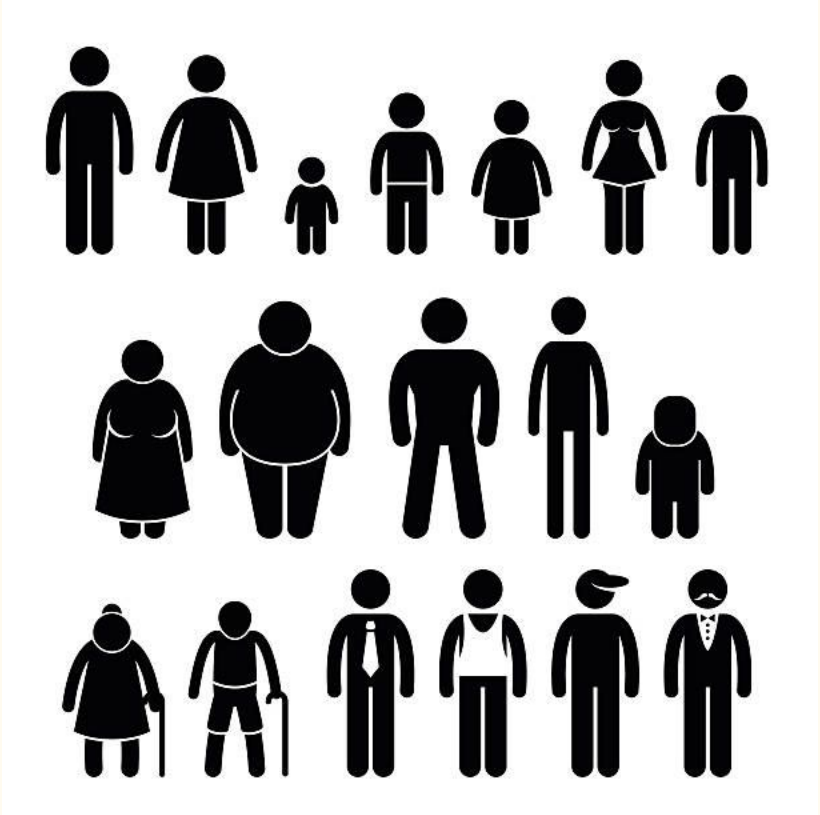
UNIVERSIDAD YACHAY TECH

SCHOOL OF PHYSICAL SCIENCES AND NANOTECHNOLOGY

Métodos Monte Carlo

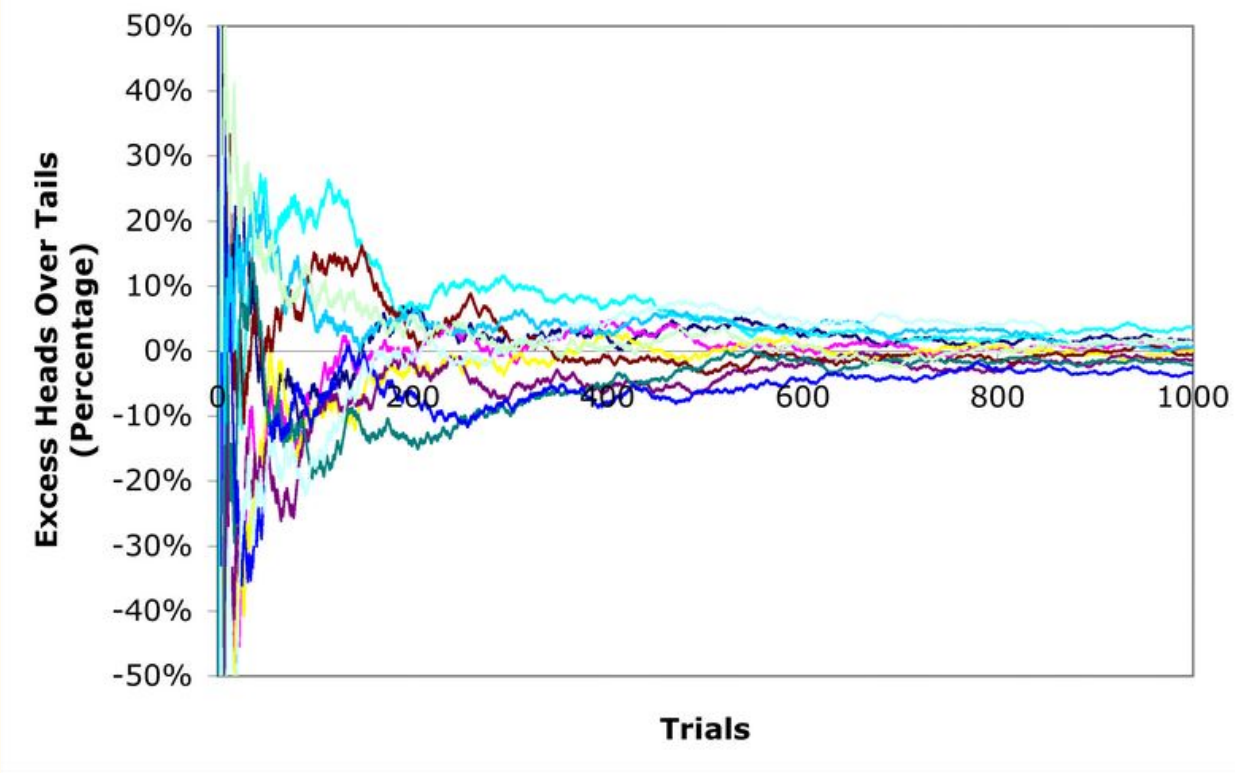
Jhon Villacís

Motivación



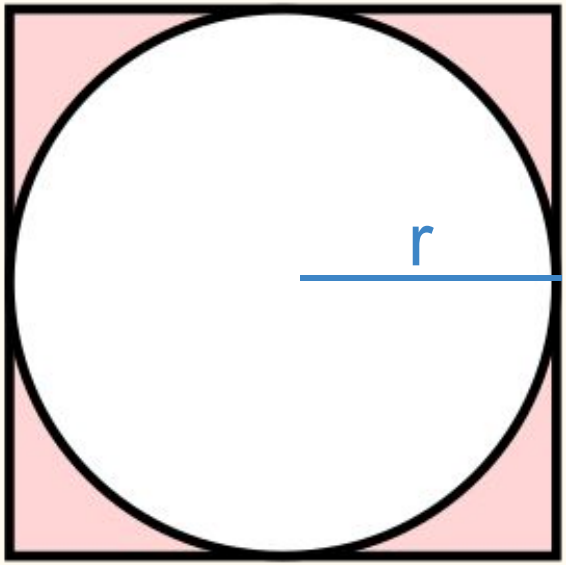
Estatura media de una población.

Ley de los grandes números (Law of large numbers)



