《天文与地球科学杂志(ISSN 2958-4043)》
Journal of Astronomy and Earth Sciences (ISSN2958-4043)



ChengZhu Science™

Serial in November, 2022

ChengZhu Science Research Center Limited

(Hong Kong Registration NO. 80561228)

Journal article DOI is registered via JiangXi Province ChengZhu Environmental Engineering Company Ltd, with Crossref membership (DOI prefix 10.58473)

出版人： 刘焕 香江出版社有限公司

Publisher: Liu Huan, Xiangjiang Publishing Company Ltd.

ISSN 2958-4043



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Article 2. The anti-matter of symmetric three-dimensional spaces along the fourth dimension axis/第四维度轴上的对称三维空间与反物质原理

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DOI: https://doi.org/10.58473/JAES0002

Formally published on 15/11/2022; Latest revised on 04/09/2026.

Abstract

Anti-matter principle in astronomy is explained from the perspective of force balance of each mass point within an atom, taking the formation of covalent bond as an example to illustrate.

Key words: Anti-matter, Force Balance, Symmetrical Three-dimensional Spaces, Covalent Bond, Coulomb force.

1.The principle of anti-matter

The force balance of each mass point within an atom can only be achieved by the traction of the antimatter Coulomb force between two symmetric three-dimensional spaces. The force of covalent bond is the Coulomb force between two symmetric three-dimension spaces as well. In our three-dimension space, the protons are positively charged and the electrons are negatively charged; the materials in correspondingly symmetric three-dimensional space along the fourth dimension axis is called antimatter, in which the protons are negatively charged and the electrons are positively charged. When discussing the motion law and force analysis of the micro-particles inside the atom, we often simplify it as the self rotation motion of the negatively charged electron around the positively charged nucleus. From the force analysis at a central point of electron, one is the centrifugal force, and the other is the centripetal force generated between positively charged nucleus and negatively charged electron, so as to achieve force balance; However, when the force analysis is conducted on nucleus, positive charge nucleus is subjected to the pulling force produced by Coulomb force that corresponds to the centripetal force of electrons, how to achieve the equilibrium of force analysis? This question is particularly evident in hydrogen atoms of mono-atomic form, such as stellar matter. For the further discussion of atomic physics, why electrons and protons in atoms (such as radioactive elements) cannot merge and neutralize due to the mutual attraction of Coulomb force

in atoms after half-life of atomic decay? Clearly, the negatively and positively charged particles move away from each other and leave out of the atoms at high speed. These questions can only be resolved by introducing the anti-matter principles between two symmetric three-dimension spaces along the fourth dimension in this article, which is that only when the positively charged protons in our three-dimensional space are paired and pulled by the negatively charged protons in its symmetrical three-dimensional space along the fourth dimensional axis, the force balance of the atomic nucleus can be maintained. The mechanical equilibrium in more complex motion model inside an atom is further discussed in another article [2].

Next let's discuss further for more complex cases. For example, there are two covalently bonded atoms (atom1 and atom2). There are electron 1 and proton 1 in atom 1 ; and electron 2 and proton 2 in atom 2, respectively. The negatively charged electron 1 is pulled and paired by the positively charged electron in its correspondingly symmetric three-dimensional space; electron 1 is also pulled and paired by positively charged proton 2 in atom 2 due to the covalent bond; the positively charged proton 2 is pulled and paired by the negatively charged electron 2 in atom 2; then the negatively charged electron 2 is pulled and paired by the positively charged electron in its correspondingly symmetric three-dimensional space; finally the positively charged proton 2 is pulled and paired by the negatively charged proton in its correspondingly symmetric three-dimensional space (Figure 1 below). This series relationship also exists on electron 2 - proton 1 - electron 1. It's like a series of batteries, from positive to negative, positive to negative..... Cyclic connection. This also makes the electron cloud between atoms display as a double - ring crossing mode, so as to form a stable molecular structure. However, the covalent bond force is inter-atomic force, which is different from the force balance analysis of intra-atomic force discussed above.

