the author of the dipole-shell model of multielectron atoms.