

# Giornate del Raggruppamento INAF RSN1 *contributo del CS*

*Enrichetta Iodice*  
*INAF-Astronomical Observatory of Capodimonte*  
*Presidente CS - membro eletto RSN1*

# Outline

## *Part 1:*

### *Il ruolo del Consiglio Scientifico dell'INAF*

- ➔ Presentazione CS
- ➔ Compiti statutari del CS
- ➔ Attività 2025/2026

## *Part 2:*

### *Charting the Extragalactic Frontier: Science Today & Tomorrow*

# CS INAF 2025-2028

## Membri eletti:



**Enrichetta Iodice**  
*RSN1*  
*Presidente*



**Michele Bellazzini**  
*RSN2*



**Federico Tosi**  
*RSN3*  
*Segretario*



**GianLuca Israel**  
*RSN4*  
*Vice Presidente*



**Marco Riva**  
*RSN5*

## Membri nominati dal Presidente:

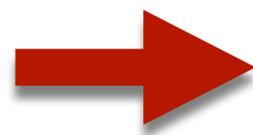


**Daniela Billi**  
*Univ. Tor Vergata, RM*  
*Astrobiologia*



**Monica Colpi**  
*Univ. Bicocca, MI*  
*GW/LISA*

# Compiti del CS



definiti in tre commi

**Art. 8 dello Statuto**

1. Il CS, nei limiti delle attribuzioni assegnate dal presente statuto e dai regolamenti, è **organo consultivo del Presidente e del CdA dell'INAF**
2. Il CS è organismo consultivo del CdA su tutte le questioni che riguardano l'**attività complessiva di ricerca dell'Ente**, e opera in ottemperanza al combinato disposto dell'articolo 8, commi 1 e 3 del Decreto Legislativo 4 giugno 2003, numero 138, e dell'articolo 10 del Decreto Legislativo 31 dicembre 2009, numero 213
3. Il CS su richiesta del Presidente dell'INAF, **esprime parere scientifico** su:
  - ▶ proposte di piano triennale e sui relative aggiornamenti annuali
  - ▶ configurazione dei Raggruppamenti Scientifici
  - ▶ assunzioni per chiamata diretta
  - ▶ proposte di modifica dello statuto
  - ▶ tematiche di natura scientifica legate alle attività dell'Ente
4. Il CS su richiesta del Presidente dell'INAF
  - ▶ svolge analisi, studi e confronti sullo stato della ricerca di competenza a livello nazionale ed internazionale
  - ▶ individua le possibili linee evolutive della ricerca di competenza

Part 1

# Compiti del CS



Piano Triennale di attività (PTA)  
*Art. 16 dello Statuto*



Documento Visione Strategica (DVS)  
*Art. 6, 20, 22 dello Statuto*

# Compiti del CS

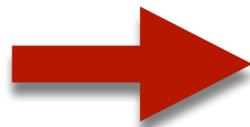


Piano Triennale di attività (PTA)  
*Art. 16 dello Statuto*

1. Il Direttore Scientifico & il Direttore Generale:

- ▶ *predispone il PTA, comprensivo del piano di fabbisogno del personale*
- ▶ *riceve indicazioni dal CS, Collegio dei Direttori di Struttura*
- ▶ *sottopone al Presidente*

+ CSN



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# Compiti del CS

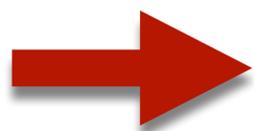


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Documento Visione Strategica (DVS)  
*Art. 6, 20, 22 dello Statuto*

1. [Art.6 & 20] Il CdA, su proposta del Presidente:

- ▶ *adotta, ai sensi dell'articolo 5 del decreto legislativo 31 dicembre 2009, n. 213 il DVS decennale, predisposto dal CS e i relativi aggiornamenti;*

2. [Art.22] L'INAF opera

- ▶ *sulla base del DVS dell'Ente, con i relativi aggiornamenti, predisposto ai sensi dell'articolo 5, comma 1, del Decreto Legislativo 31 dicembre 2009, numero 213*
- ▶ *approvato dal CdA, su proposta del CS e sentiti sia il Direttore Scientifico che il Collegio dei Direttori delle Strutture di Ricerca;*

