The Stability and Radioactivity of Atomic Nucleus

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Abstract: put the causes and mechanism for unstable atomic nucleus has radioactivity.

Main viewpoints and conclusions:

A Deuterium's nucleus is composed of one proton and one neutron, which two protons and one π-meson,[1] is stable; the nucleus of Helium-3 is composed of two protons and one neutron, which three protons and one π-meson, is stable; a Tritium's nucleus is composed of one proton and two neutrons, which three protons and two π-mesons, is unstable, and its half-life is about 12.32 years, then it decays into Helium-3.

Simultaneously, a nucleus of Helium-3 containing two protons and one neutron, is stable; but a Tritium's nucleus containing two neutrons and only one proton, there is no existence the Coulomb repulsion between of protons inside the Tritium's nucleus, is still unstable, it shows that the Coulomb repulsion between of protons is not the reality causes for atomic nucleus in unstable state and has radioactivity.

The reality causes for the Tritium's nucleus in unstable state and has radioactivity is: compared with a stable Helium-3, a Tritium's nucleus has a redundancy π-meson and excess energy. Until freed the redundancy π-meson and excess energy, after decays into Helium-3 by π decay, reaches stable state.

And even since $\pi = e^{-}(\beta) + \nu(\gamma)$, $e^{-}(\beta)$ and $\nu(\gamma)$ are corresponding with one-to-one, so, if one β appear, one neutrino must be exist, thus, there is no exist the decay mode which "neutrinoless double β decay ".In short, atomic nucleus' energy is produced by neutrons and their π-mesons, the energy levels and stability boundary of atomic nucleus are determined by (A–Z)/A, one kind of nuclide has radioactivity, is because it containing extra neutrons, or more accurately, is because it containing redundancy π-mesons and excess energy.[2]

The process that an unstable nucleus spontaneously rays (such as α-rays, β-rays, γ-rays, etc.), and decays into a stable state, is the process that release the redundancy π-mesons and the excess energy.

Also precisely one kind of nuclide has radioactivity, is due to it containing extra neutrons and redundancy π-mesons, employ the ***Neutron excitation***, namely, by neutrons emission, Injection (conveying; load) neutrons into the target nucleus, making the target nucleus obtains extra neutrons and redundancy π-mesons, then into unstable state and obtains radioactivity, to produce radioactive substances is widely used in the medical sector, academia and the industrial.

References

[1]*The Basic Structure and Properties of Hadrons* http://vixra.org/abs/1407.0015
[2] *π-Meson and the Structure of a Nucleus* http://vixra.org/abs/1405.0228