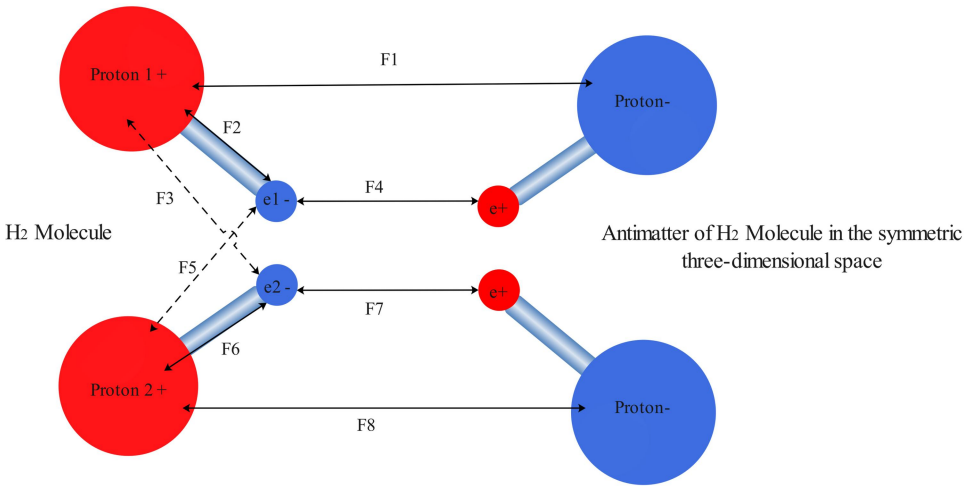

Figure 1. The inter-atomic force balance analysis for covalent bond between

double H atoms in H_2 molecule.

Figure 1 illustrates the H_2 molecule structure (left) and its corresponding antimatter structure of H_2 molecule in the symmetric three-dimensional space (right). Inside the antimatter structure of H_2 molecule, the proton is negatively charged and the electron is positively charged. For the proton 1, the positively-charged proton is pulled by three forces (F1, F2, F3) from three negatively-charged particles; For the proton 2, the positively-charged proton is pulled by three forces (F5, F6, F8) from three negatively-charged particles as well. For the electron 1 (e1), the negatively-charged electron is pulled by three forces (F2, F4, F5) from three positively-charged particles; For the electron 2 (e2), the negatively-charged electron is pulled by three forces (F3, F6, F7) from three positively-charged particles as well. Consequently, each positively-charged particle is pulled and paired by three Coulomb forces, and each negatively-charged particle is correspondingly pulled and paired by three Coulomb forces, so as to achieve force balance at each mass point. It is noted that the forces between F3 and F3 display as a double - ring crossing mode, forming the covalent bond between double H atoms in H_2 molecule.

2.译文：反物质原理

原子内各质点的受力平衡必须依靠两个对称三维空间之间的反物质库仑力牵引才能实现。共价键力是两个对称三维空间之间的库仑力作用。其中我们所在的三维空间质子带正电荷、电子带负电荷；则在第四维度轴上与它对应的对称三维空间中的质子带负电荷、电子带正电荷，即为反物质。在讨论原子内部粒子运动规律和受力分析时候，我们常常简化为负电荷电子围绕正电荷原子核做高速自旋转运动。从电子做单点受力分析，一方面是离心力的作用，另一方面是正负电荷产生的向心力作用，从而实现受力平衡；但是从原子核做单点受力分析，正电荷原子核受到库仑力产生的与电子向心力所对应的拉力，如何做平衡受力分析？这个问题在单原子形态存在的氢原子（比如恒星天体物质）中尤其明显。更进一步讨论原子物理之后，原子（比如放射性元素）在半衰期后为何正负粒子之间不会由于库仑力的相互吸引力而在原子内部合并中和？而是带电粒子高速远离并射出原子外？这些命题都必须借助本文提出的对称三维物质空间中的反物质原理才能解决，即：我们所在三维空间中的正电荷质子与对称三维空间中的负电荷质子相配对、牵引，才能维系原子核的受力平衡。另一篇文章进一步讨论了原子内更复杂的运动模型中的力学平衡[2]。

再进一步讨论更为复杂的情景：比如两个共价键配对的原子。原子 1 中有电子 1 和质子 1；原子 2 中有电子 2 和质子 2。其中负电荷电子 1 在第四维度轴上受其对应的对称三维时空中对应的正电荷电子牵引，并在自身三维时空中形成共价键的原子 2 中的其中一个正电荷质子 2 可以配对牵引，而这个正电荷质子 2 又可与自身原子中的另一个对应负电荷电子 2 牵引，然后这个负电荷电子 2 又在第四维度轴上受其对应的对称三维时空中正电荷电子牵引配对，最后正电荷质子 2 在第四维度轴上受其对应的对称三维时空中负电荷质子牵引配对（详见图 1 和对应的英文论述）。这个串联关系同样作用于电子 2-质子 1-电子 1. 这就像多个串联电

池一样正负极、正负极.....循环连接。这也使得原子间电子云呈现双环交叉模式，才能形成稳定分子结构。然而，共价键力为原子间作用力，与以上讨论的原子内作用力的受力平衡分析不同。

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