

Отображение вселенный

우주를 지도로 나타내기

Mapping the Universe

Lập bản đồ vũ trụ

새벽녘에서 지금에, 瞭解宇宙

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Berkeley Center for Cosmological Physics

LBNL & Physics Department University of California at Berkeley

Institute for the Early Universe (IEU)

Ewha W. University & Academy of Advanced Studies

Chaires Blaise Pascal --- Paris Center for Cosmological Physics (PCCP)

Université Sorbonne Paris Cité - Université Paris Diderot - APC

Extreme Universe Laboratory Lomonosov Moscow State University

Cosmology and Astrophysics Research Center (CARC) TNU China

“Cosmic Scene Investigation” 宇宙場面調査

Место действия - Космос

The Dawning of the Universe

L' Aube de l' Univers

破曉宇宙, 우주의 날이 새기



www.csi-fanpage.de

Relics of Creation

Di tích của tạo hóa

Реликты Творения

創建遺物, 작성의 유적

Reliques de la Création

Professor George F. Smoot

IEU & Ewha University, Seoul

Physics Department & LBNL

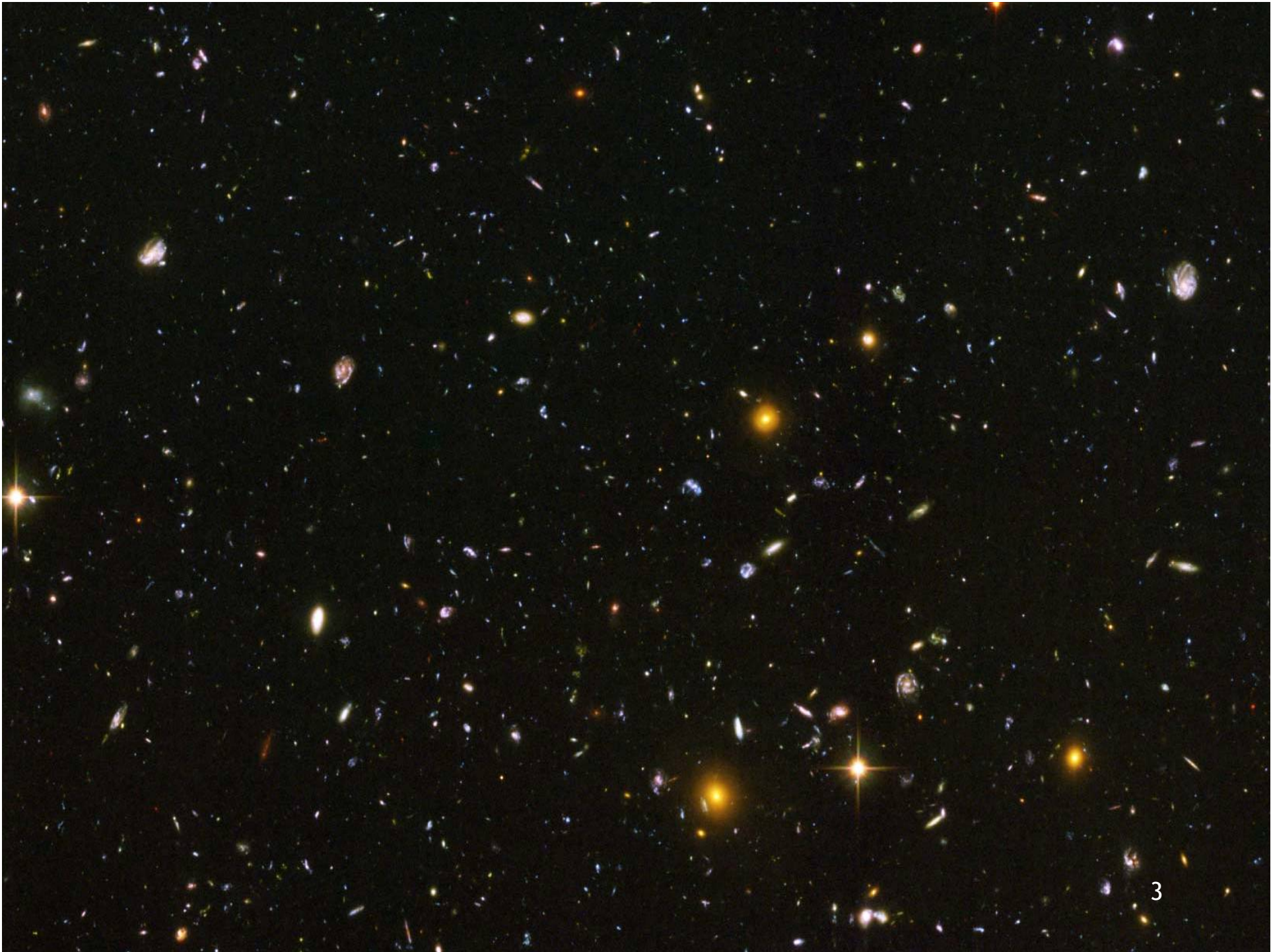
University of California at Berkeley

Chaires Blaise Pascal – PCCP

Université Sorbonne Paris Cité –

Université Paris Diderot - APC

EUL Moscow State University



CSI Primary Tool:

밖으로 보기 공간으로
또한 때 맞추어 회고하고 있다

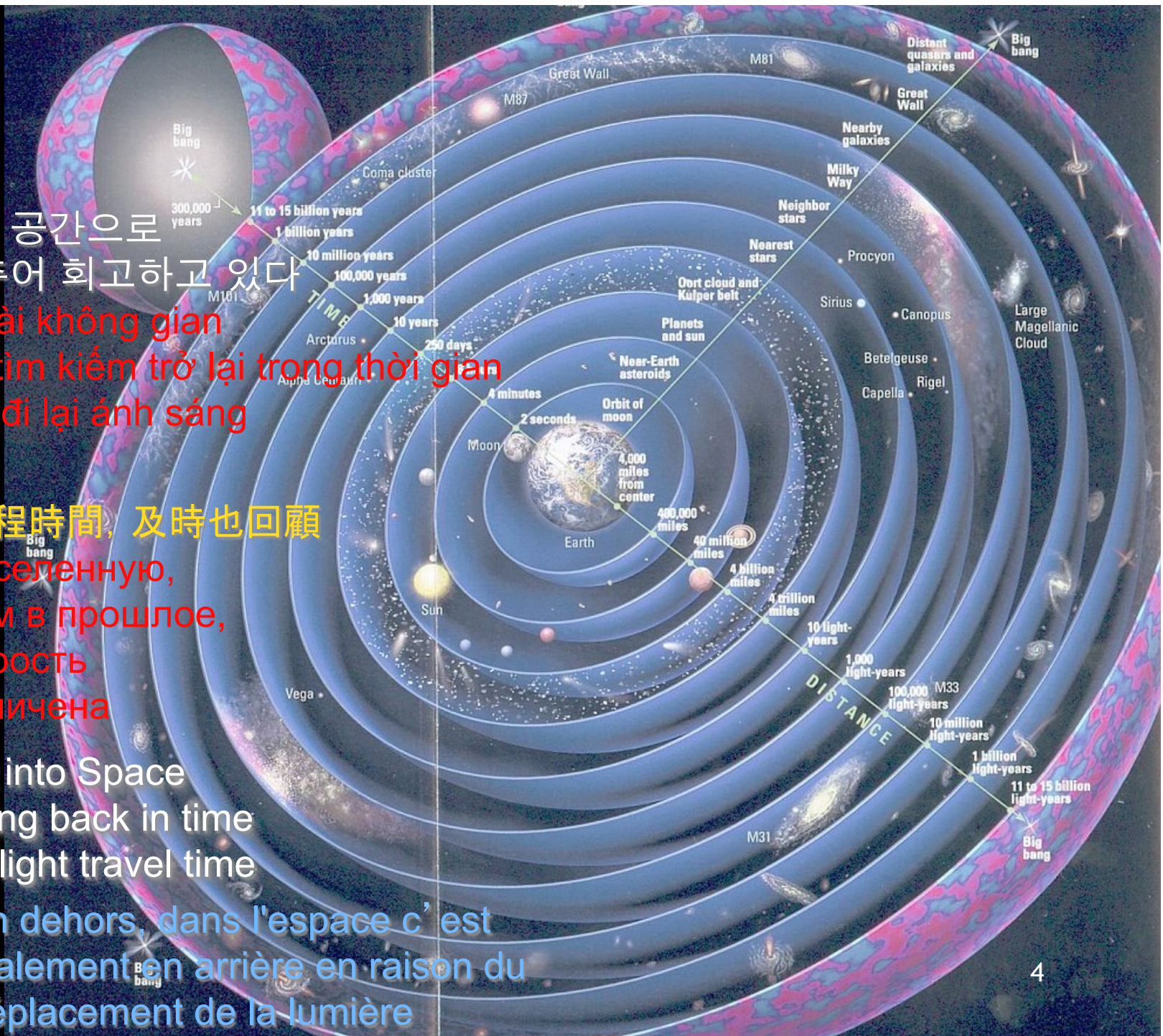
Nhìn ra ngoài không gian
Cũng đang tìm kiếm trở lại trong thời gian
Vì thời gian đi lại ánh sáng