Estimación de π

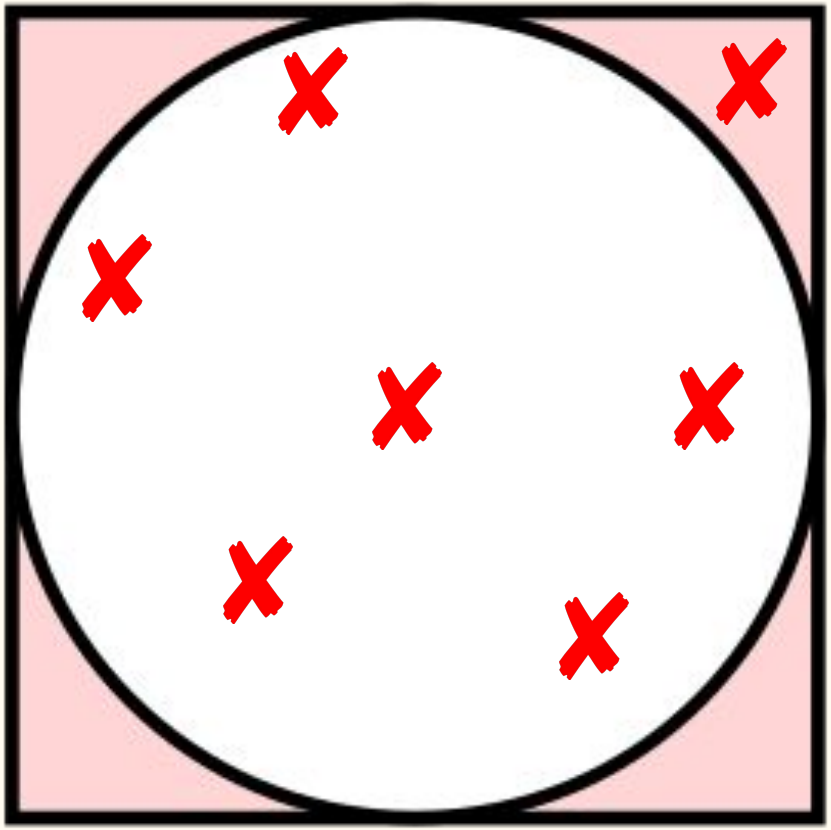
Estimaremos π mediante un círculo inscrito en un cuadrado



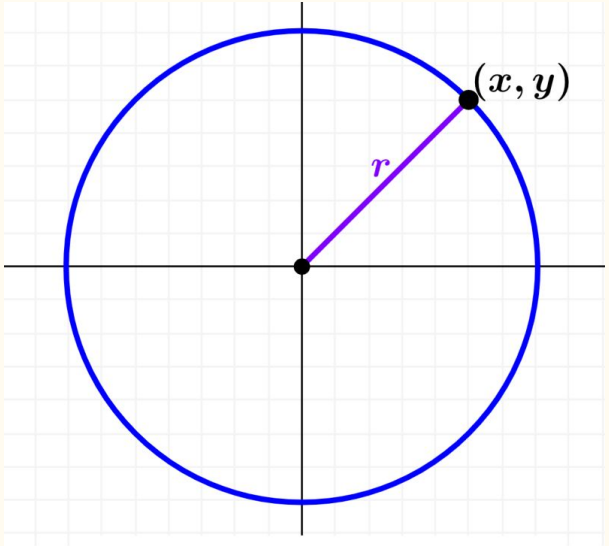
$$A_{\bigcirc} = \pi r^2$$

$$A_{\square} = 4 r^2$$

$$\frac{A_{\bigcirc}}{A_{\square}} = \frac{\pi r^2}{4 r^2} = \frac{\pi}{4}$$



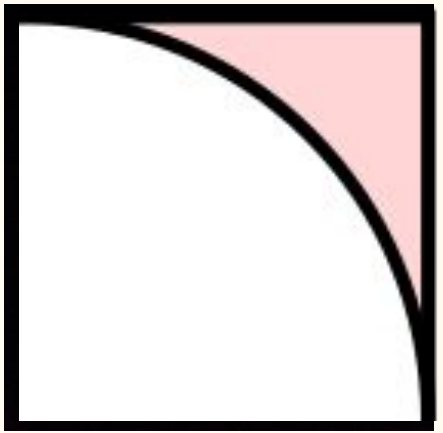
$$\frac{A_{\bigcirc}}{A_{\square}} = \frac{\pi}{4}$$



