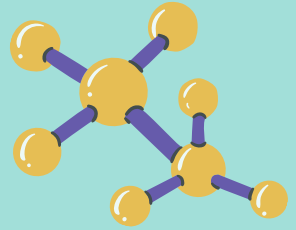
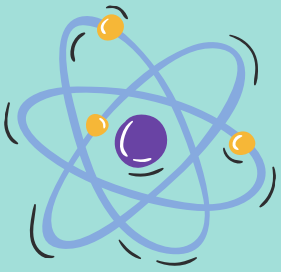


ANTIMATTER

Penelope Cortesi, Catia Guerra, Tibo Demaré,
Simon De Smet, Julia Scaccia, Tibo Vande Weghe

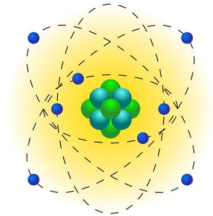


WHAT IS ANTIMATTER?

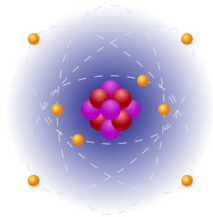
- it can be described as the "mirror of common matter" meaning that it's the same as matter but with the opposite charge
- a positron corresponds to an electron and an anti-proton to a proton
- it was created in the same way as matter: through the **BIG BANG**
- it can be artificially made using particle-accelerators



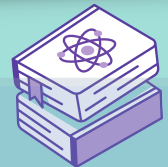
- + ● Proton
- ● Neutron
- ● Electron



- ● Antiproton
- ● Antineutron
- + ● Positron



THE HISTORY OF ANTIMATTER



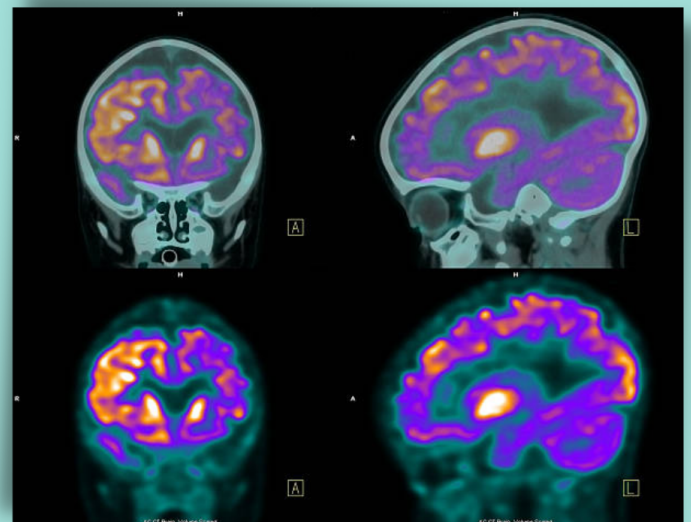
- in **1928** Paul Dirac in "The Quantum Theory of the Electron" predicted the existence of an anti-electron
- in **1932** Carl Anderson officially discovered the positron
- in **1955**, the scientific team led by Emilio Segrè and Owen Chamberlain stated the existence of the anti-proton
- in **1964** James Cronin and Val Fitch demonstrated that matter and antimatter don't have a fully symmetrical behaviour
- In **1995** research teams from CERN and Chicago's Fermilab artificially synthesized the antihydrogen

$$(i\partial - m)\psi = 0$$



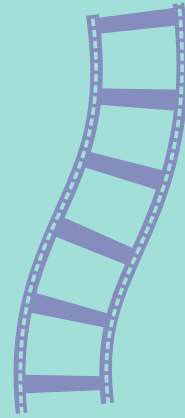
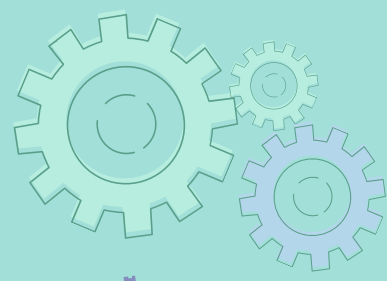
HOW IS IT APPLIED?

- **penning traps** can hold charged antiparticles that keep them inside by use of magnetic and electric forces
- **PET** allows to take precise images within the human body and find diseases like tumors



HOW COULD IT BE APPLIED?

- it could be used to make explosive weapons way more dangerous than nuclear bombs
- possible fuel for spacecraft
- PROBLEM: it is very hard to contain and manage since it instantly reacts with any kind of matter and obliterates itself



WHAT ARE ITS MYSTERIES?

- theoretically matter and antimatter were created in equal amounts: where did all the antimatter go?
- some antimatter could have escaped from the grasp of matter: is there an antiworld?
- we know for a fact that matter falls down: does antimatter fall up?



HOW DOES POP CULTURE PORTRAY IT?

- in Star Trek antimatter is used as a common energy source
- In the Marvel Universe the "negative zone" is a parallel universe made out of antimatter
- legendary Pokémon Giratina is thought to be the living personification of antimatter
- Angels and Demons images an antimatter bomb