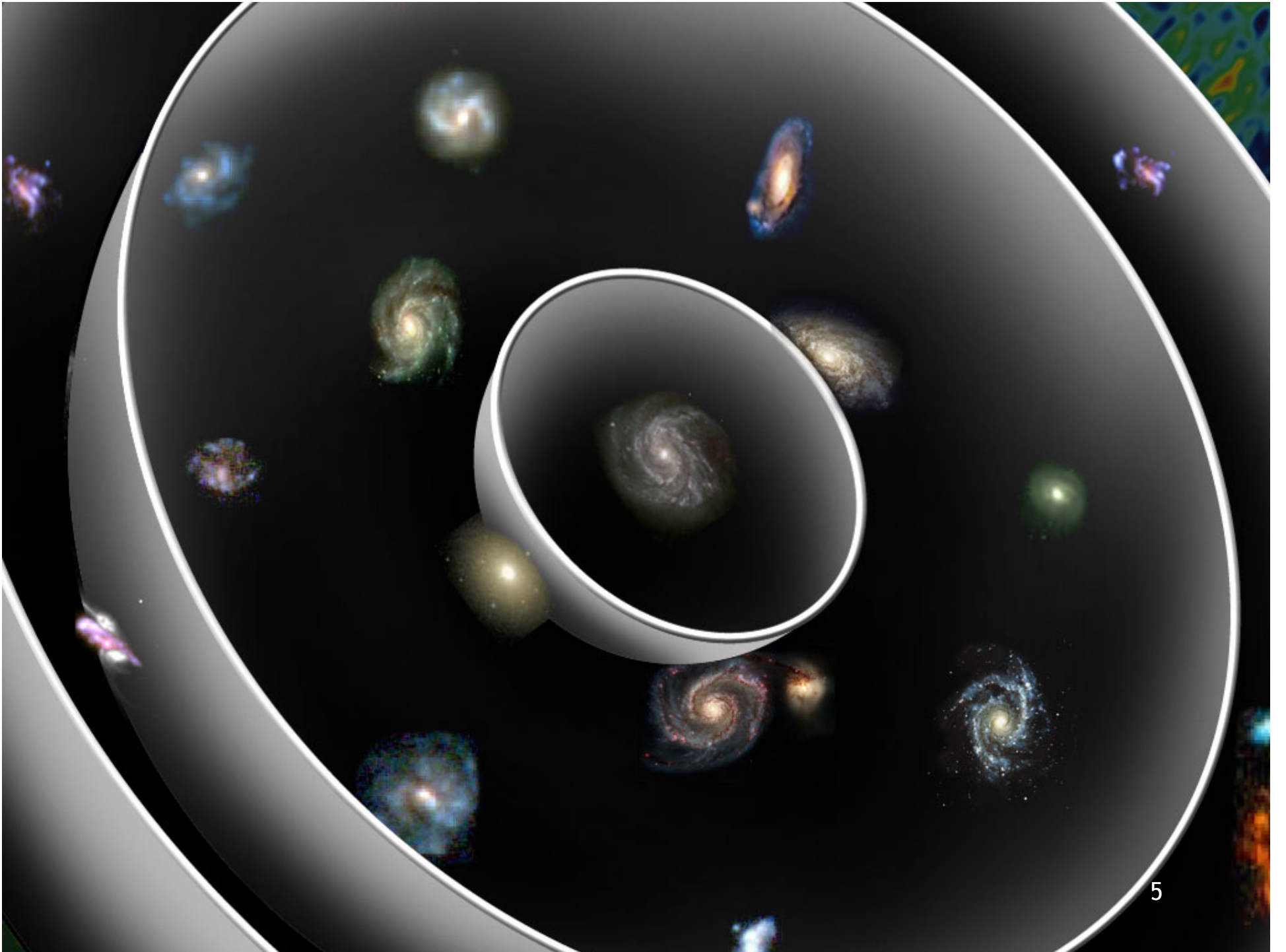
查找到空間
由於輕的行程時間, 及時也回顧

Глядя на Вселенную,
мы смотрим в прошлое,
так как скорость
света ограничена

Looking out into Space
Is also looking back in time
Because of light travel time

Regarder en dehors, dans l'espace c'est
regarder également en arrière en raison du
temps de déplacement de la lumière

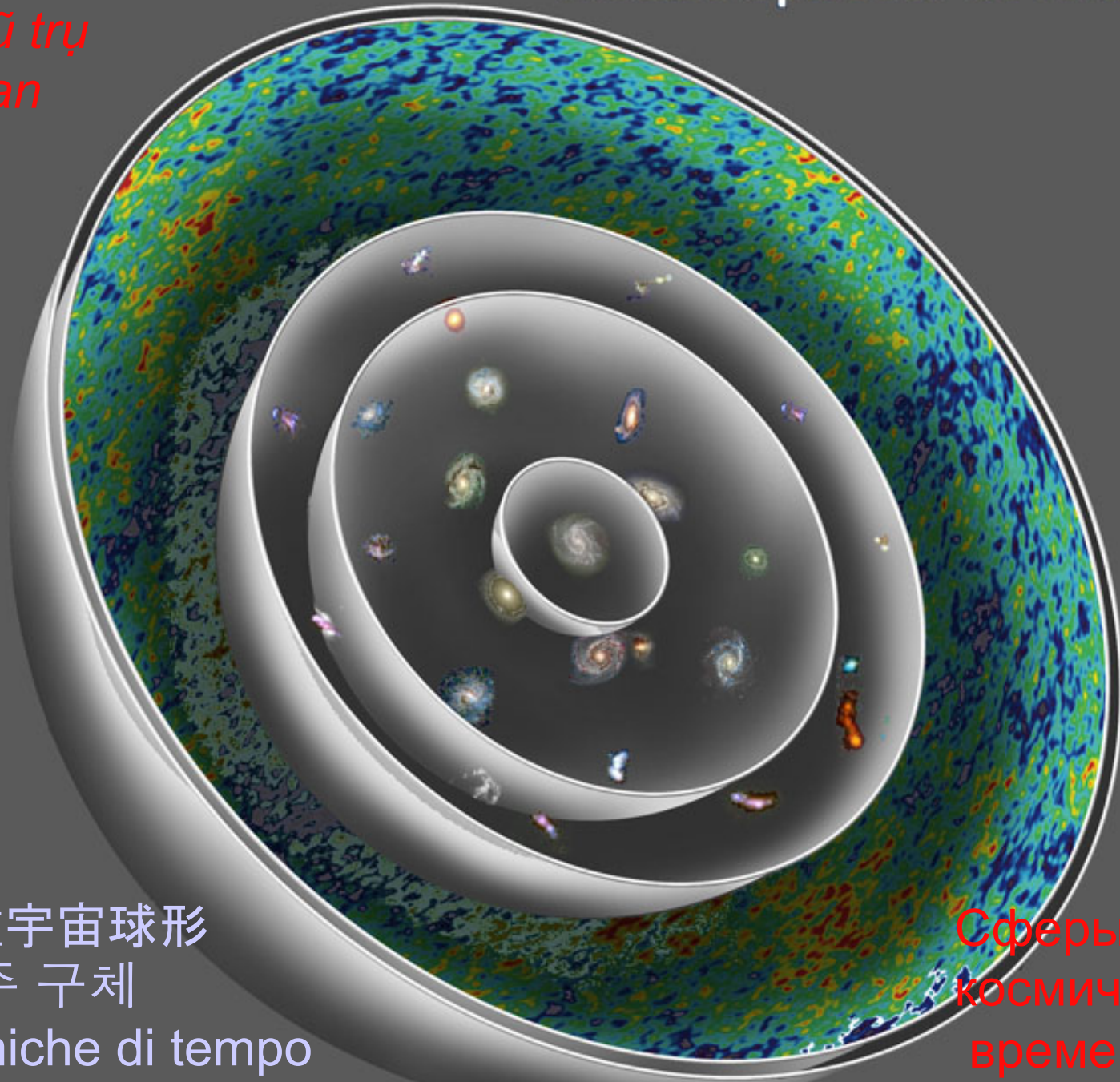




Sphères Cosmiques du Temps

Cosmic Spheres of Time

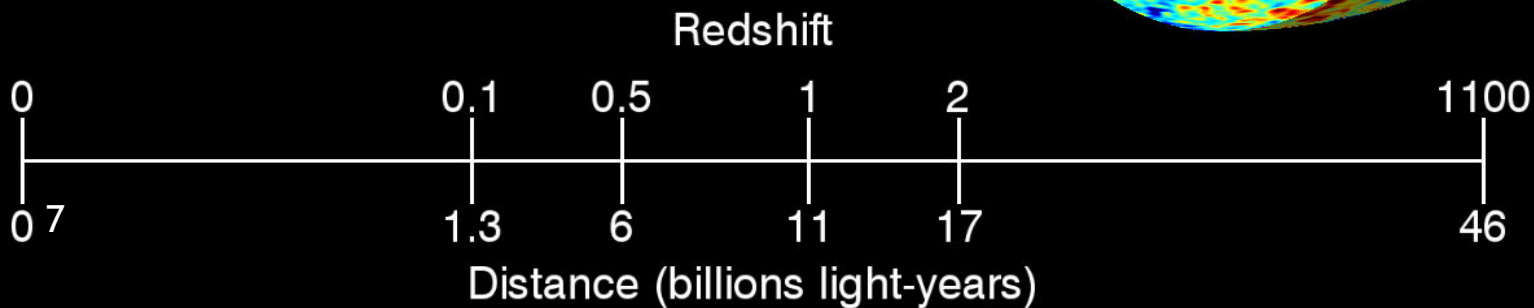
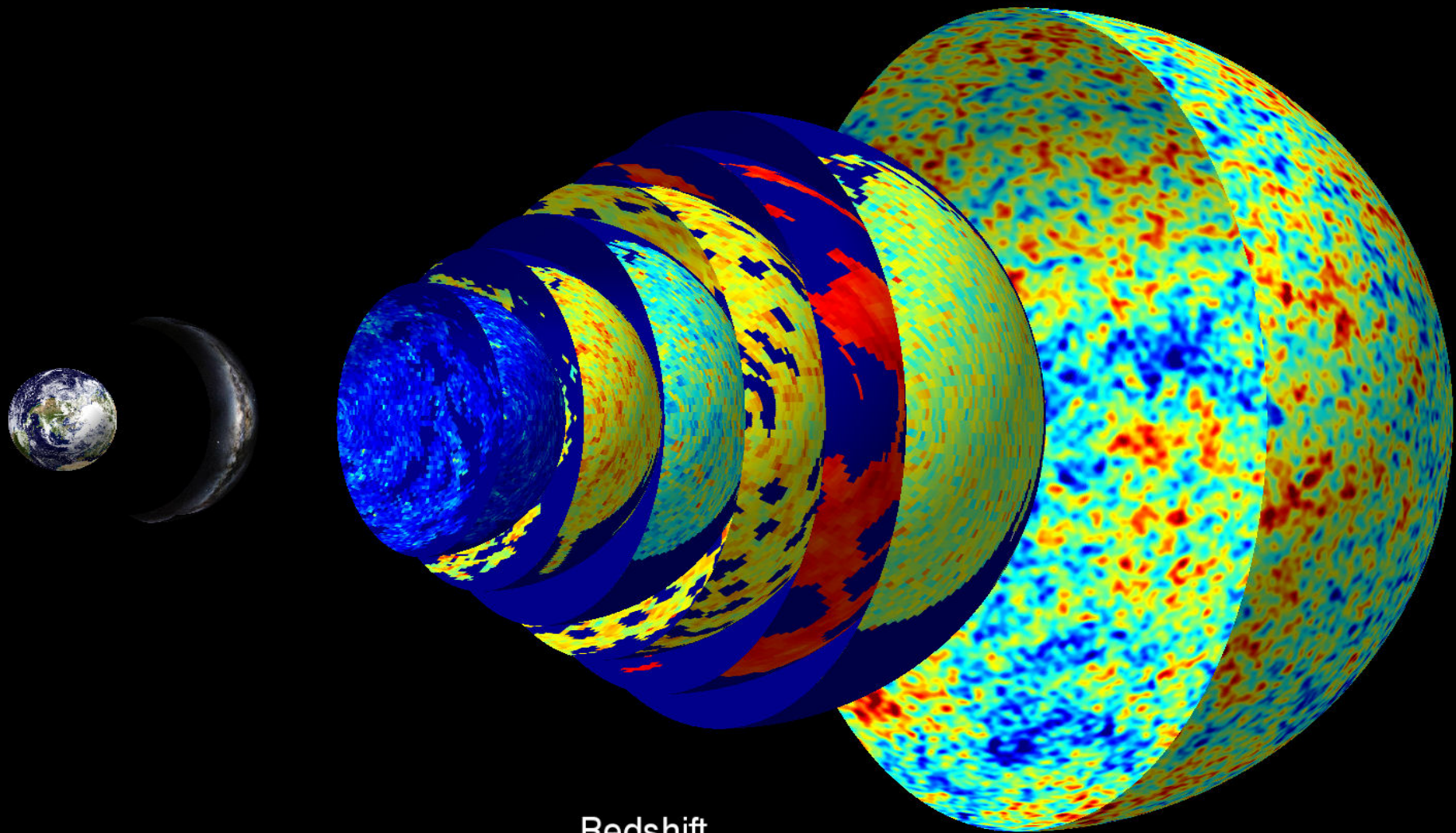
*Lĩnh vực vũ trụ
của thời gian*