$$x^2 + y^2 = r^2$$

$$\frac{A_{\bigcirc}}{A_{\square}} = \frac{\pi}{4}$$

$$\frac{A_{\bigcirc}/4}{A_{\square}/4} = \frac{\pi}{4}$$

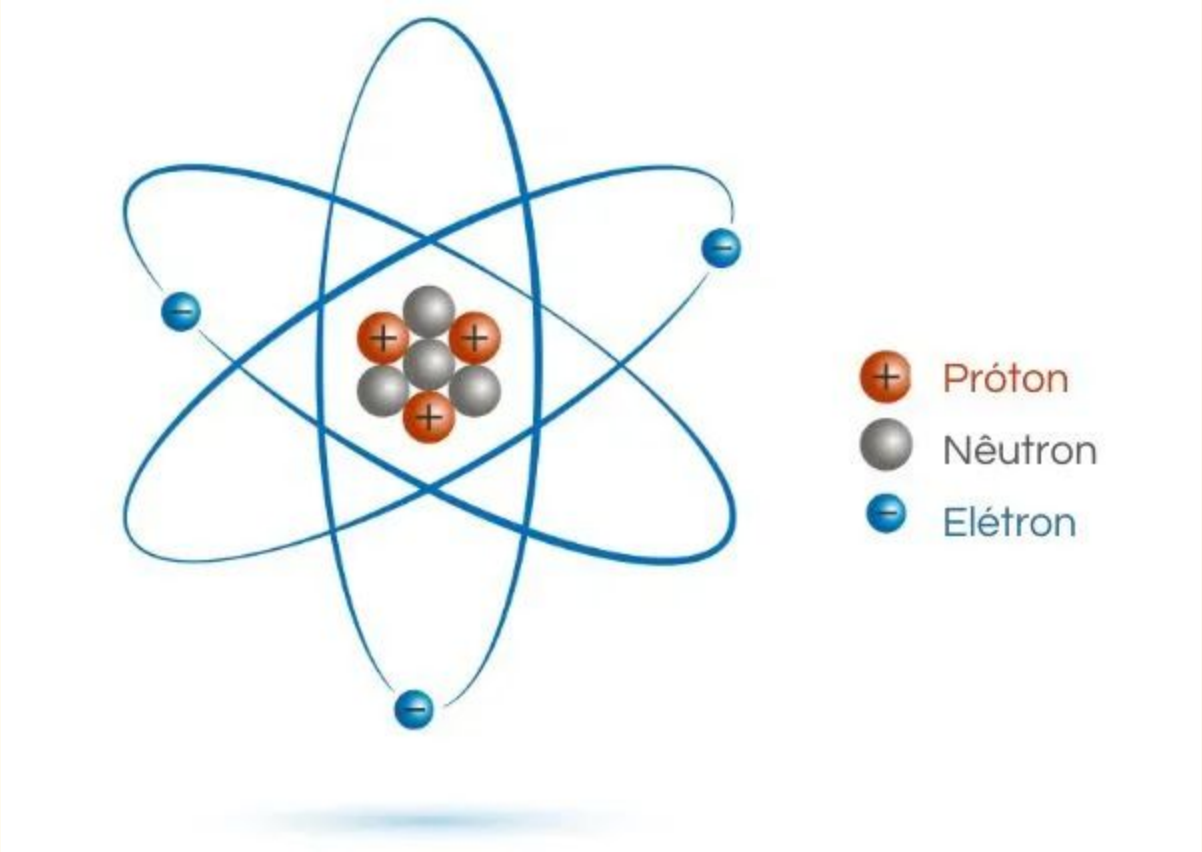


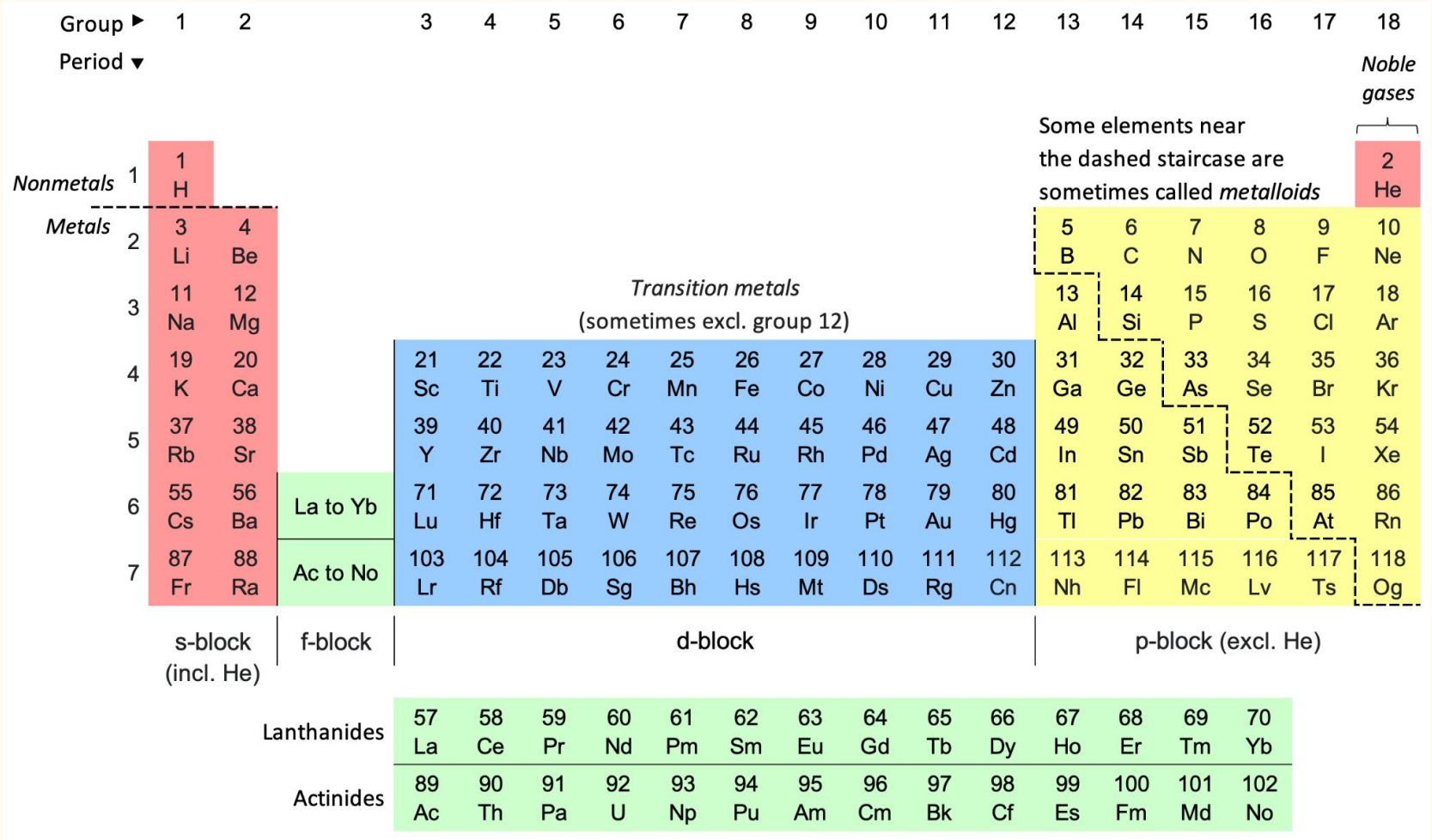
π es irracional!

$$\pi \neq \frac{a}{b}$$


3.14
15926535897932384626433832795028841971693993751058209749445923078164062862089986280348253421170679821480865132823066470938446095505822317253594081284811174502841027019385211055596446229489549303819644288109756659334461284756482337867831652712019091456485669234603486104543266482133936072602491412737245870066063155881748815209209628292540917153643678925903600113305305488204665213841469519415116094330572703657595919530921861173819326117931051185480744623799627495673518857527248912279381830119491298336733624406566430860213949463952247371907021798609437027705392171762931767523846748184676694051320005681271452635608277857713427577896091736371787214684409012249534301465495853710507922796892589235420199561121290219608640344181598136297747713099605187072113499999983729780499510597317328160963185950244594553469083026425223082533446850352619311881710100031378387528865875332083814206171776691473035982534904287554687311595628638823537875937519577818577805321712268066130019278766111959092164201989380952572010654858632788659...