# Attività del CS 2025-2026



<http://www.inaf.it/it/sedi/sede-centrale-nuova/consiglio-scientifico>

1. 01/2025: Insediamiento & Passaggio di consegne precedente CS
2. 24/02/2025: riunione operativa sul lavoro del CS e prossimi steps
3. 26/03/2025: prima convocazione del Presidente –> Parere su ruolo INAF-CTAO, HQ Bologna
4. 04/04/2025: Incontro con i presidenti e deputy dei CSN
5. 11/04/2025: discussione su
  - ▶ Rafforzamento geografico e sfruttamento scientifico dei dati CTA
  - ▶ Ottimizzazione risorse per il Bando Ricerca Fondamentale
6. 29/08/2025: Parere e contributo PTA 2024-2026
7. 12/01/2026: Parere e contributo PTA 2025-2027
8. 11/2025 - 01/2026: Parere su piano finanziamenti AF2025 [Verbale n.5 del 01/2026]
  - ▶ temi SN & DT
  - ▶ SDT
  - ✦ **Partecipazione a workshop su progetti e attività scientifiche INAF –> giornate RSN**

# Attività del CS 2025-2026

 <http://www.inaf.it/it/sedi/sede-centrale-nuova/consiglio-scientifico>

*Buoni propositi inizio mandato: in questo primo anno, l'obiettivo del CS era*

- ▶ *consolidamento del proprio ruolo consultivo*
- ▶ *avvio delle attività programmatiche di lungo termine...*

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*Realtà: lavoro del CS al termine del primo anno  
"abbiamo lavorato come un jukebox" cit. M. Bellazzini*



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*Cosa resta dei buoni propositi?*

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Cosa resta dei buoni propositi?

consolidamento



# *Charting the extragalactic frontier: Science Today and Tomorrow*

# Charting the extragalactic frontier: Science Today and Tomorrow

We started from here...

## Shapley-Curtis Debate: *on the nature of faint nebulae*

*At the meeting of the National Academy of Sciences in Washington (April 1920), Harlow Shapley (Mount Wilson) and Heber D. Curtis (Lick Observatory) gave talks under the title "The Scale of the Universe"*



➔ Shapley argued that the nebulae are parts of our own Galaxy, the only one

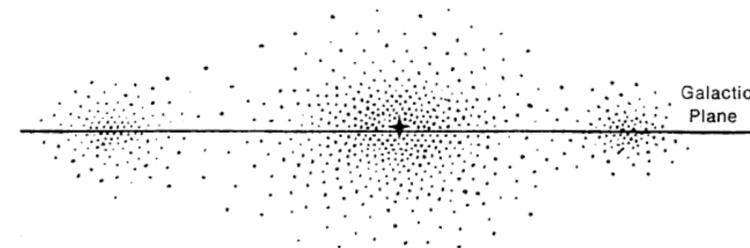


FIG. 3—Arthur Eddington's (1912) galaxy placed the Sun's position 60 LY above the center of the galactic plane.



Curtis ➔

thought that these are other galaxies, just like ours

# Charting the extragalactic frontier: Science Today and Tomorrow

We started from here...