時間和距離宇宙球形
시간의 우주 구체
Sfere cosmiche di tempo

Сферы
космического
времени

Maps of Universe vs. distance/redshift/time



CMB Missions Revolutionise Our Understanding of the Universe

PLANCK



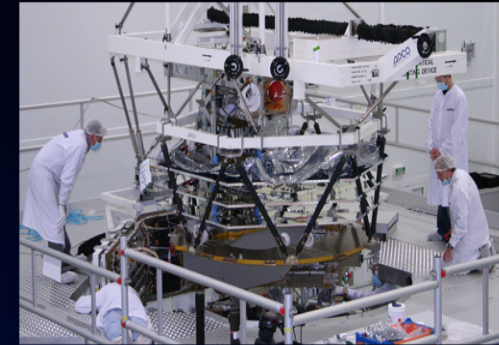
1989



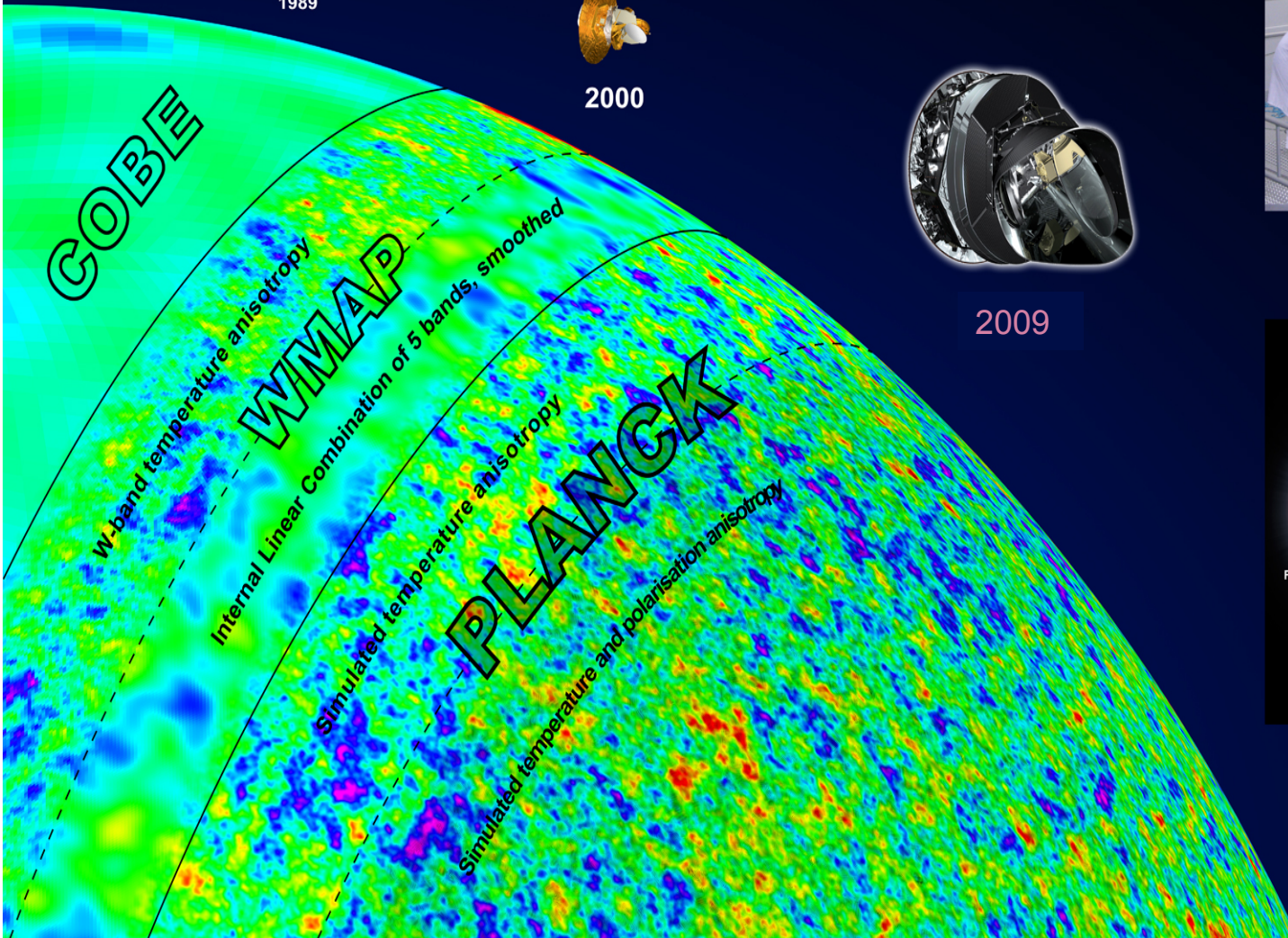
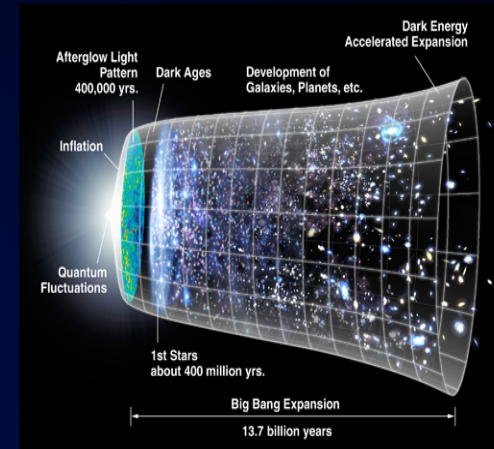
2000



2009



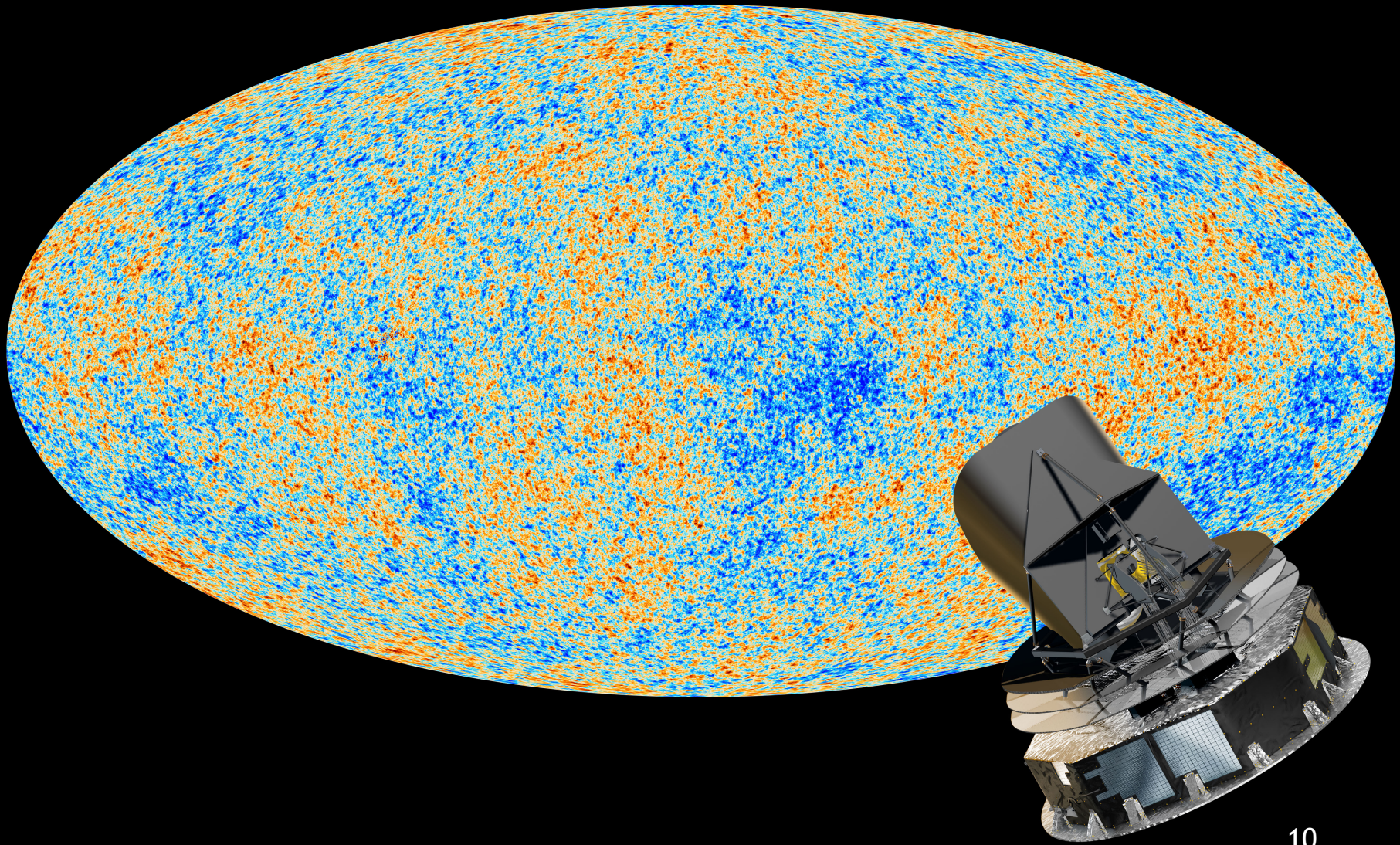
Planck spacecraft in clean assembly at Alcatel Alenia Space in January 2007



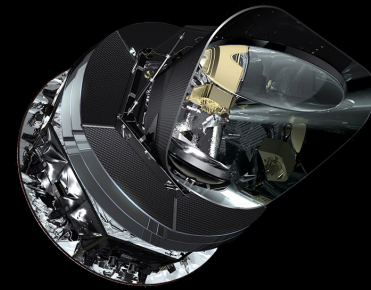
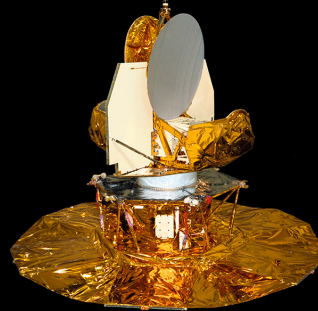
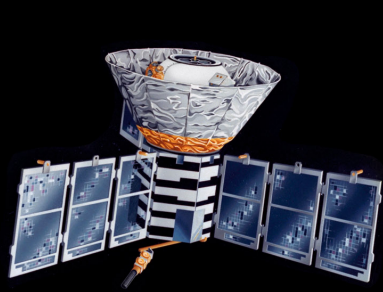
Planck Maps the Microwave Sky

