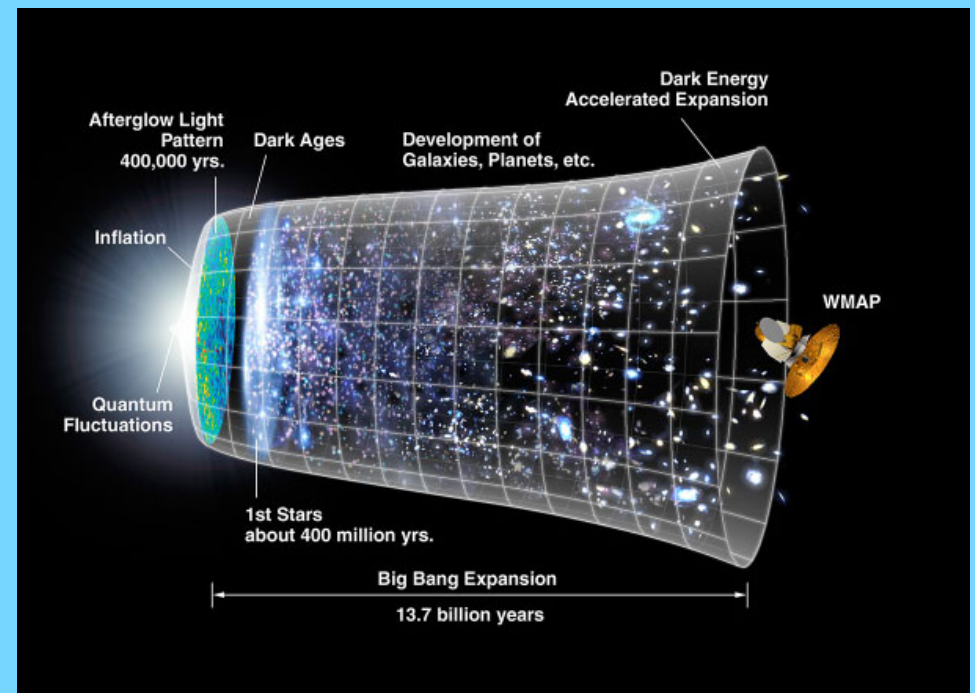
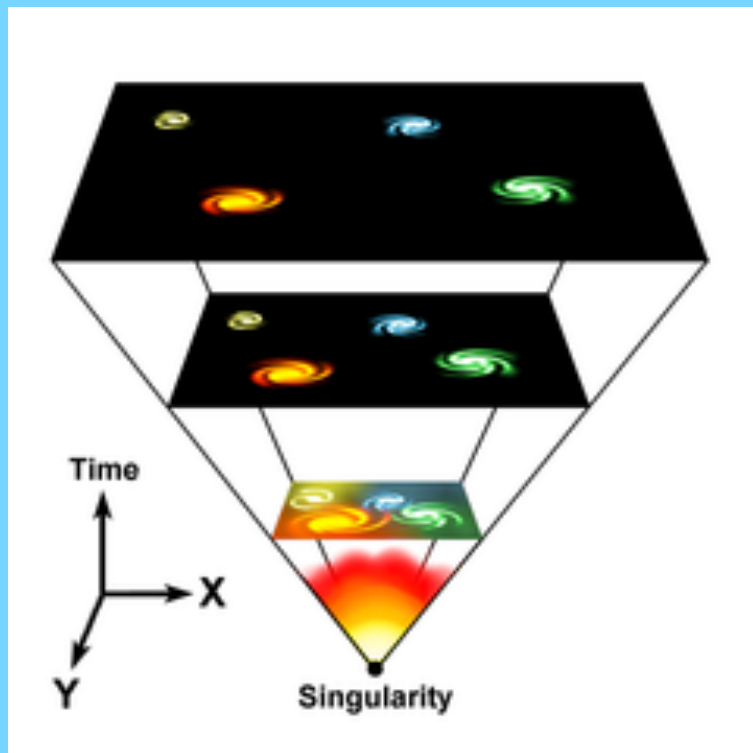