**Shapley-Curtis Debate:** *on the nature of faint nebulae*

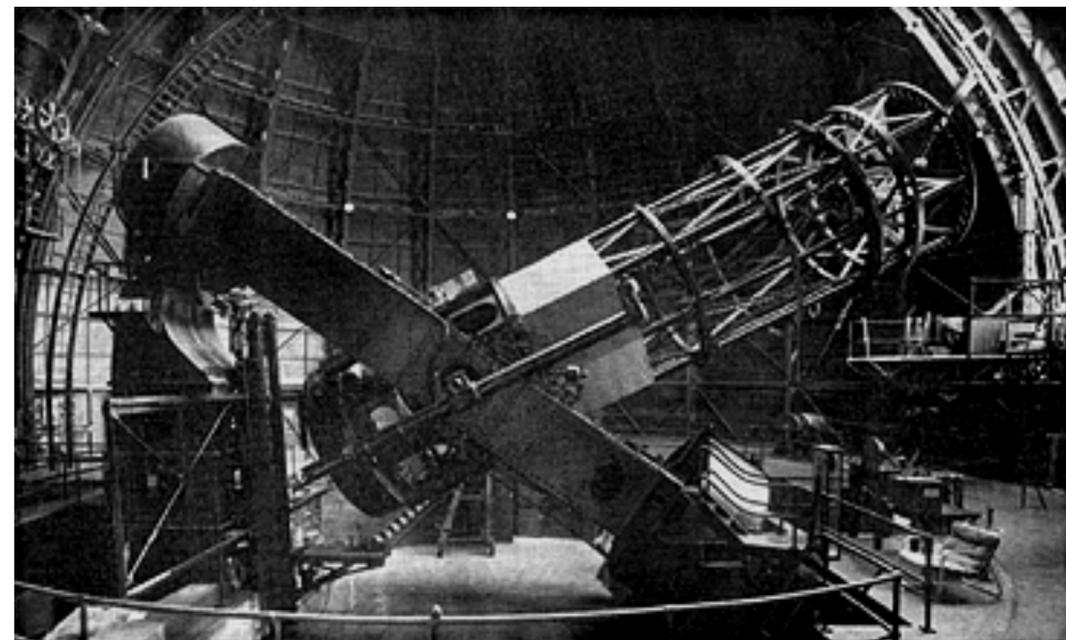
*In 1923 Hubble used the Mount Wilson telescope to resolve individual stars in the Andromeda Nebula, proving it was a separate galaxy → validating the Island Universe theory*



*A profound shift in the understanding of the scale of the universe*



Edwin Hubble



The Mt. Wilson 100-inch

Hale Observatories, courtesy AIP

# Charting the extragalactic frontier: Science Today and Tomorrow

- ➔ Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*
- ➔ Which science topics attracted more funds, in INAF, in Italy, in Europe?
- ➔ How this scenario can change with the arrival of new ground-based and space observing facilities?



A NEW profound shift in the  
understanding of the scale of the universe

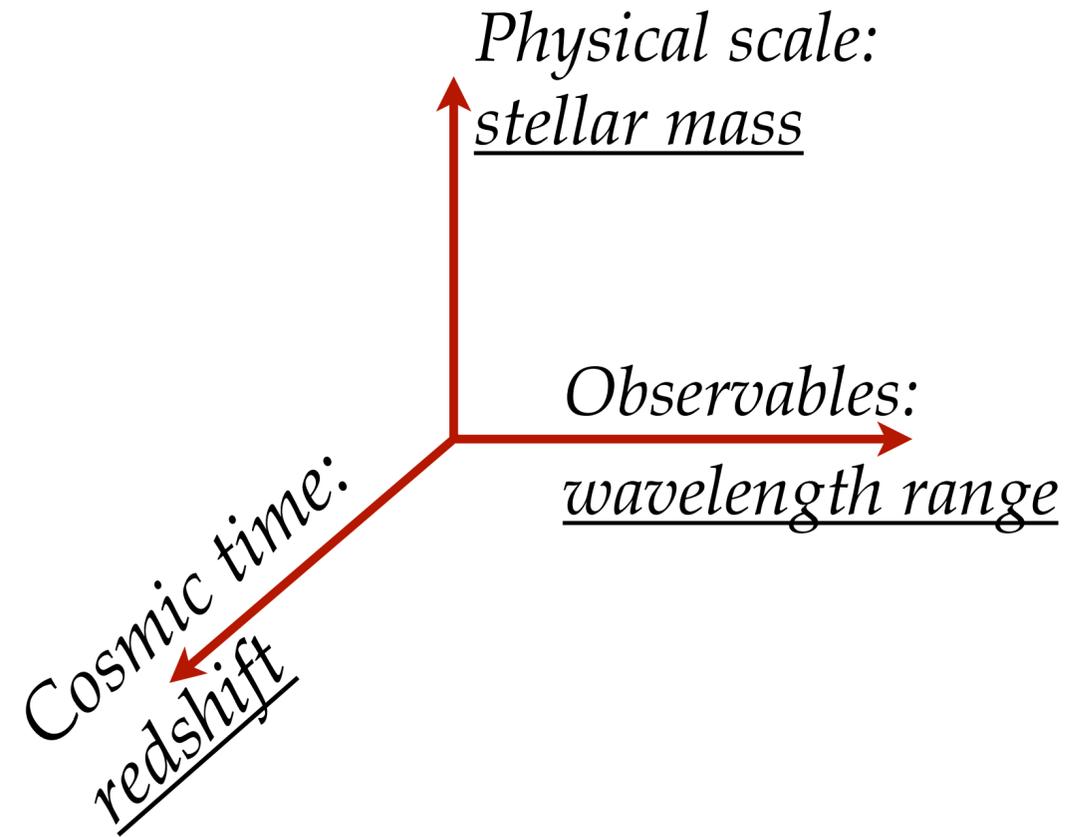
# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*which is the picture we got from the science presentations of this workshop?*