Planck отображает микроволновое небо

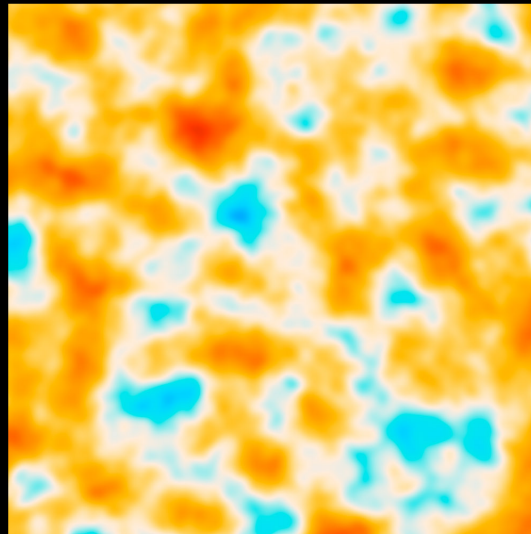
Planck 2013 CMB Map



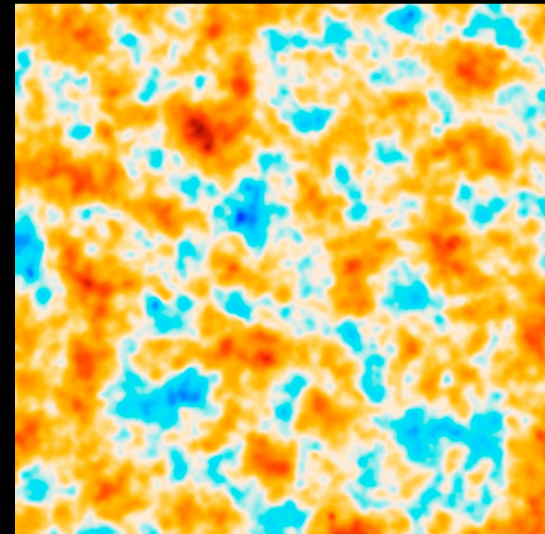
Higher Resolution Views



COBE

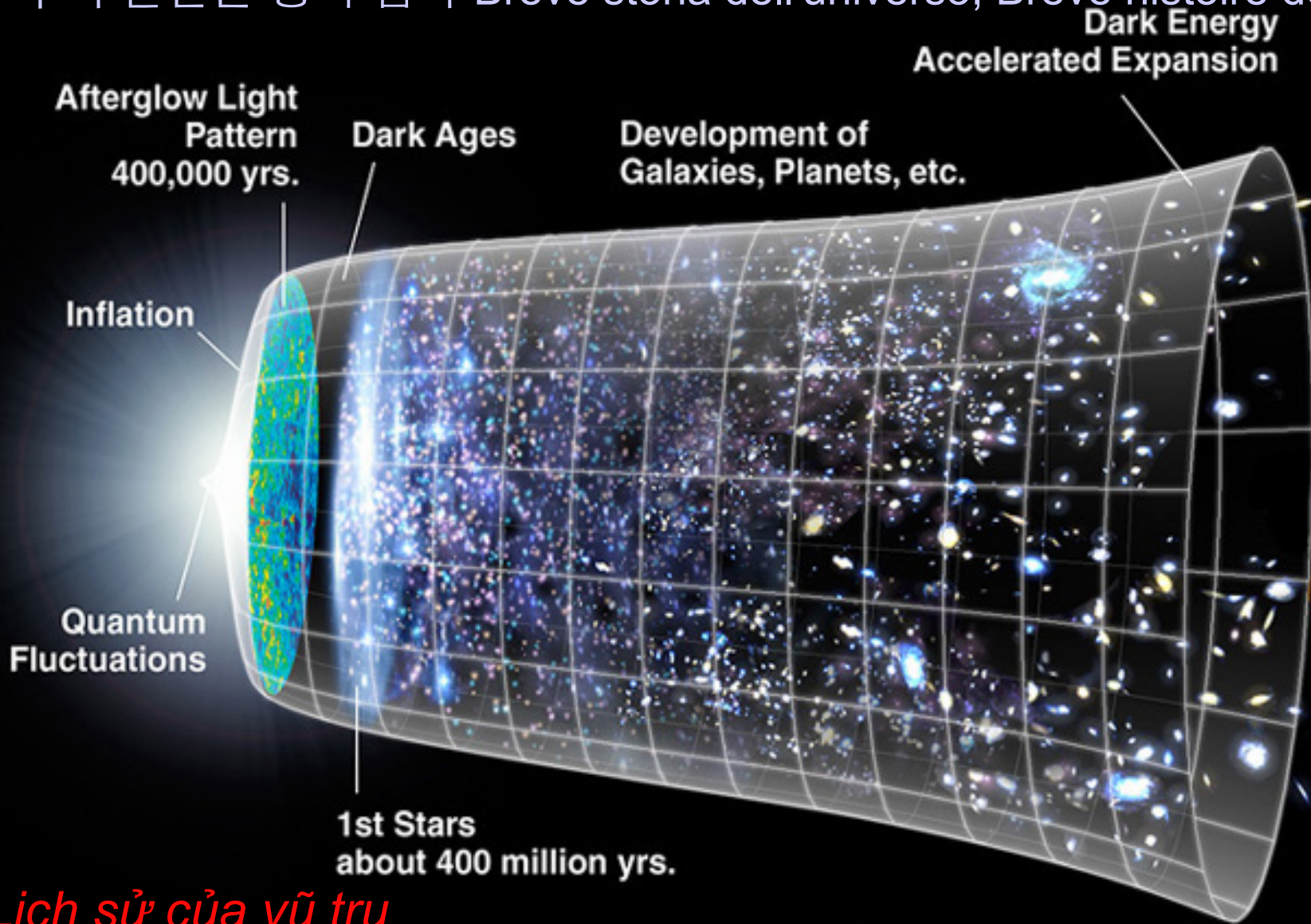


WMAP



Planck

우주의 간단한 병력 검사 Breve storia dell'universo; Brève histoire de l'univers



Lịch sử của vũ trụ

Big Bang Expansion

13.7 billion years

Краткая история Вселенной 宇宙的簡史

Brief History of the Universe

1 million galaxies

1 triệu thiên hà

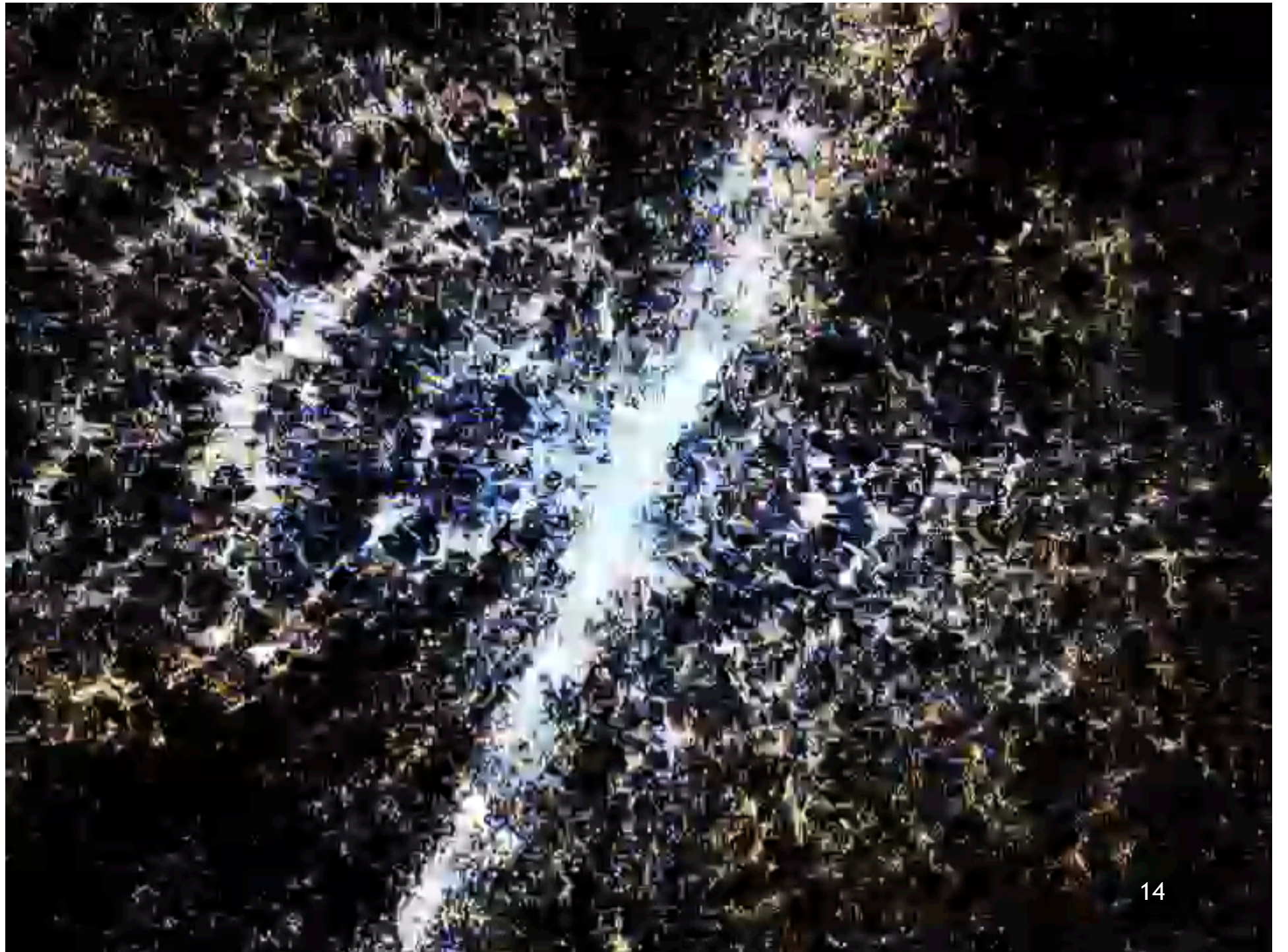
1百萬星系

1백만개의 은하

1 млн галактик

SDSS

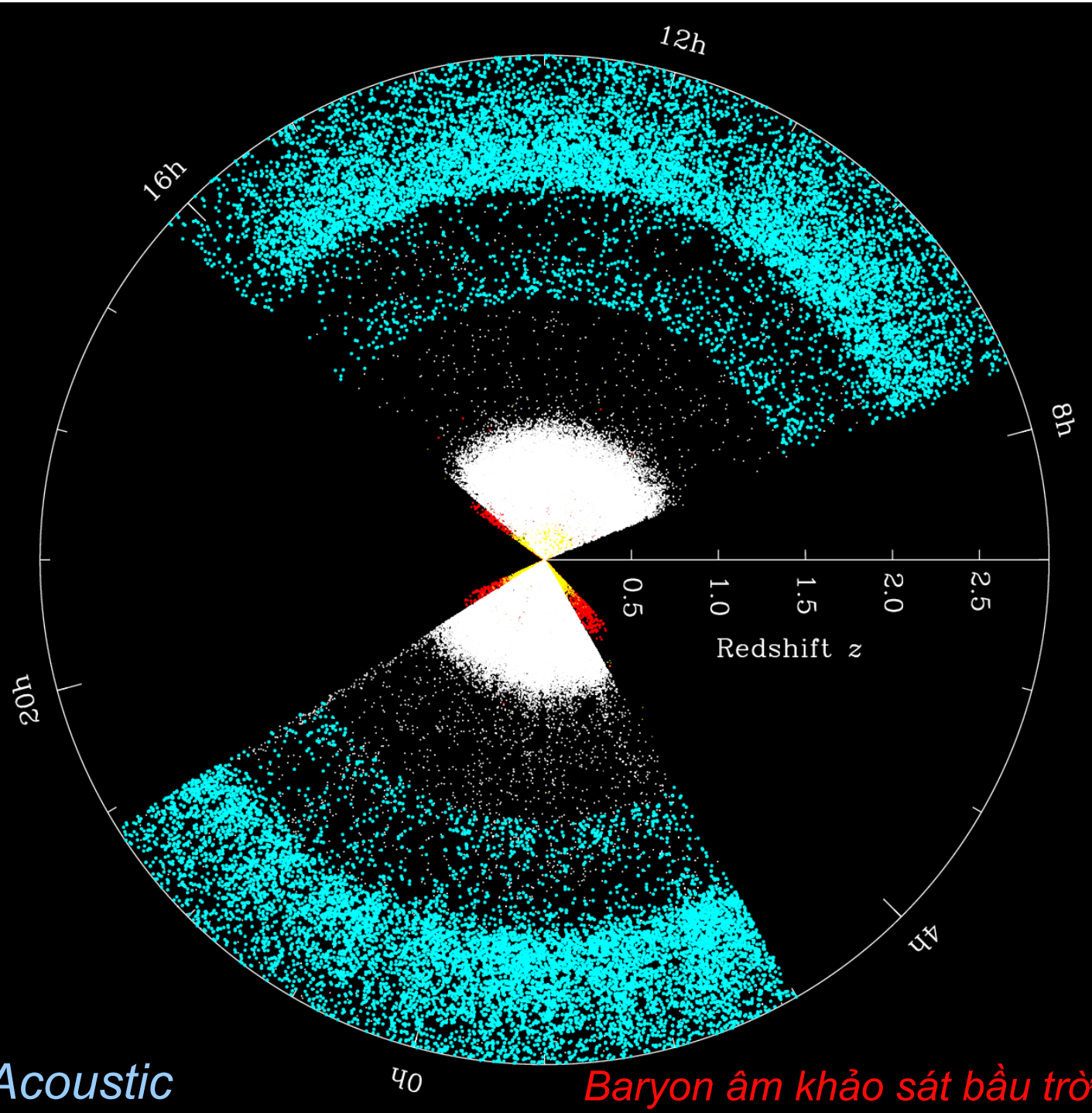