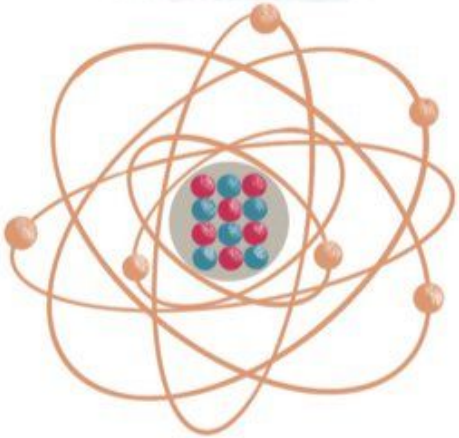
Desintegración radioactiva


Próton
Nêutron
Elétron


Group ▶
Period ▼
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Noble gases
Some elements near the dashed staircase are sometimes called metalloids
Nonmetals
Metals
Transition metals
(sometimes excl. group 12)
1 H
2 He
3 Li
4 Be
5 B
6 C
7 N
8 O
9 F
10 Ne
11 Na
12 Mg
13 Al
14 Si
15 P
16 S
17 Cl
18 Ar
19 K
20 Ca
21 Sc
22 Ti
23 V
24 Cr
25 Mn
26 Fe
27 Co
28 Ni
29 Cu
30 Zn
31 Ga
32 Ge
33 As
34 Se
35 Br
36 Kr
37 Rb
38 Sr
39 Y
40 Zr
41 Nb
42 Mo
43 Tc
44 Ru
45 Rh
46 Pd
47 Ag
48 Cd
49 In
50 Sn
51 Sb
52 Te
53 I
54 Xe
55 Cs
56 Ba
La to Yb
71 Lu
72 Hf
73 Ta
74 W
75 Re
76 Os
77 Ir
78 Pt
79 Au
80 Hg
81 Tl
82 Pb
83 Bi
84 Po
85 At
86 Rn
87 Fr
88 Ra
Ac to No
103 Lr
104 Rf
105 Db
106 Sg
107 Bh
108 Hs
109 Mt
110 Ds
111 Rg
112 Cn
113 Nh
114 Fl
115 Mc
116 Lv
117 Ts
118 Og
s-block (incl. He)
f-block
d-block
p-block (excl. He)
Lanthanides
57 La
58 Ce
59 Pr
60 Nd
61 Pm
62 Sm
63 Eu
64 Gd
65 Tb
66 Dy
67 Ho
68 Er
69 Tm
70 Yb
Actinides
89 Ac
90 Th
91 Pa
92 U
93 Np
94 Pu
95 Am
96 Cm
97 Bk
98 Cf
99 Es
100 Fm
101 Md
102 No