Origin of the Universe

Kenza Arraki

10/08/2009



Historical Overview

Size of the universe

1901 - Olber's Paradox

http://en.wikipedia.org/wiki/File:Olber%27s_Paradox_-_All_Points.gif

1920 - The Great Debate

Shapely & Curtis

Historical Overview

Einstein

1916 - General Relativity

Cosmological Constant

Strong desire to find a static universe

Historical Overview

Hubble

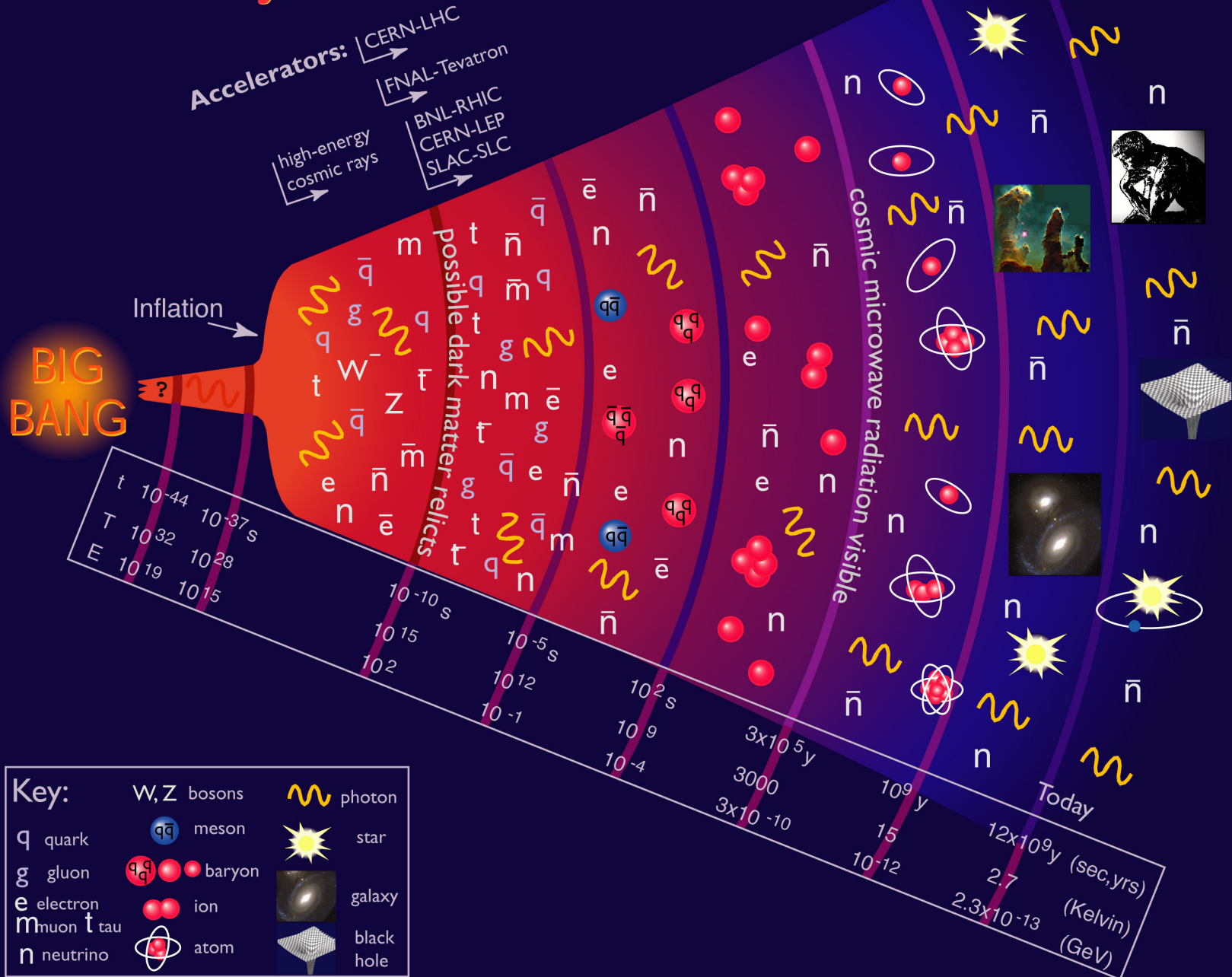
1925 - Cepheid Variable stars

Solution to the Great Debate

1929 - Distance and radial velocity

Expanding Universe

History of the Universe



Big Bang

What does it successfully explain?