Sloan Digital Sky Survey



2 Degree Field of View Survey 2 Bằng Trường nhìn Khảo sát
Обзор области видимости 2 градусов 2度視野調査

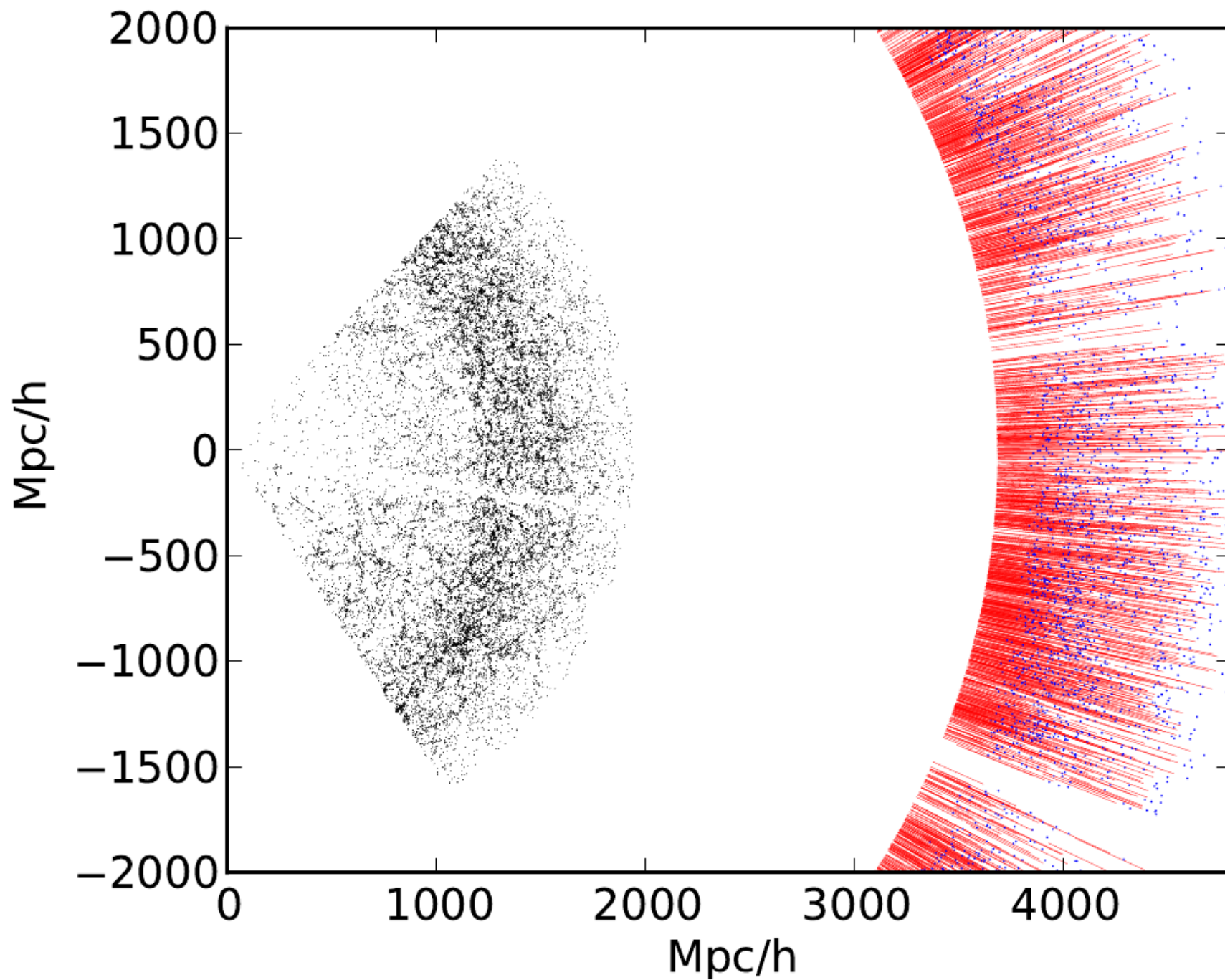


BOSS
SDSS
III



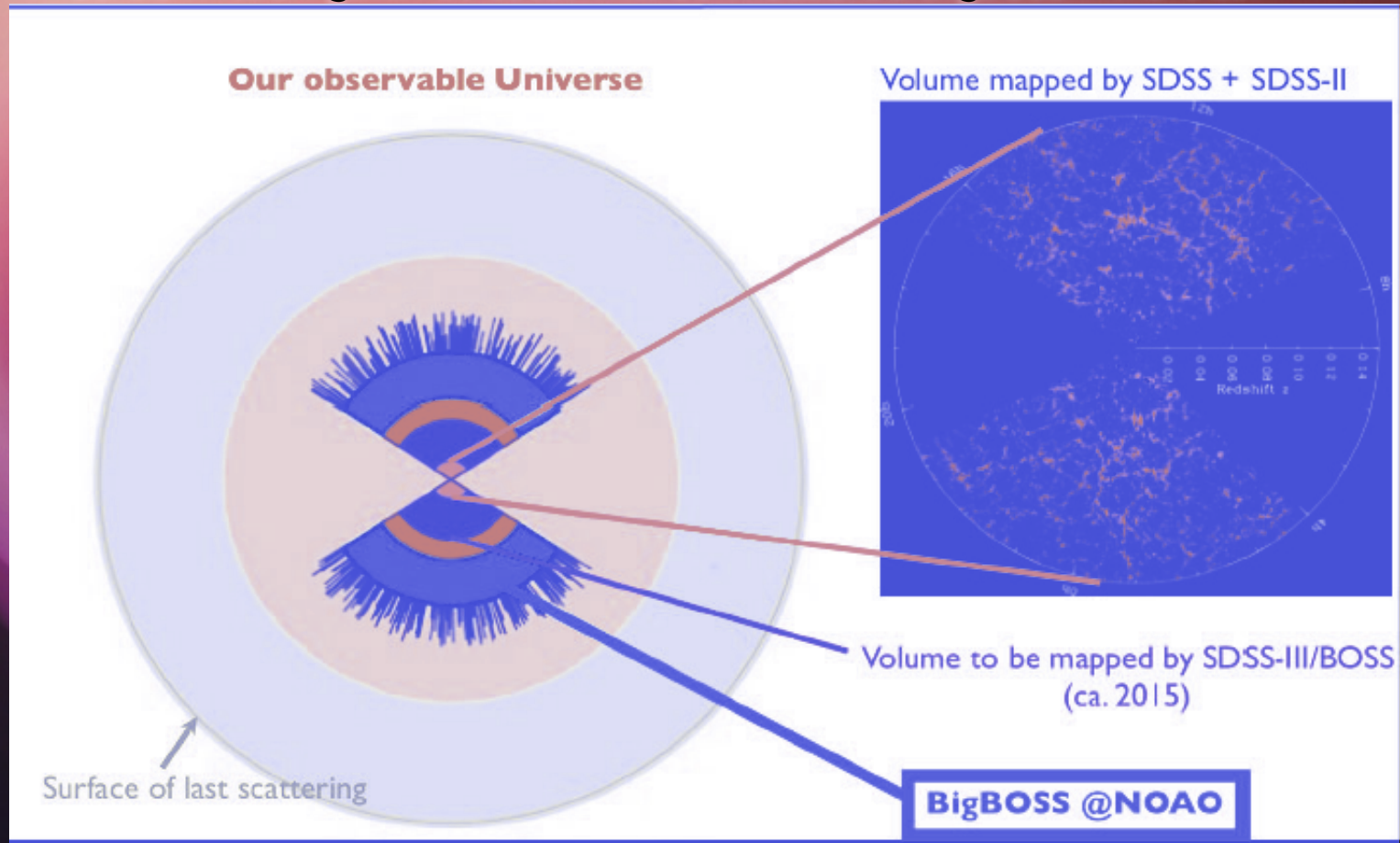
Baryon Acoustic

Baryon âm khảo sát bầu trời dao động



BigBOSS - largest spectroscopic survey ever

- ♦ BigBOSS -> MS-DESI will be the deepest mapping of our universe in galaxies and quasars.
 - more than 1/2 the sky is covered, from $z=0.2$ to 2, or more than halfway back to the big bang in time.
 - 20-50 million galaxies total will be measured BigBOSS-> MS-DESI



