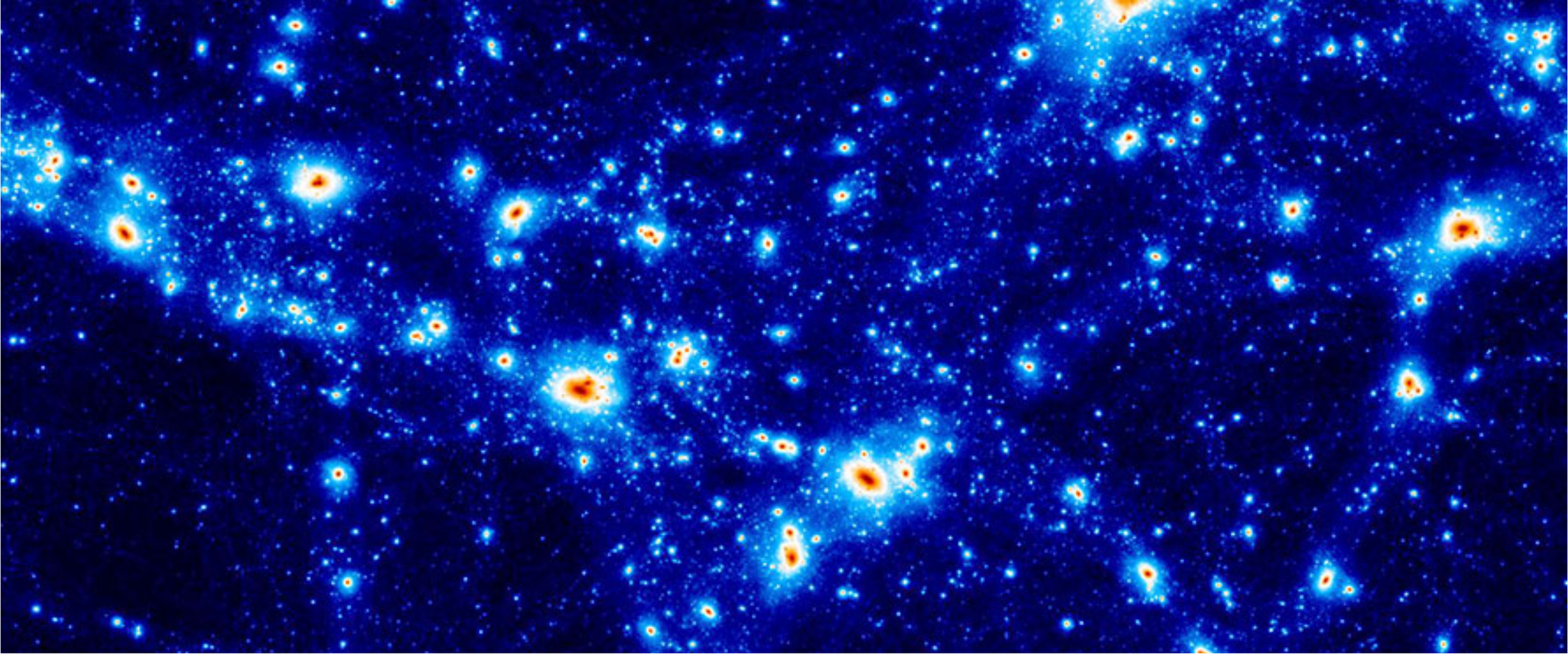
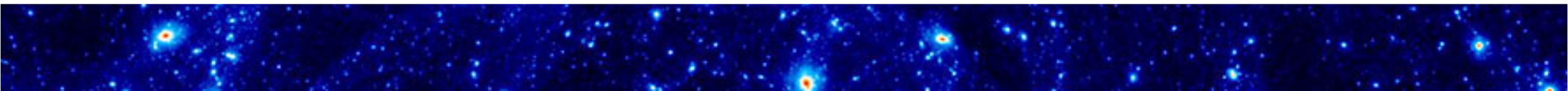
