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NEW PROPERTIES OF NATURAL RADIOACTIVITY

Bakhodir Abdusamatovich Mirsalikhov
Candidate of Physical and Mathematical Sciences, Associate Professor,
mirsalikhov53@gmail.com

Saytdjanov Shovkat Nigmatjanovich
Senior Teacher, saytdjanov123@mail.ru

Xusniddinov Faxriddin Shamsiddinovich,
Assistant, Tashkent State Transport University

Abstract
This article contains a brief description of the new properties of radioactivity in nuclear physics. In accordance with it, the interpretation of new types of beta emirate, the process of formation of photonuclei and photonuclei are explained by reaction mechanisms.

Keywords: nuclear physics, radioactivity, star, nucleon, atom, gamma, photonucleus, reaction, antineutrino, electron-pozitron.

Introduction

The doctrine of the atomic nucleus developed rapidly in the early 20th century. A lot of work is currently being done in this area. Much work is planned and effectively carried out in various spheres of the national economy, in addition to nuclear energy for peaceful purposes. Therefore, this article presents a brief description of the new properties of radioactivity in nuclear physics. The work [1] reports on a new type of natural radioactivity. To explain the new type of β-decay, let us consider the formation of nucleons in stellar plasma. In stellar plasma, the atoms are highly ionized and there is a large flux of gamma rays.

MATERIALS AND METHODS

Gamma rays form a photonuclear reaction with stellar plasma nuclei. The mechanisms of photonuclear reactions are as follows:

$$\gamma + A(Z,N) \rightarrow A^*(Z,N) \rightarrow A(Z+1,N-1) + e^- + \nu \quad (1)$$

$$\gamma + A(Z,N) \rightarrow A^*(Z,N) \rightarrow (A(Z+1,N-1) + e^-)_{connected} + \nu \quad (2)$$

$$\gamma + A(Z,N) \rightarrow (e^+ - e^-)_\nu + A(Z,N) \rightarrow (A(Z+1,N-1) + e + \nu \quad (3)$$

$$\gamma + A(Z,N) \rightarrow (e^+ - e^-)_\nu + A(Z,N) \rightarrow (A(Z+1,N-1) + e^-)_{connected} + \nu \quad (4)$$

Here the subscript n means that the electron-positron pair is virtual. In the first reaction, an excited nucleus transforms into a heavier nucleus through β decay. The second reaction is similar to the first reaction. In this case, all the energy is carried away by the β-decay antineutrino. In the third reaction, a virtual electron-positron pair is formed, and the nucleus absorbs the positron, creating a heavier nucleus, an electron, and an antineutrino.

RESULTS AND DISCUSSION

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There may be a backlash here:

$\gamma + A(Z+1, N-1) \rightarrow (e^+ - e^-)_\nu + A(Z+1, N-1) \rightarrow (A(Z,N) + e^+ + \nu,$

(3) is equally likely to occur during the reaction. In the fourth reaction, a virtual positron is absorbed by the nucleus and a daughter nucleus is formed in a bound state, and all the decay energy is transferred to the antineutrino. The formation of a bound state of a positron with nuclei does not exist, since the positron is a positively charged particle. This statement is supported by the empirically observed asymmetry between the distribution of matter and antimatter in the Universe.

CONCLUSION

The above data allow us to formulate the following opinion: the reaction of capture of virtual positrons by the nuclei of highly ionized atoms represents a new type of natural radioactivity.

REFERENCES

1. Ф.А.Гареев, И.Е.Жидков, Ю.Л.Ратис. Влияние возбуждения и ионизации атомов на скорость ядерных процессов при низких энергиях. Препринт ОИЯИ Р4-2004-68, Дубна, 2004.
2. Зигбан К., Нордлинг К. и др. Электронная спектроскопия. Перевод с английского. Под редакцией И.Б.Боровского. Изд. Мир, М., 1971.
3. Абдуразаков А.А., Громов К.Я., Умаров Г.Я. Бета-спектрографы с постоянными магнитами. Изд. ФАН, Т., 1970.
4. Saytdjanov, Shovkat, and Fakhriddin Khusniddanov. "THE SIGNIFICANCE OF THE PRINCIPLE OF ORGANIZATION IN TEACHING ATOMIC AND NUCLEAR STRUCTURE ON THE BASIS OF INTERDISCIPLINARY INFORMATION TECHNOLOGIES." *Евразийский журнал медицинских и естественных наук* 3.2 (2023): 91-95.
5. Караходжаев А., Сайтджанов Ш.Н. Выполнение правила Алаги для интенсивностей во вращательных полосах 3/2[521], 5/2[642] в ядре ^{155}Sm. III Республиканская конференция Молодых физиков Узбекистана, «Ядерная физика и ядерные технологии» 1-2 декабря, 2010 г., Сборник докладов. С-131.
6. Мирсалихов, Баходир, and Шовкат Сайтджанов. "ЯДРО НУРЛАРИНИ ТИББИЁТДА ҚЎЛЛАНИЛИШИНИНГ АҲАМИЯТИ." *Involta Scientific Journal* 1.3 (2022): 129-135.