*Three physical quantities*



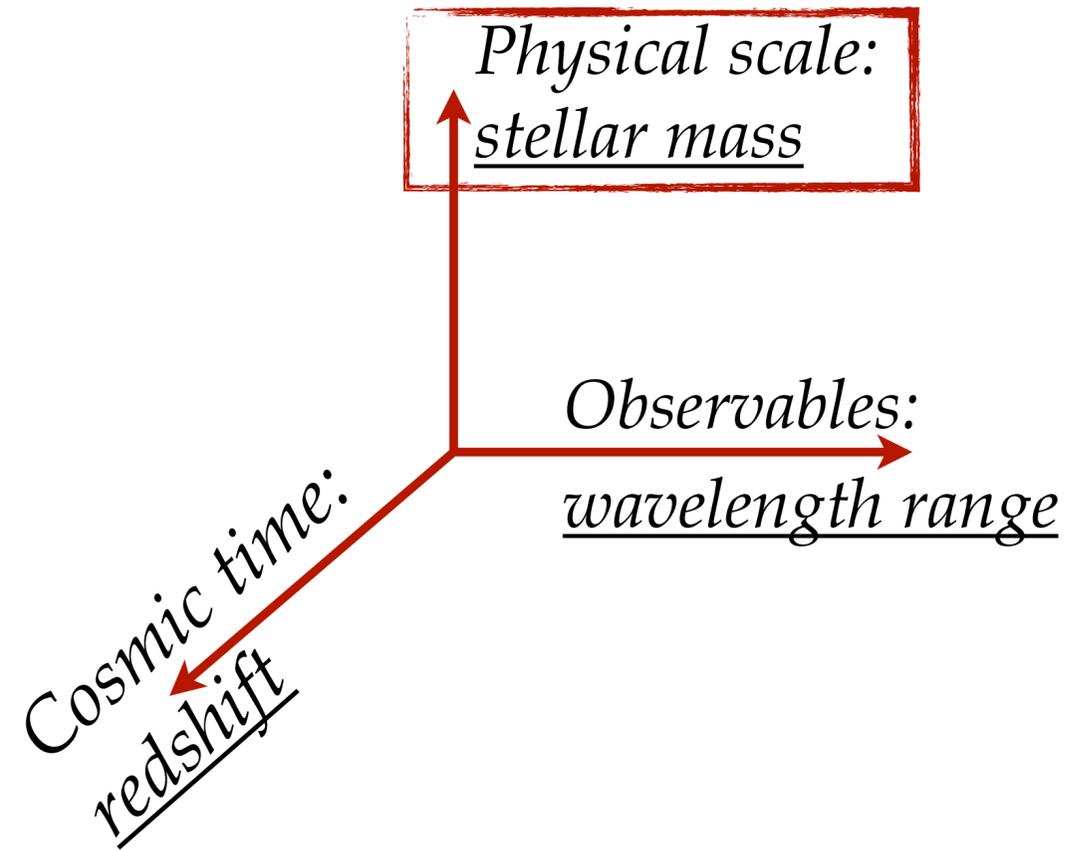
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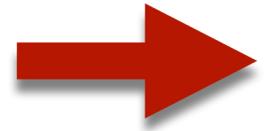


# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

→ *Physical Scale: stellar masses*

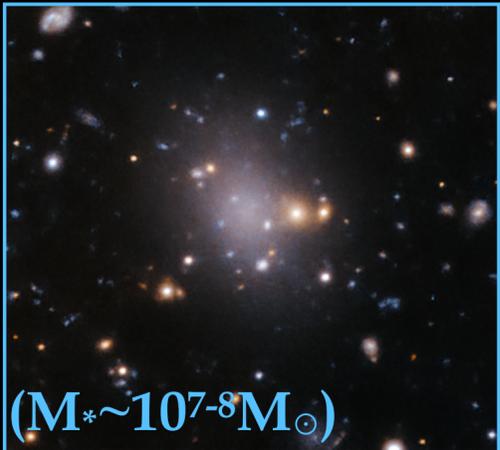


# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



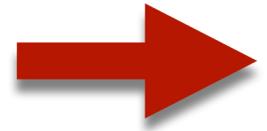
*Physical Scale: stellar masses*

LSB galaxies



Credits: Illustris TNG

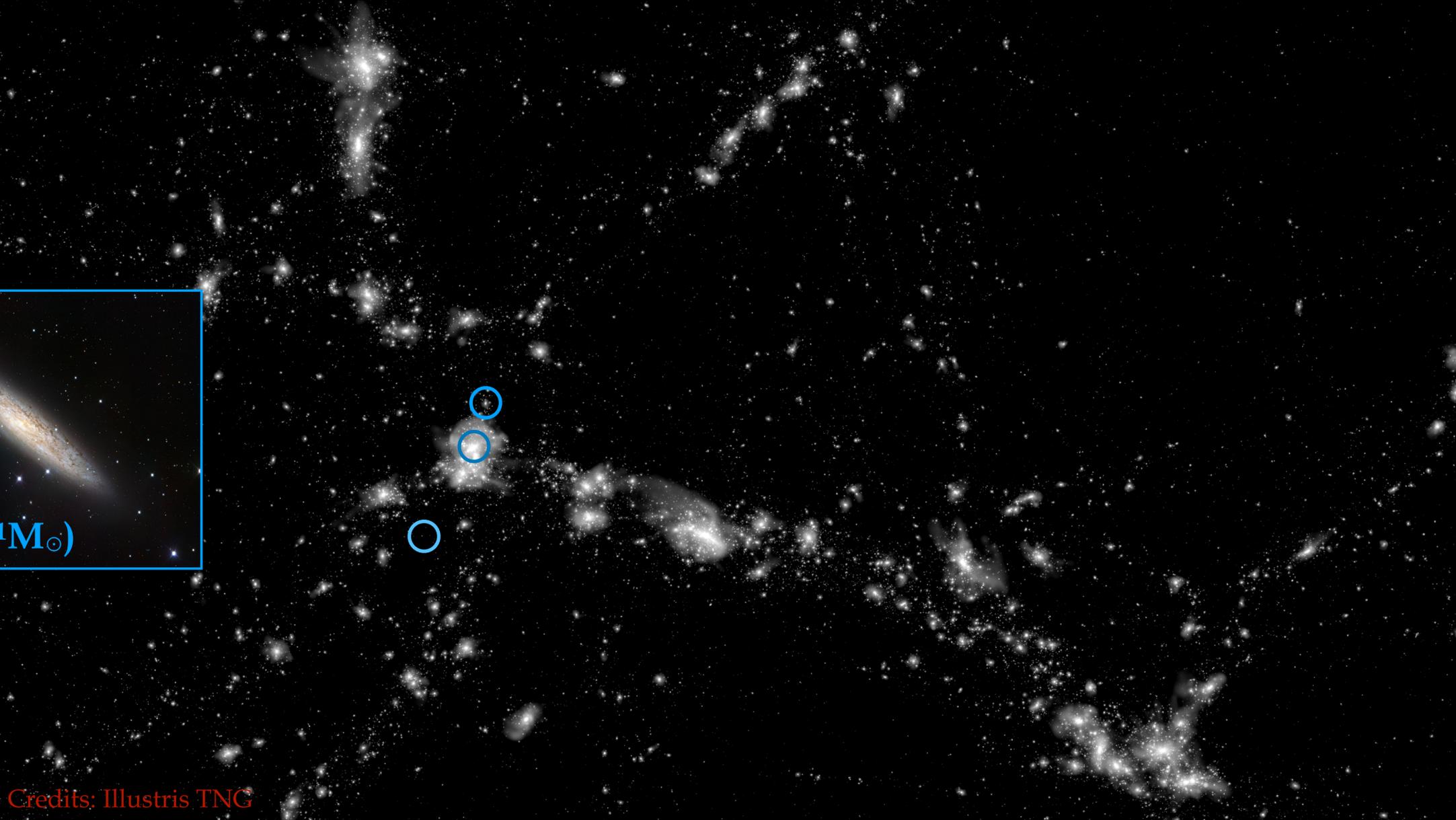
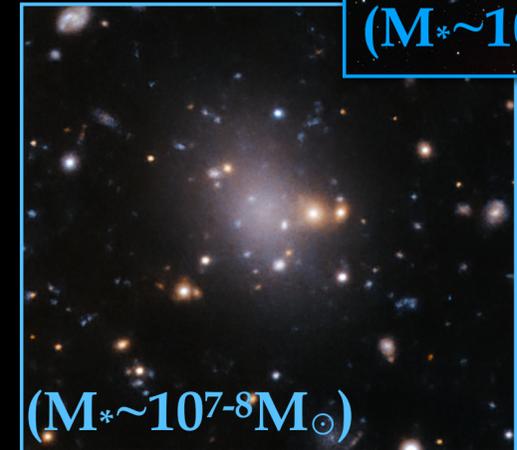
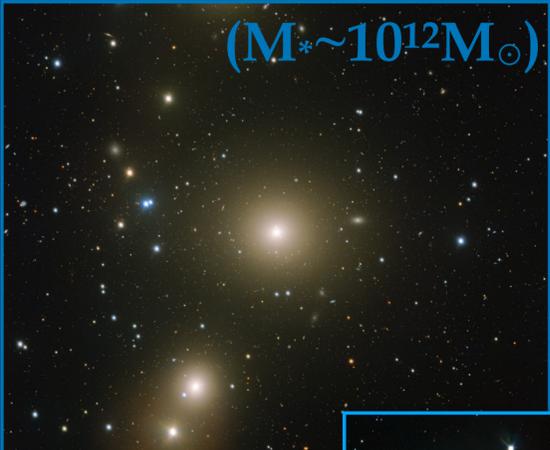
# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