Put in primordial fluctuations, let gravity takes its course 放置在原始波動和讓重力採取其路綫

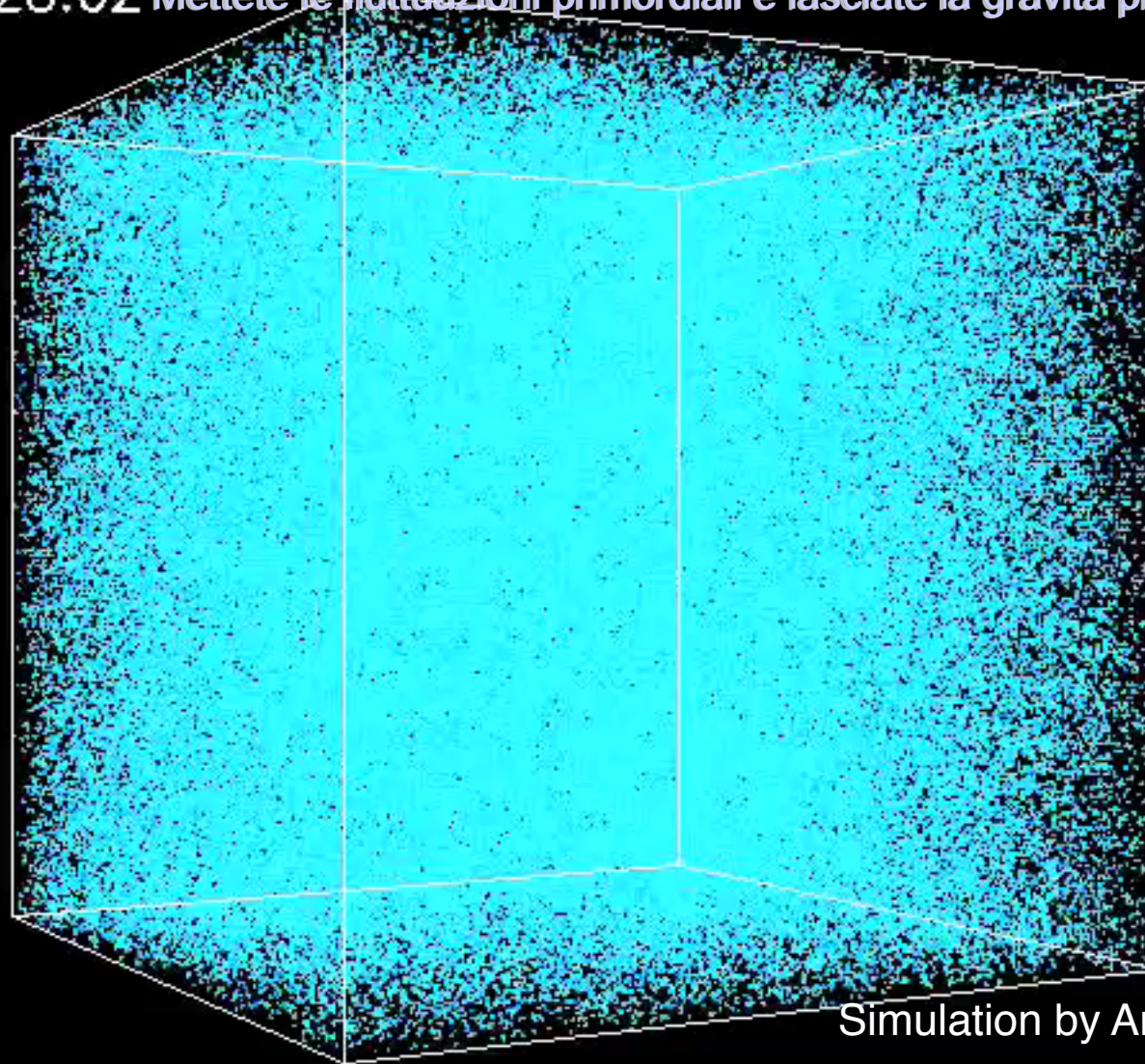
Закладываем первичные флуктуации, а далее всем управляет гравитация

원초적인 동요에서 뒤 중력을 취한다 그것의 과정을 시키거든

Đưa vào biến động nguyên thủy, để cho trọng lực có khóa học của mình

Entrez les fluctuations primordiales et laissez la gravité suivre son cours

Z=28.62 Mettete le fluttuazioni primordiali e lasciate la gravità prendere il suo corso



Simulation by Andrey Kravtsov¹⁹

Распределение
Материи по
сравнению с
масштабом
Distribution de
matière versus
Echelle