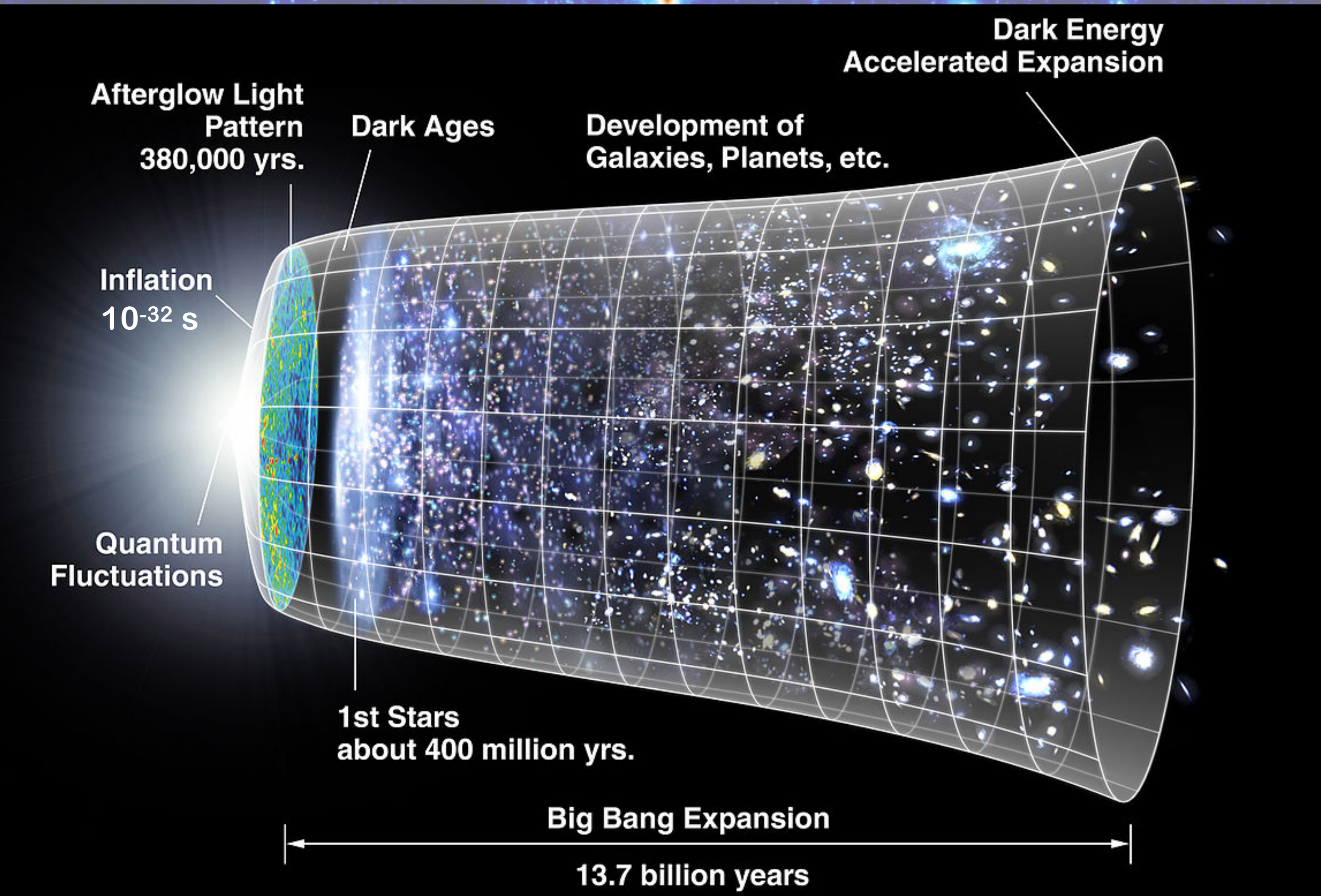