Physical Scale: stellar masses

LSB galaxies

Bright & massive galaxies



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# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

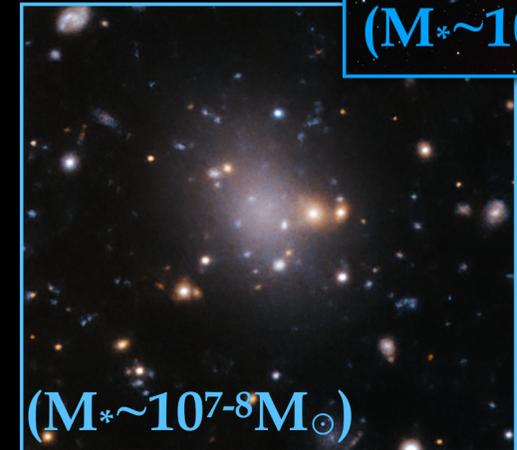
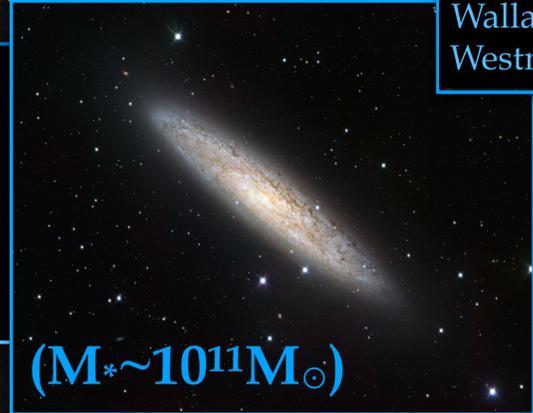
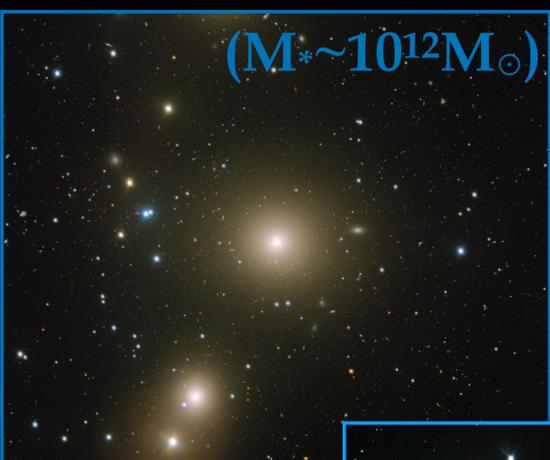


