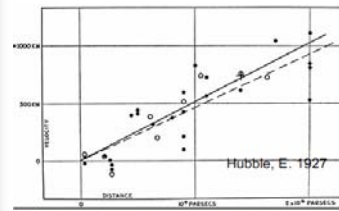


El principio del tiempo

Prof: Patricio Rojo

Expansión

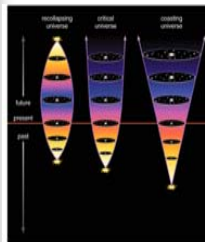
- A gran escala, todo se aleja



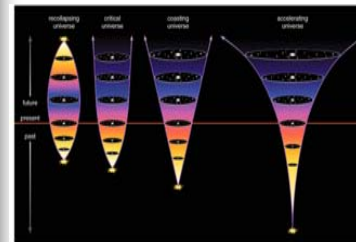
El tiempo



El tiempo

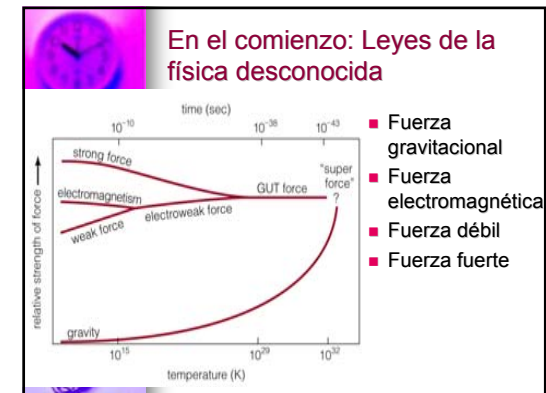
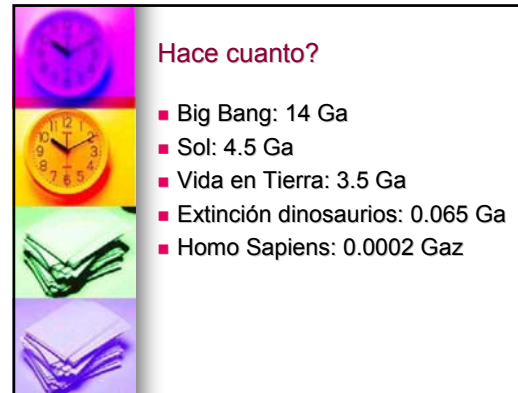


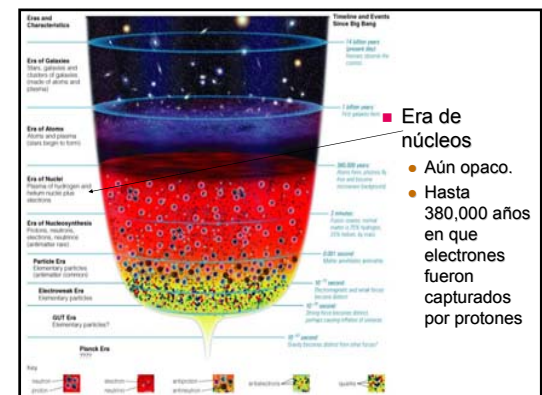
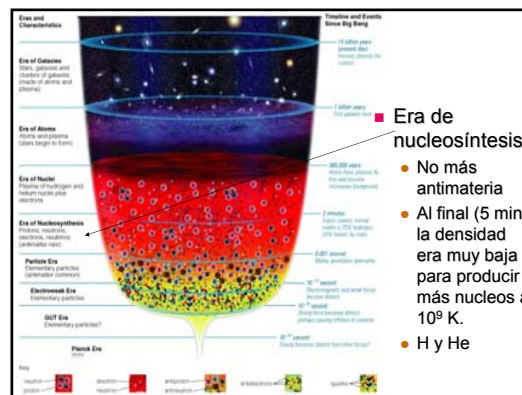
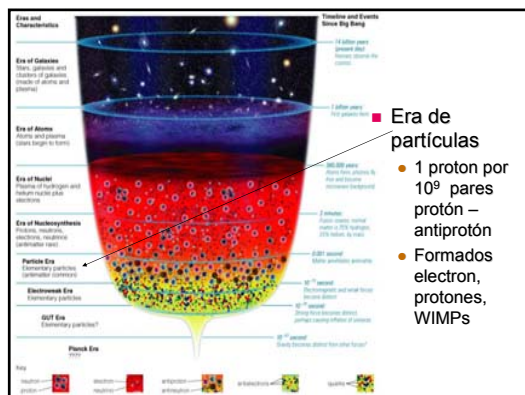
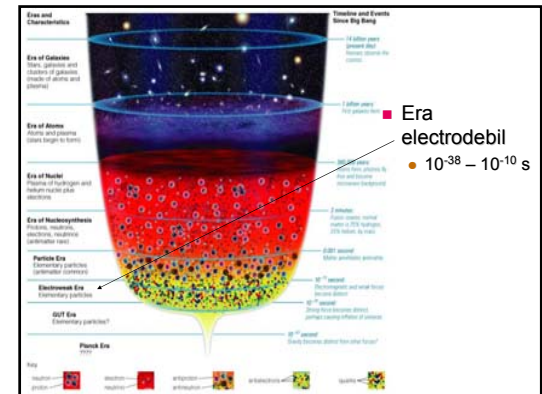
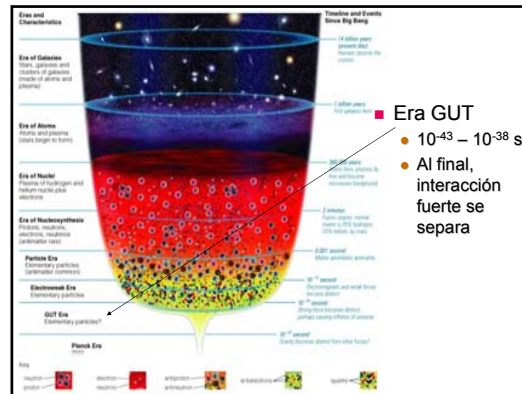
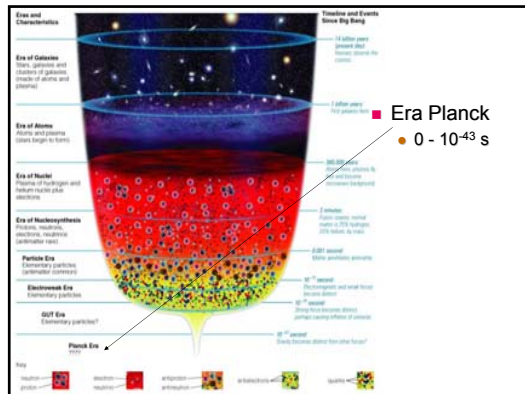
El tiempo