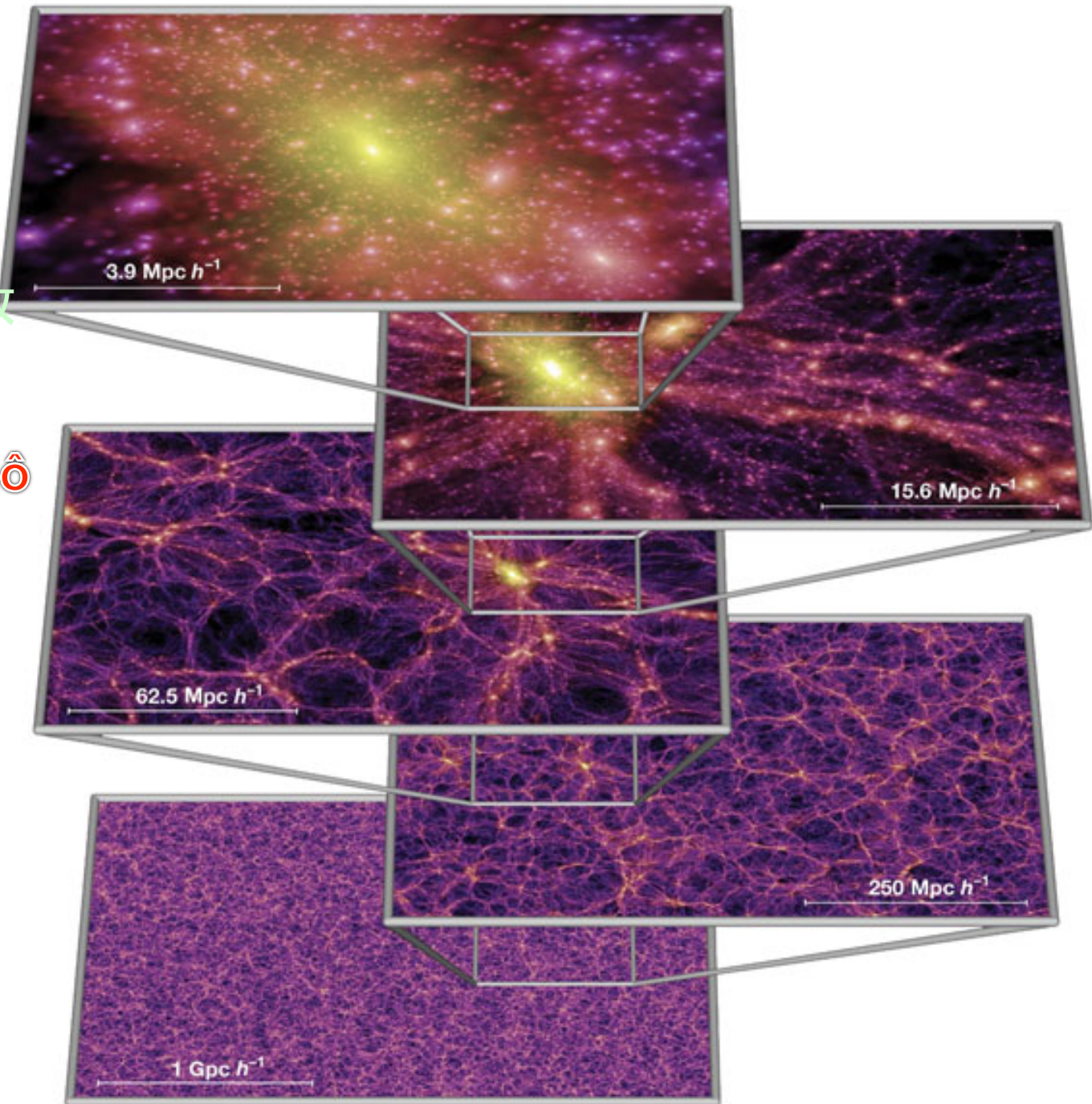
問題配電器與縮放
比例

Phân phối vật
đề so với quy mô

Matter
distribution
versus scale

배급 대
가늌자사정

Distribuzione
della materia
versus scala



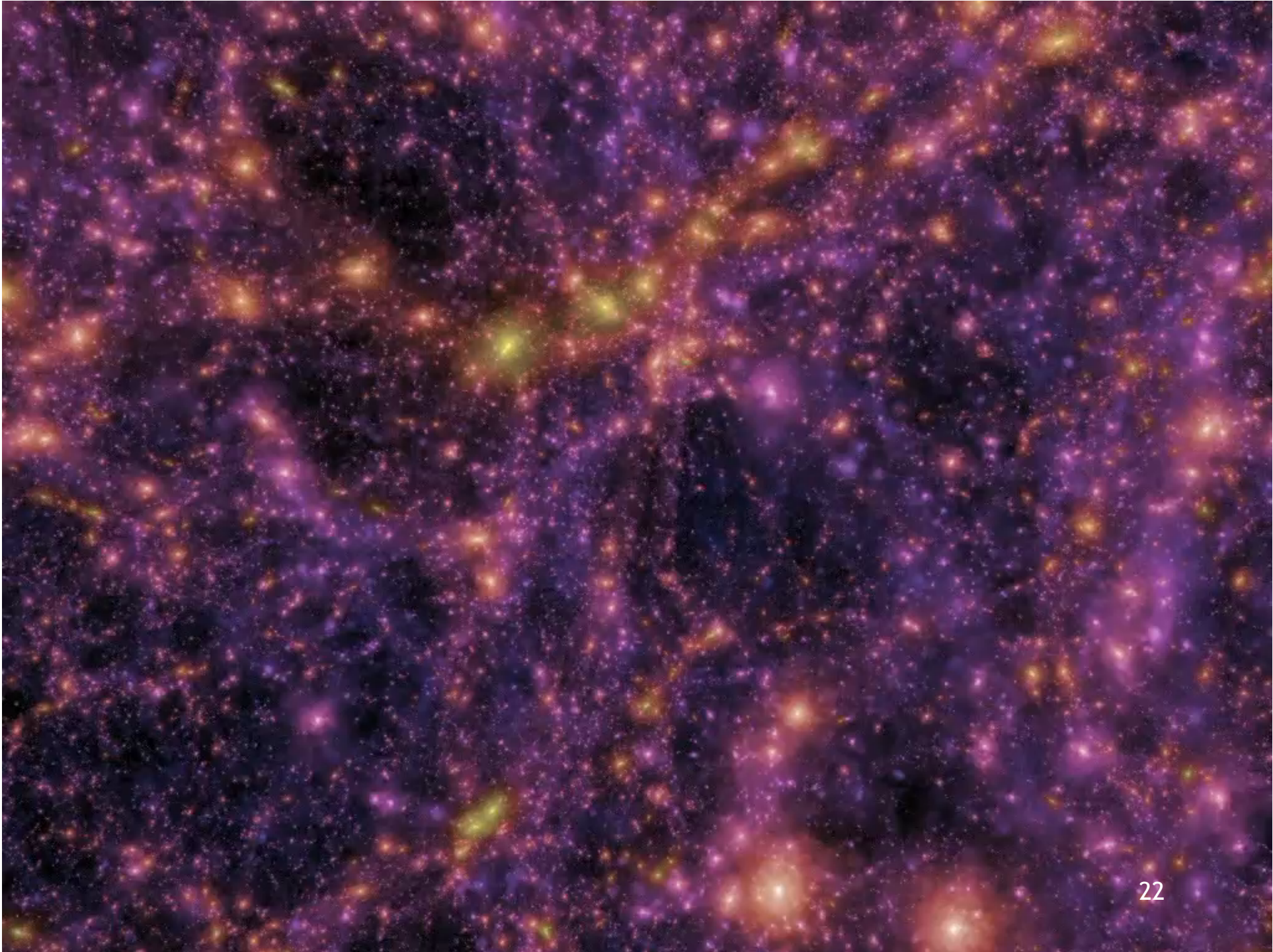
A visualization of the Millennium Simulation, showing a dense network of particles in a purple and blue color scheme. The particles are arranged in a complex, interconnected web, representing the large-scale structure of the universe. A horizontal scale bar is located at the top left, indicating a distance of 1 Gpc/h. The text 'Millennium Simulation' and '10,077,696,000 particles' is overlaid on the image. The redshift value '(z = 0)' is in the bottom left corner, and the page number '21' is in the bottom right corner.

1 Gpc/h

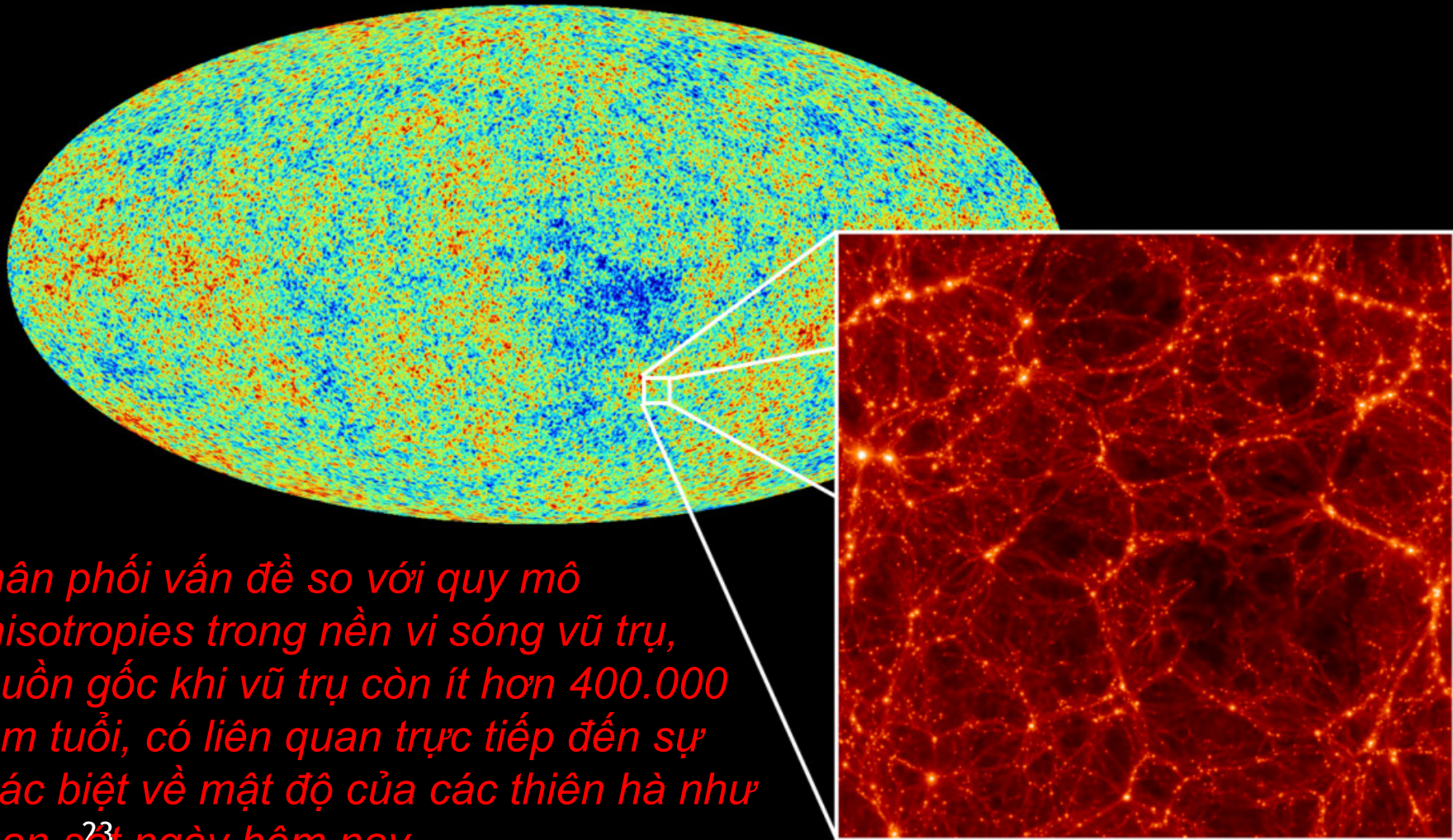
Millennium Simulation

10,077,696,000 particles

($z = 0$)



Anisotropies in the cosmic microwave background, originating when the universe was less than 400,000 years old, are directly related to variations in the density of galaxies as observed today.



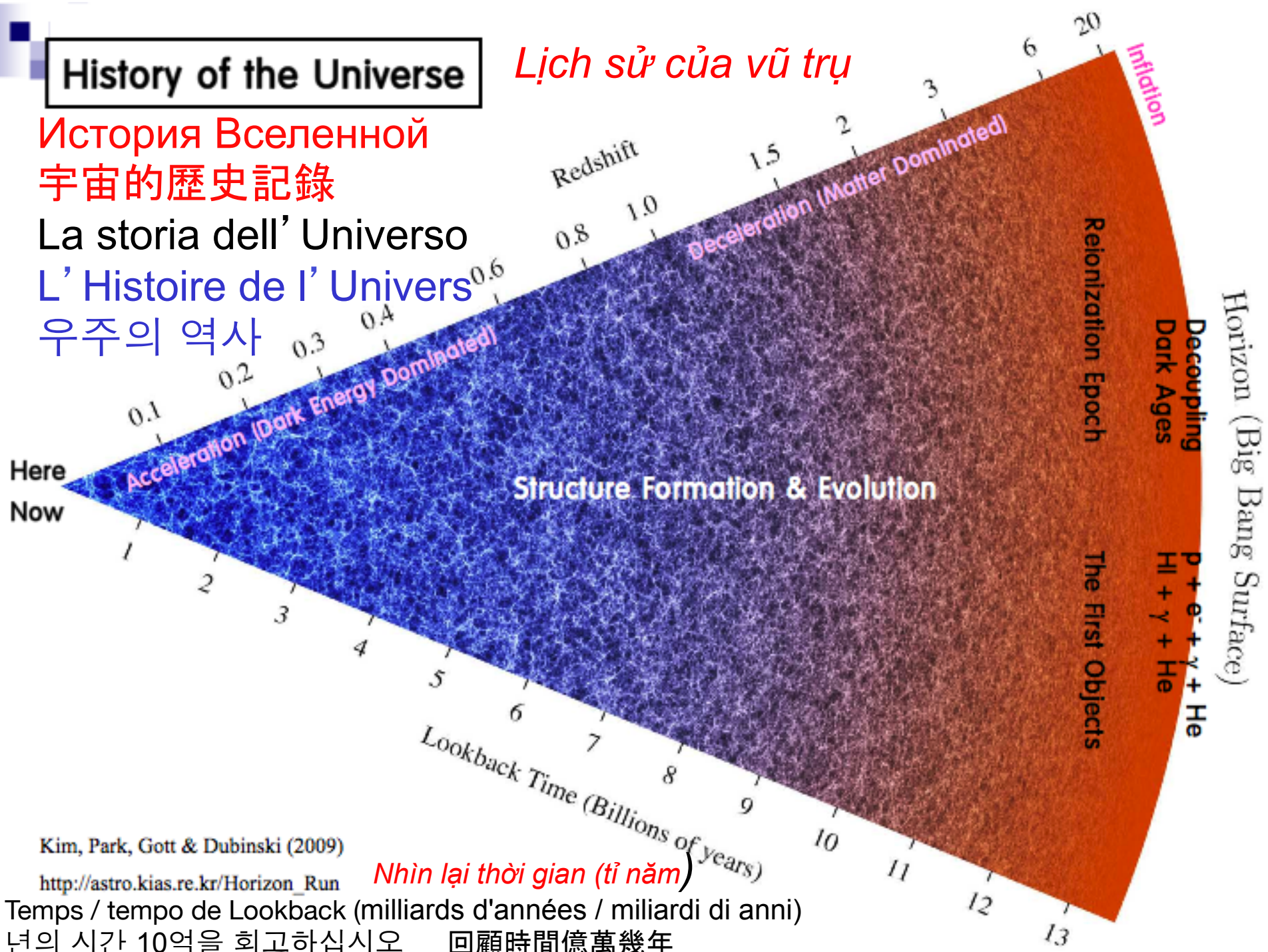
*Phân phối vân đề so với quy mô
Anisotropies trong nền vi sóng vũ trụ,
nguồn gốc khi vũ trụ còn ít hơn 400.000
năm tuổi, có liên quan trực tiếp đến sự
khác biệt về mật độ của các thiên hà như
quan sát ngày hôm nay.*