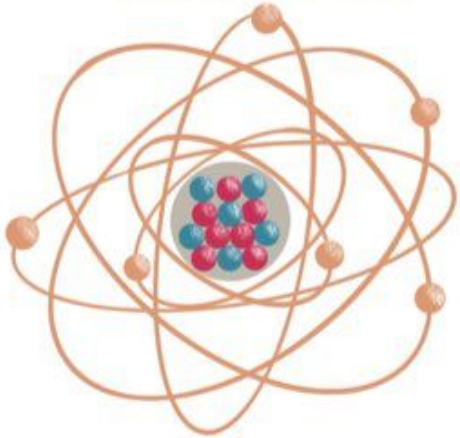
ISÓTOPOS ESTABLES

Carbono-12



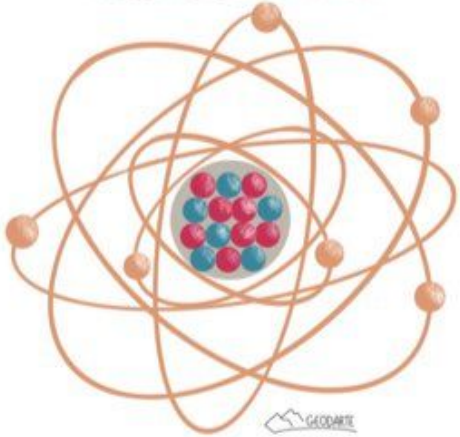
6 electrones
6 protones
6 neutrones

Carbono-13



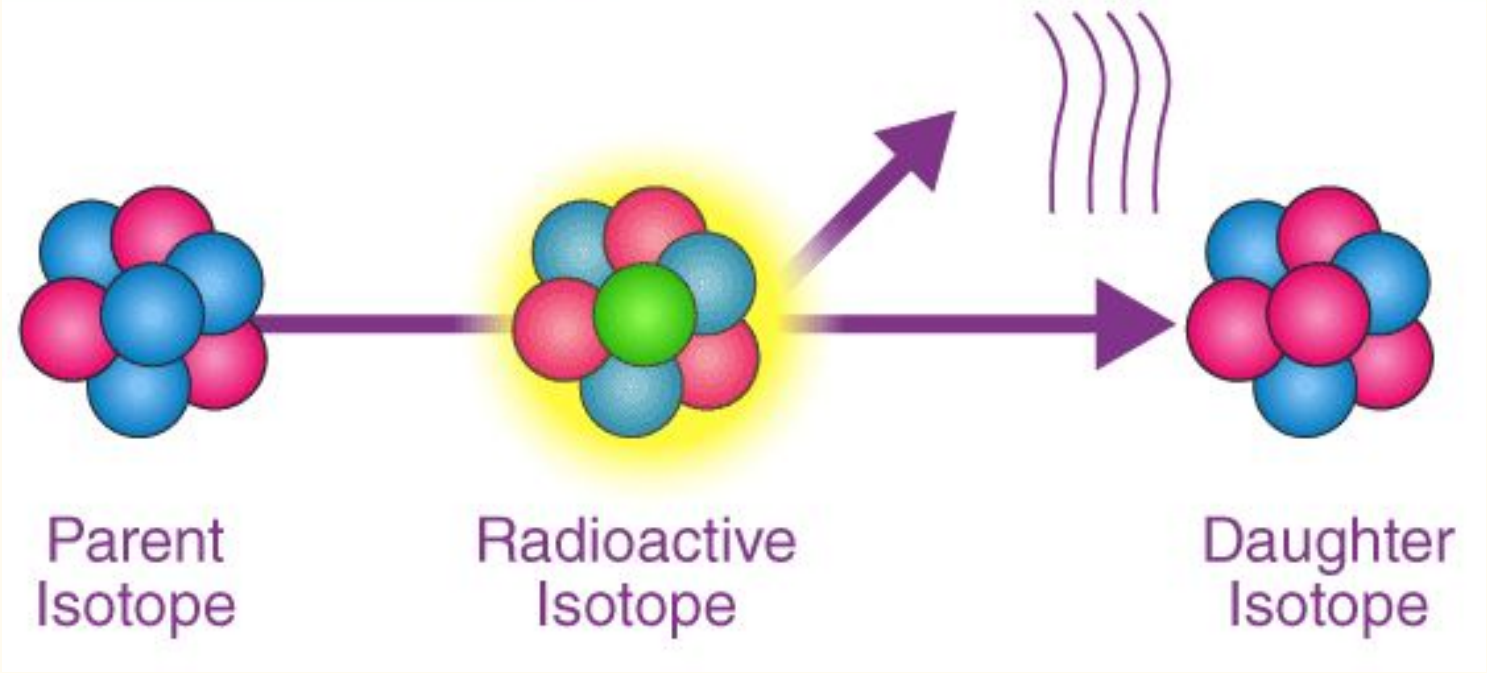
6 electrones
6 protones
7 neutrones

Carbono-14



6 electrones
6 protones
8 neutrones

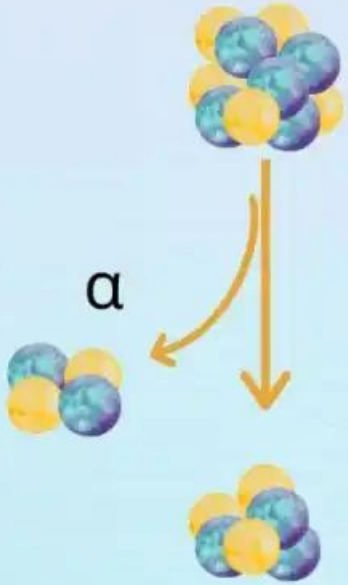
Neutrón Protón Electrón


Parent
