

X don't copy

WILHELM ROENTGEN

1895: X-rays



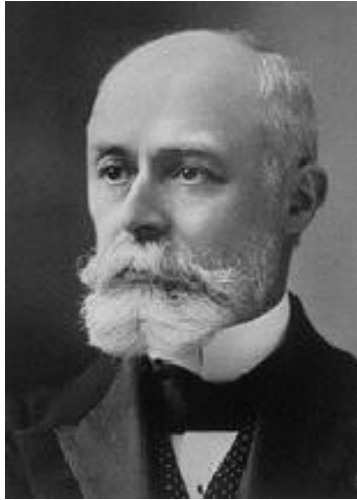
Noticed that a glass tube with accelerating electrons emitted some sort of unknown rays: X-rays.

They will expose film.

They will go through flesh, but not bone.



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HENRI BECQUEREL

1896: Natural Radiation

Discovered that Uranium emits three kinds of radiation, one of which is even more penetrating than X-rays



THE CURIES

Spent time separating and purifying naturally radioactive substances: Uranium, Radium, Polonium, and more

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TYPES OF RADIATION

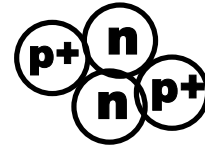
Description

What they really are

α

A fast-moving particle
Easy to shield against

2 protons and 2 neutrons
(a helium nucleus)



β

A very fast-moving particle
A little tougher to shield against

An electron



γ

Pure energy, moving at the speed of
light. Can never be 100% blocked

?

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Protect yourself against radiation by:

1. Limiting your time of exposure
2. Shielding with dense objects as much as possible
3. Stay as far away as possible

But since Uranium is in the soil all around the world, we are constantly exposed to a natural background radiation.

α β γ

can damage cells, but do not make things radioactive.

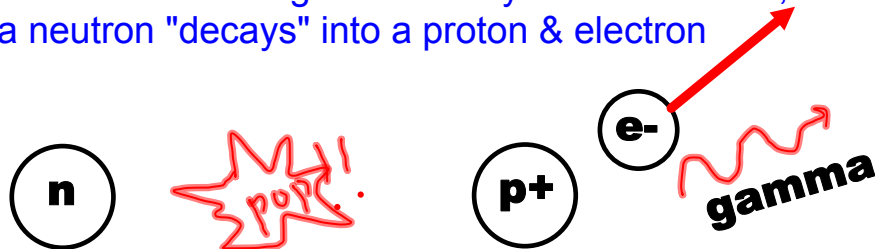
On the other hand, if the substance emitting them gets on you or in you (contamination), then you will be bombarded by radiation from a close distance, constantly

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The reason some atoms spit out radiation

Weak Nuclear Force

Holds neutrons together. Every once in a while, it fails and a neutron "decays" into a proton & electron



The electron shot out at high speed is the beta particle, along with some gamma

Strong Nuclear Force

Holds the nucleus together against the repulsion of the protons. It takes a balance of protons & neutrons to be stable.

examples: Carbon-12: 6 protons and 6 neutrons
Oxygen-16: 8 protons and 8 neutrons

But if the numbers are not right, the nucleus is unstable, and will spit out an alpha particle along with gamma, sooner or later

examples: Carbon-14: 6 protons and 8 neutrons
Oxygen-15: 8 protons and 7 neutrons

Most elements below lead have unstable versions (isotopes). Above lead, they are all unstable - no numbers of protons & neutrons work.



Une voiture radiologique