- Expansion of the Universe
- Abundance of the light elements
- Properties of the CMB

Big Bang

Expansion of the Universe

- Hubble's Law

$$v = H_0 * D$$

- Preferred Reference Frame
- Center point

Big Bang

Abundance of the light elements

- H, D, He, and Li abundances

Started 3 min after BB

Ended 20 min after BB

- Observations

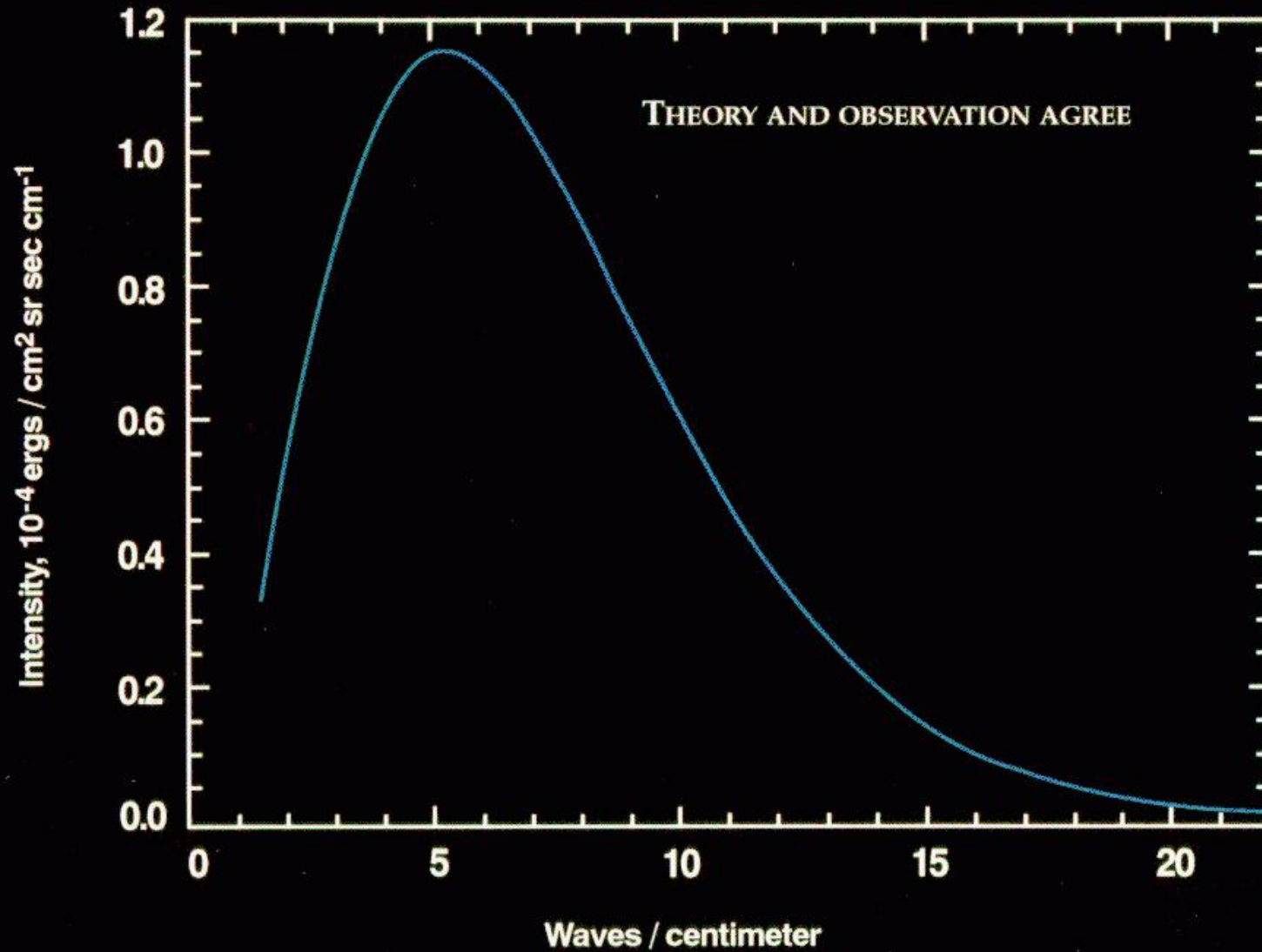
1970's - Not enough matter

1990's - High redshift clouds

2000's - Calculated values from CMB

Big Bang

COSMIC MICROWAVE BACKGROUND SPECTRUM FROM COBE

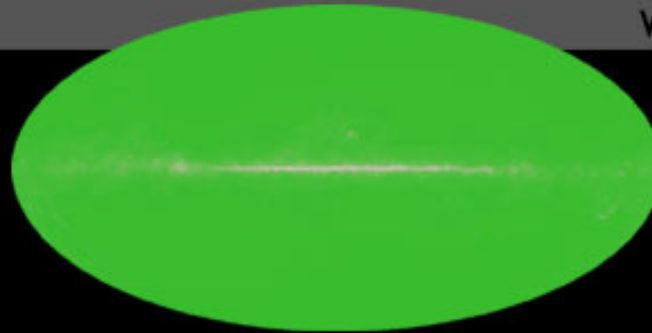


Big Bang

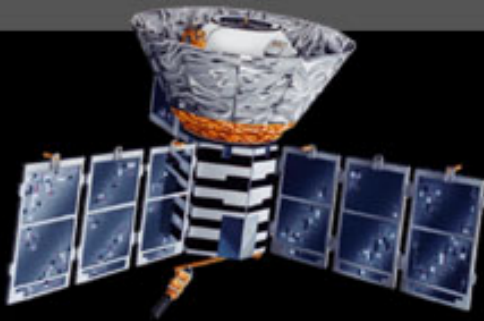
1965



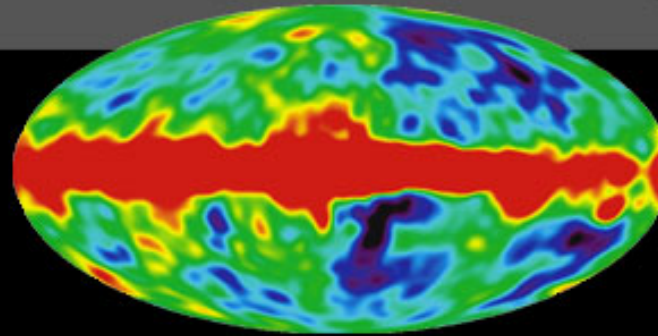
Penzias and
Wilson