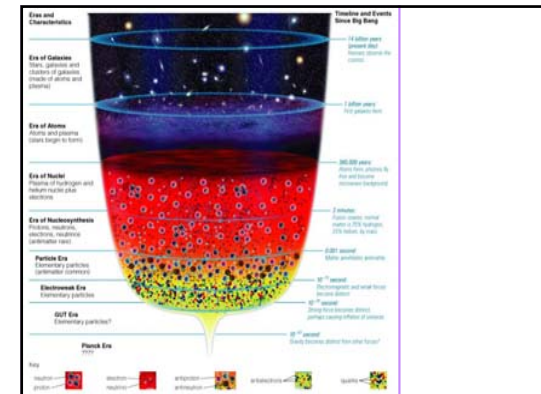
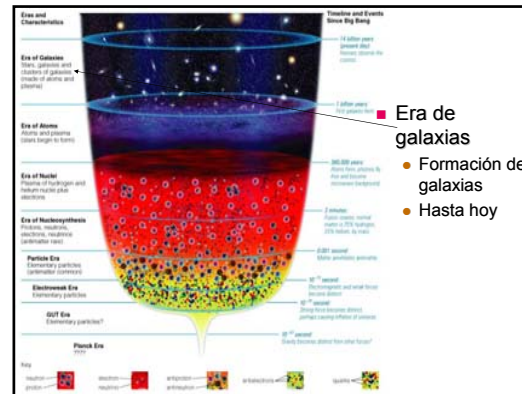
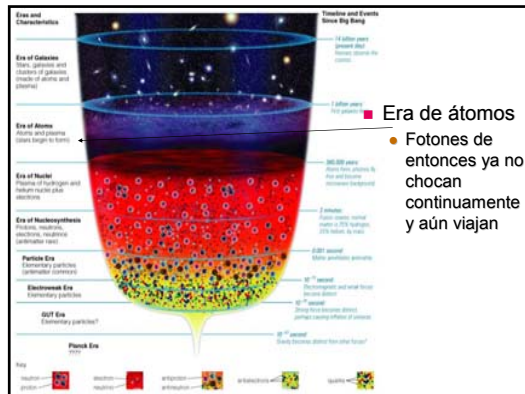


Big Bang

- Originalmente, termino fue usado en forma despectiva.

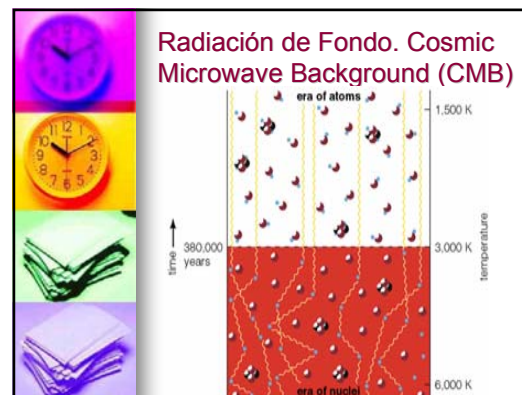






Evidencias?

- Abundancias de elementos
- Radiación de fondo



CMB

- Penzias & Wilson 1965
- Descubridores sin querer del CMB

CMB

- CMB liberado a 3000K
 - Peak en el visible!
 - Actualmente el universo 1000 veces más grande.
 - Redshift en 1000x

Distribución espacial CMB

- Inhomogeneidades 1 en 10.000
 - Pero existen

Abundancias de elementos

- En los primeros segundos, después de 0.001
 - Protones ↔ neutrones
- Lentamente
 - Protones preponderantes
 - Y justo al momento en que Helio estable:
 - 7 protones x 1 neutron

Abundancia de elementos

Step 1
Proton and neutron fuse to form a deuterium nucleus.

Step 2
Two deuterium nuclei fuse to make hydrogen-3.

Step 3
Hydrogen-3 fuses with deuterium to create helium-4.

Key:
● neutron
● proton

Big Bang predice 75%H, 25%He

during helium synthesis: 4 protons, 2 neutrons

after helium synthesis: 12 hydrogen, 1 helium

atomic mass = 12, atomic mass = 4