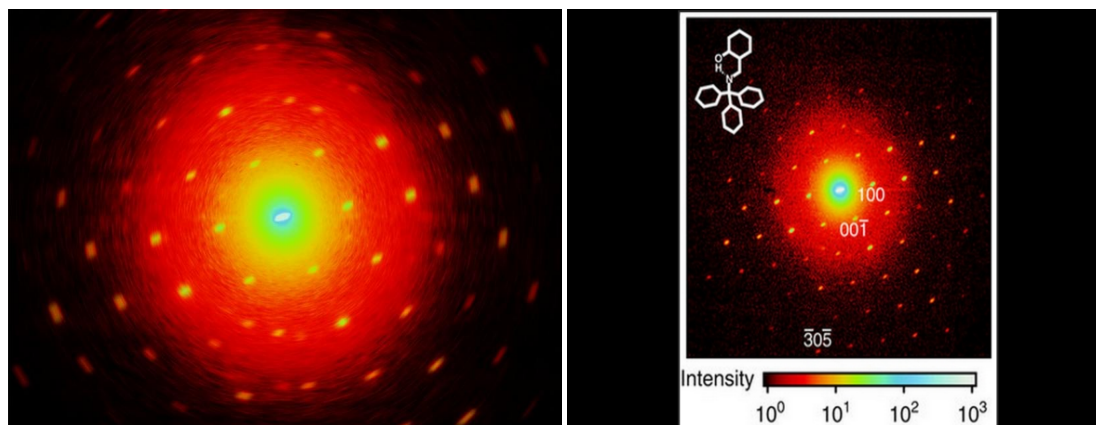


Structure and Mechanism of Energy Levels Quantization of Atoms

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Abstract: this article show a new atomic structure which has been proved by related and independent experiments; based on this atomic structure, put forwards a new mechanism of the atomic energy levels quantization.



If ultrashort electron pulses hit a bimolecular crystal, they are diffracted from it. As a result, one obtains a characteristic diffraction image of the atomic structure. *Credit: Graphic: Alexander Gliserin* ^{[4][5]}

Main viewpoints and conclusions:

Atom, from the Greek word *atomos*, which means indivisible, was first conceived around 2,400 years ago by a Greek man named Democritus. An atom is the smallest constituent unit of ordinary matter that has the properties of a chemical element. Every solid, liquid, gas, and plasma is composed of neutral or ionized atoms. ^[1]

Every atom is composed of a nucleus and one or more electrons being bounding together by the electric field(isn't electromagnetic field);^[1] and the nucleus has positive electric charges, every electron has a unit negative electric charge.

Within an atom, further and however, the all electrons-the all extranuclear charges is one kind of soft matter which has the same and consistent of negatively charged ingredient; at and in an unified and complete whole with one single basic structure; existing in and filling completely the space outside the nucleus of the atom; under the thermal effect, and by the mutual electromagnetic interaction with the nucleus and others related, Formed: the nucleus is the sphere center; different of volume matter densities; energy levels at and in the discrete states(energy levels quantized); higher to lower from the inner to the outer; a concentric spherical multilayer-shaped of volume *extranuclear charged matter* density distribution structure and energy levels existence form. ^{[2][3][4][5][6][7]}

Furthermore, the energy and energy levels distribution states of atoms is mainly refers to the energy and energy levels distribution states of the all extranuclear electrons-the all *extranuclear electric-charged matter* of the atoms.^{[8][9]}

Under normal conditions (in particular, the creation of artificial electromagnetic does not exist), through the mutual electromagnetic interaction between the nucleus and the charge itself, all foreign nucleus charge of an atom formed different volume charge density, multi-layer concentric spherical body type charge layers [1].

Since the volume charge density (*Divergence*) of each charge layer are different, so that the natural frequency of each charge layer are also different. Meanwhile, because the volume charge density of each charge layer are different, making the mass per unit volume of each charge layer is different, by the $E=mc^2$, we can know that the energy which contained in every unit volume of each charge layer are also different, I.e., the energy density of different charge layer are different.

Because of the existence of this cases that energy density and the natural frequency of the discrete, differential distribution of stratification, on the whole, and showing the formation of atomic energy distribution pattern having a plurality of discrete energy levels, structure and morphology.

In summary, extra-nuclear charge volume density stratification differentiated is the causes for atomic energy levels quantized.

In the normal state, an atom of an element in its k -th charge layer formed therein, we make the following definition: not any state atomic energy exchange (in the form and means) had occurred with the outside world, is the benchmark of the atomic energy state; otherwise known as: benchmark energy state of an atom.

In the benchmark energy state of an atom, Let:

1. ν_i is the benchmark frequency (natural frequency) of the i -th charge layer;
 $i = 1, 2, \dots, k$.
2. E_i is the benchmark energy level of the i -th charge layer, $E_i = h\nu_i$; $i = 1, 2, \dots, k$,
 h is the Planck's constant.
3. E_{i0} is the benchmark energy of the i -th charge layer, and there be $E_{i0} = m_i h\nu_i$;
 m_i is a positive integer; $i = 1, 2, \dots, k$.
4. E_0 is the benchmark energy of the atom, and there be $E_0 = E_{10} + E_{20} + \dots + E_{k0} =$
 $= m_1 h\nu_1 + m_2 h\nu_2 + \dots + m_k h\nu_k$.

Each charge layer, forming a fundamental field; k charge layers, formed k fundamental fields, The particles from the same fundamental field (the same charge layer) are absolutely identical particles, each and every all is $E_i = h\nu_i$ ($i = 1, 2, \dots, k$) of identical particles (quantum of energy).

Each charge layer (benchmark energy level is E_i , $E_i = h\nu_i$; $i=1,2,\dots,k$), uniquely corresponding to a spectral line; k charge layers corresponding to k spectral lines, The frequency of the spectral line corresponding to i -th charge layer is ν_i .

On the contrary, there are k spectral lines; the different volume charge densities k individual layers should exist correspondingly, if the frequency of a spectrum is ν_i , its corresponding benchmark frequency (natural frequency) of the charge transport layer is ν_i .

References [1] Atom <https://en.wikipedia.org/wiki/Atom>

Music ... Sleepless Tonight!

<http://music.163.com/#/song?id=26512065>

T.<http://music.163.com/#/search/m/?s=sleepless%20tonight&type=1&market=baiduqk>

Music ... 今夜无眠!

1. <http://music.163.com/#/song?id=5267986>

2. <http://www.kuwo.cn/yinyue/5369850?catalog=yueku2016>

T.<http://music.163.com/#/search/m/?s=%E4%BB%8A%E5%A4%9C%E6%97%A0%E7%9C%A0&type=1>

Astronomy picture of the day(August 18, 2017): Perseids over the Pyrénées



<https://apod.nasa.gov/apod/ap170818.html>