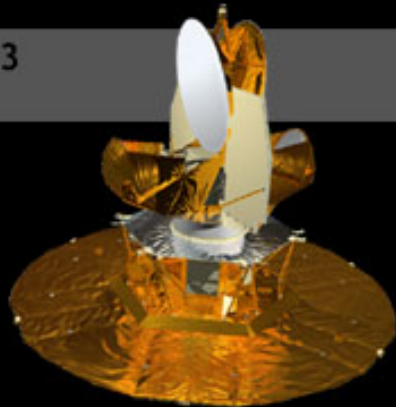
1992



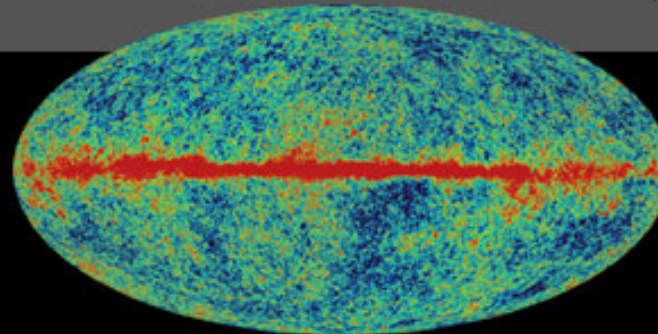
COBE



2003

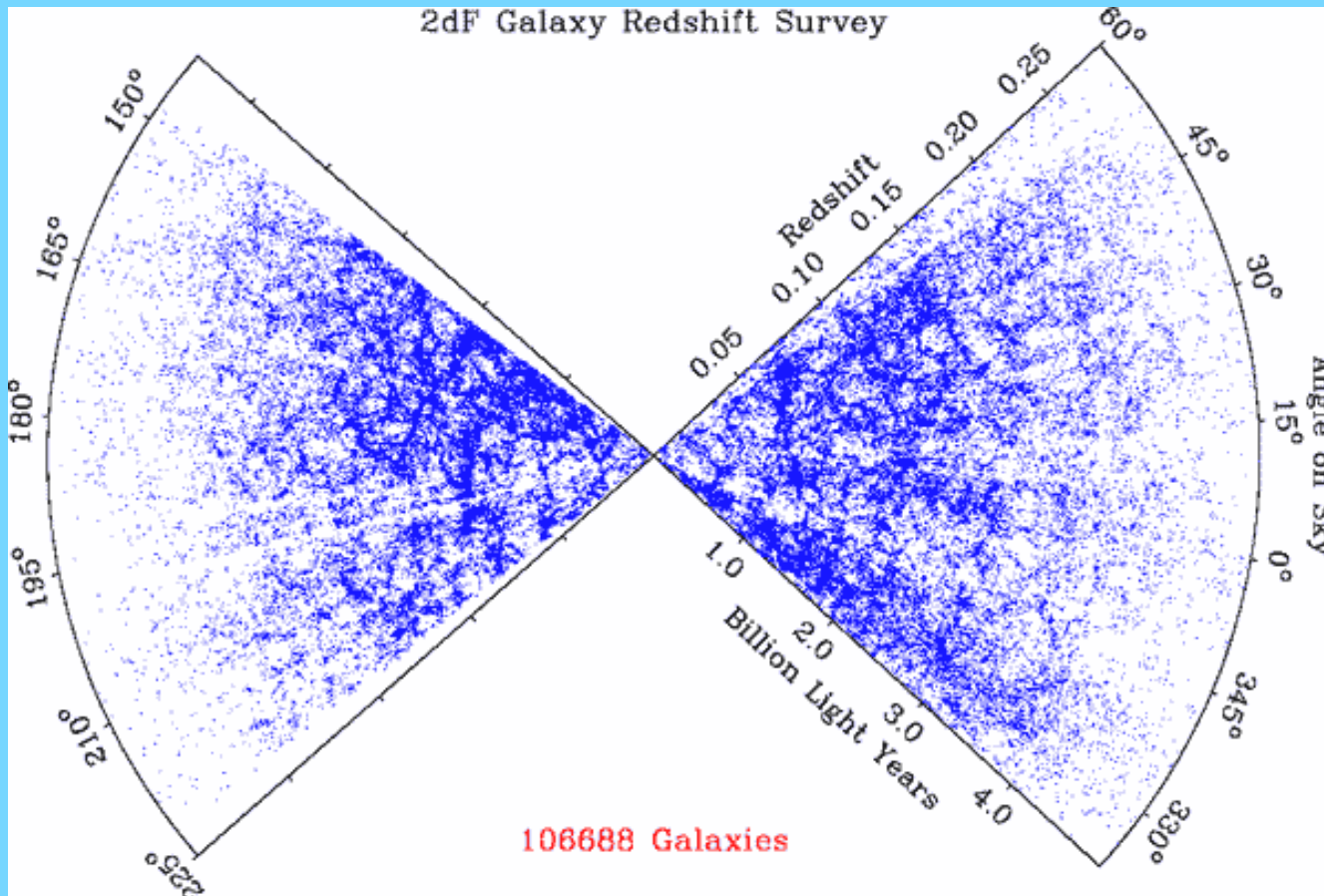


WMAP



Ground Based Missions

- SDSS
- Two degree field



Inflation

What does it successfully explain?

- Large size and uniformity of the universe
- Flatness of the universe
- Origin of lumpiness