INTRODUCTION TO COSMOLOGY

针对两个无穷的物理研究 2019



A BRIEF HISTORY OF THE UNIVERS



A BRIEF HISTORY OF THE UNIVERS

Dark Energy
Accelerated Expansion

Afterglow Light
Pattern
380,000 yrs.

Dark Ages

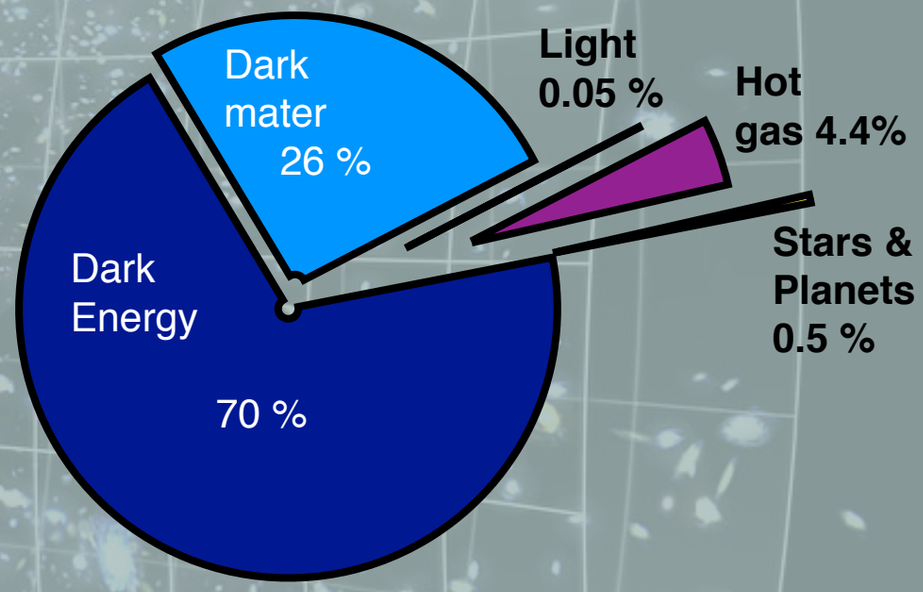
Development of
Galaxies, Planets, etc.

Inflation

Quantum
Fluctuations

≃96 % of the energy content of the Univers
is from the dark sector :

- 26 % in the form of dark matter:
  Elementary particles yet to be seen
- 70 % in the form of Dark energy: A
  background field pervading the entire
  Univers



⇒ 96 % of the content of the Univers is
still a total mystery to us.

1st Stars
about 400 million yrs.

Big Bang Expansion

13.7 billion years

ORDER OF MAGNITUDE

Cosmology also goes down to the Planck scale …

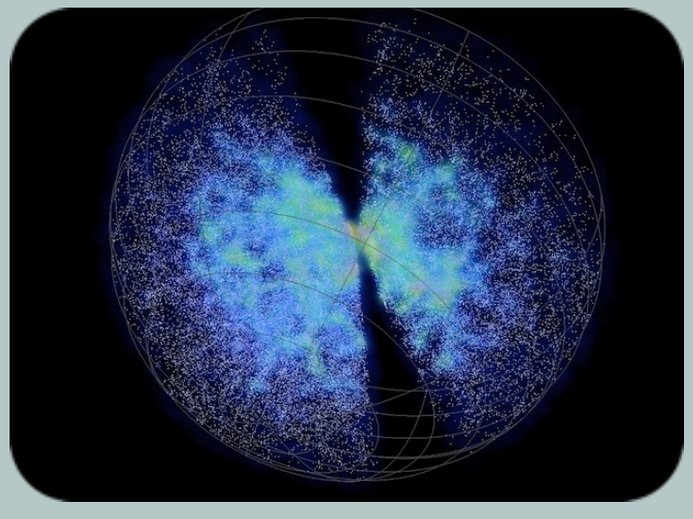
… but for now we are more interested in large scale !

Solar system:

- size: Billion of km (10^9 km)
- 1 Astronomical Unit (AU): 1.5×10^8 km
- Voyager reaches 128 AU

Galaxies:

- size: Few 10 of kpc
- 1 parsec (pc) ≃ 3 lyrs ≃ 3×10^{13} km
- Contains billions of stars



Observable Univers:

- size: 10 Gpc ≃ 10^{23} km
- Contains ≃ 10^{11} galaxies

HOW TO DESCRIBE THE UNIVERS