History of the Universe

Lịch sử của vũ trụ

История Вселенной
宇宙的歷史記錄

La storia dell' Universo
L' Histoire de l' Univers
우주의 역사



Kim, Park, Gott & Dubinski (2009)
http://astro.kias.re.kr/Horizon_Run

Nhìn lại thời gian (tỉ năm)

Temps / tempo de Lookback (milliards d'années / miliardi di anni)
년의 시간 10억을 회고하십시오 回顧時間億萬幾年

轉移往紅色 dịch chuyển đỏ

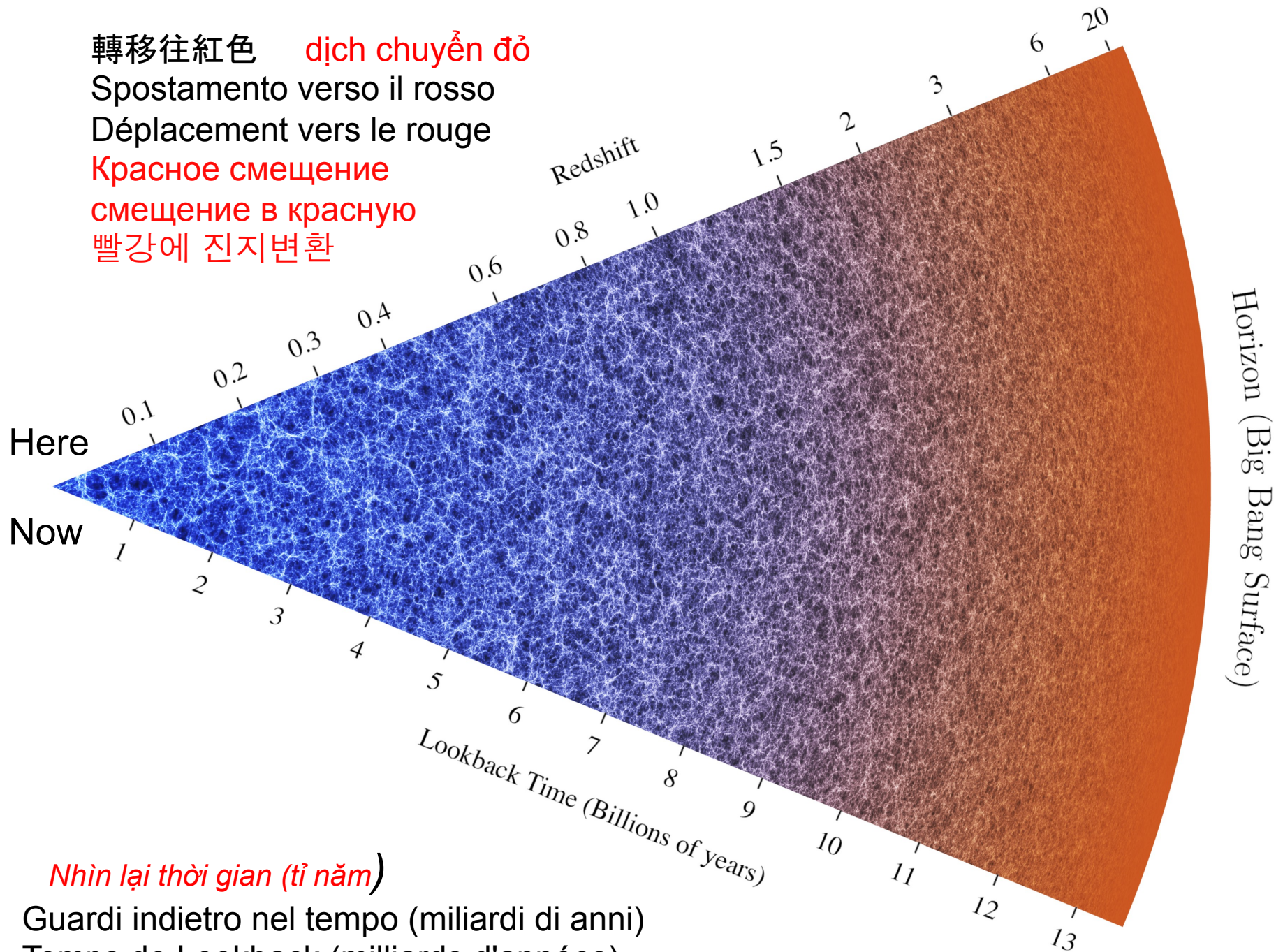
Spostamento verso il rosso

Déplacement vers le rouge

Красное смещение

смещение в красную

빨강에 진지변환



Nhìn lại thời gian (tỉ năm)

Guardi indietro nel tempo (miliardi di anni)

Temps de Lookback (milliards d'années)

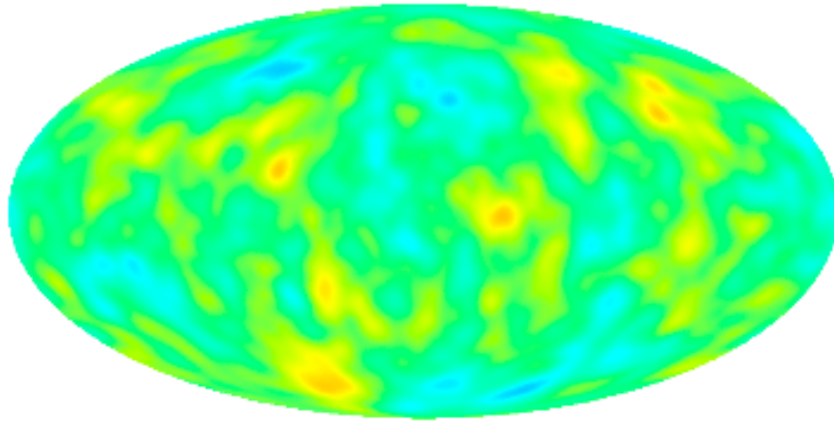
La grande ère de découverte se dévoile

La grande era di scoperte si svela...

Грандиозная эра открытия раскрывает
중대한 발견 시대는 펼쳐진다... 巨大發現時代展開...

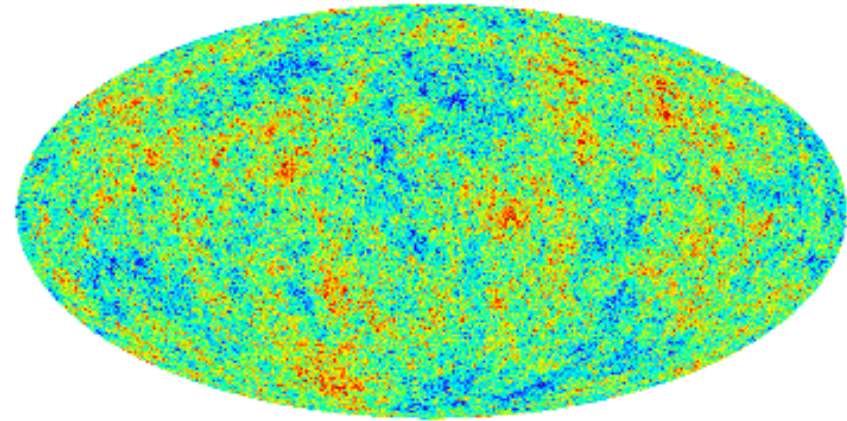
Great Discovery Era Unfolds...

COBE-DMR Resolution

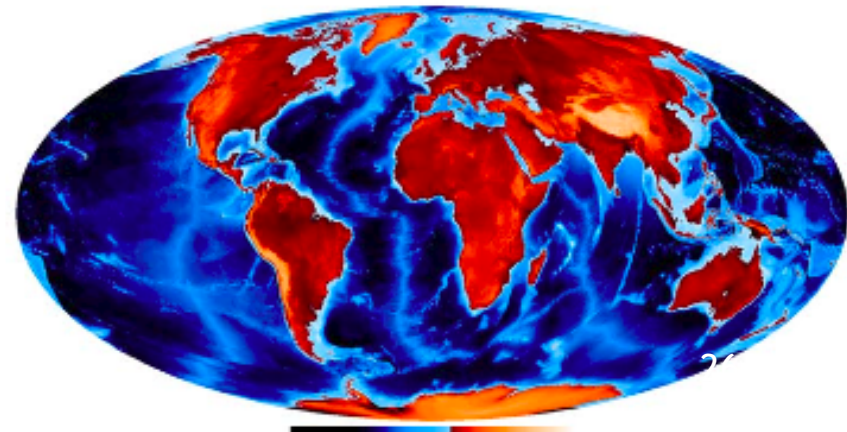
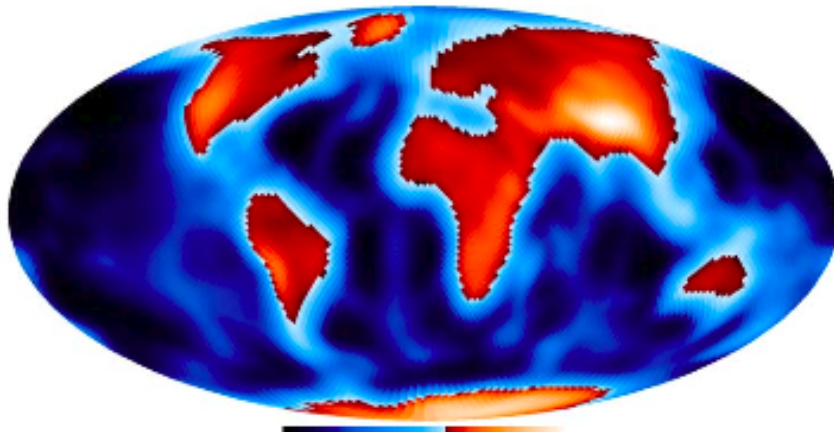


COBE DMR

Planck Surveyor Resolution



WMAP & Planck



A flight through the universe

This model was put together by the Cosmus group in 2003/4.

Cosmus is part of the SCOPE program, a joint project of the University of Chicago, SciTech Hands-on Museum, and Adler Planetarium & Museum.

SCOPE receives generous financial support from:

National Science Foundation (Disclaimer: this grant is intended here to represent the opinion of the author, not that of the NSF.)

Center for Cosmological Physics

Materials Research Science and Engineering Center

University of Chicago

High Energy Physics group

Professional Program in Computer Sciences

Women's Board

Physical Sciences Division

SUN

Credits

250 000 galaxies, 35 000 quasars: **Sloan Digital Sky Survey**

Milky Way: **The Hipparcos Project** (via Brian Abbott et al's Digital Universe at AMNH/Hayden)

Cosmic Microwave Background: **Wilkinson Microwave Anisotropy Probe**

Pictures of local galaxies: **The Anglo-Australian Observatory**

Donald Pettit, Till Credner, Sven Kohle, Tom Licha, Steven Juchnowski

George Greeney, Bill Keel, Brad Wallace, Robert Provir, Martinez Delgado

James Foster, Cord Scholz, Bekke Hunter, Deep Sky Images

Programming: Dinoj Surendran, Mark Subbarao

COSMUS