Isotope
Radioactive
Isotope
Daughter
Isotope

Desintegración radiactiva

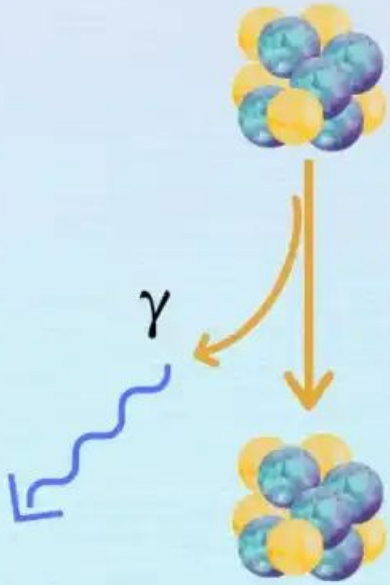
La radiactividad es la emisión de radiación ionizante de la desintegración nuclear.

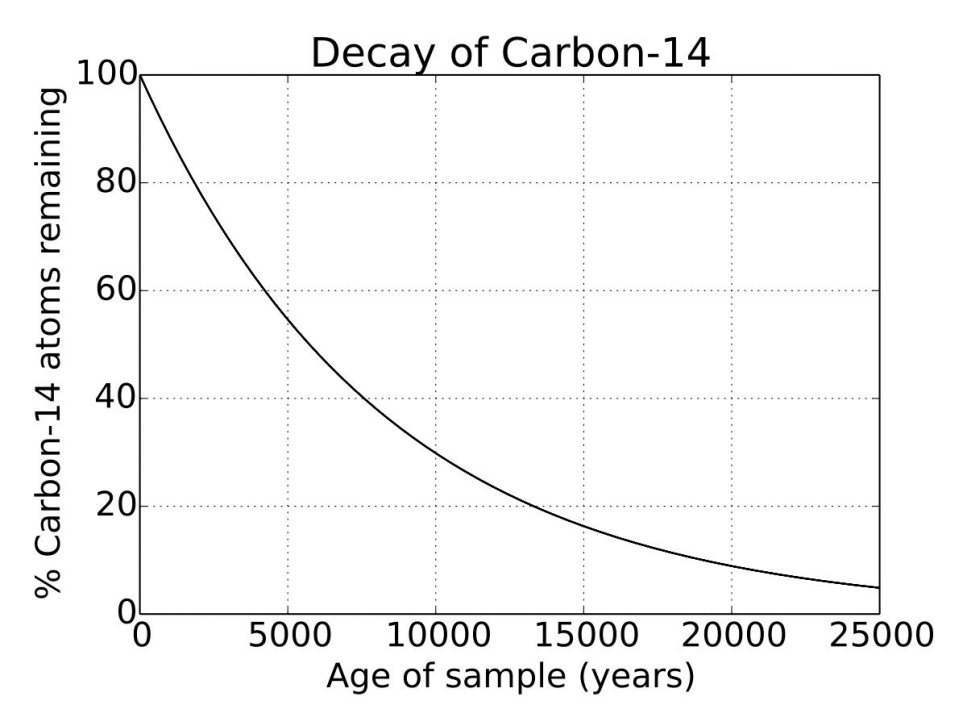
Desintegración alfa



Desintegración beta

Desintegración gamma





$$N(t) = N_0 \exp(-\lambda t)$$

$$\lambda = \frac{1}{\tau}$$