Physical Scale: stellar masses

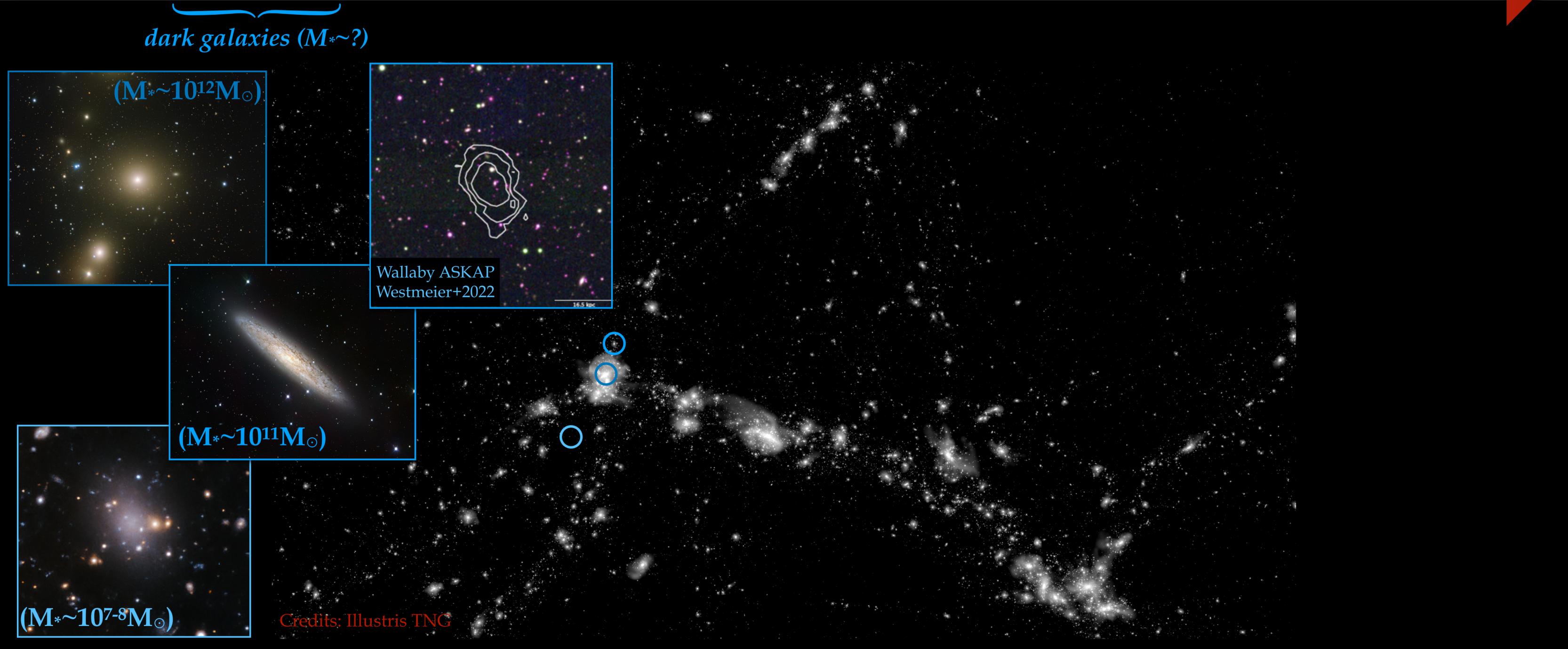
LSB galaxies

Bright & massive galaxies

dark galaxies ( $M_* \sim ?$ )



Credits: Illustris TNG



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



Physical Scale: stellar masses

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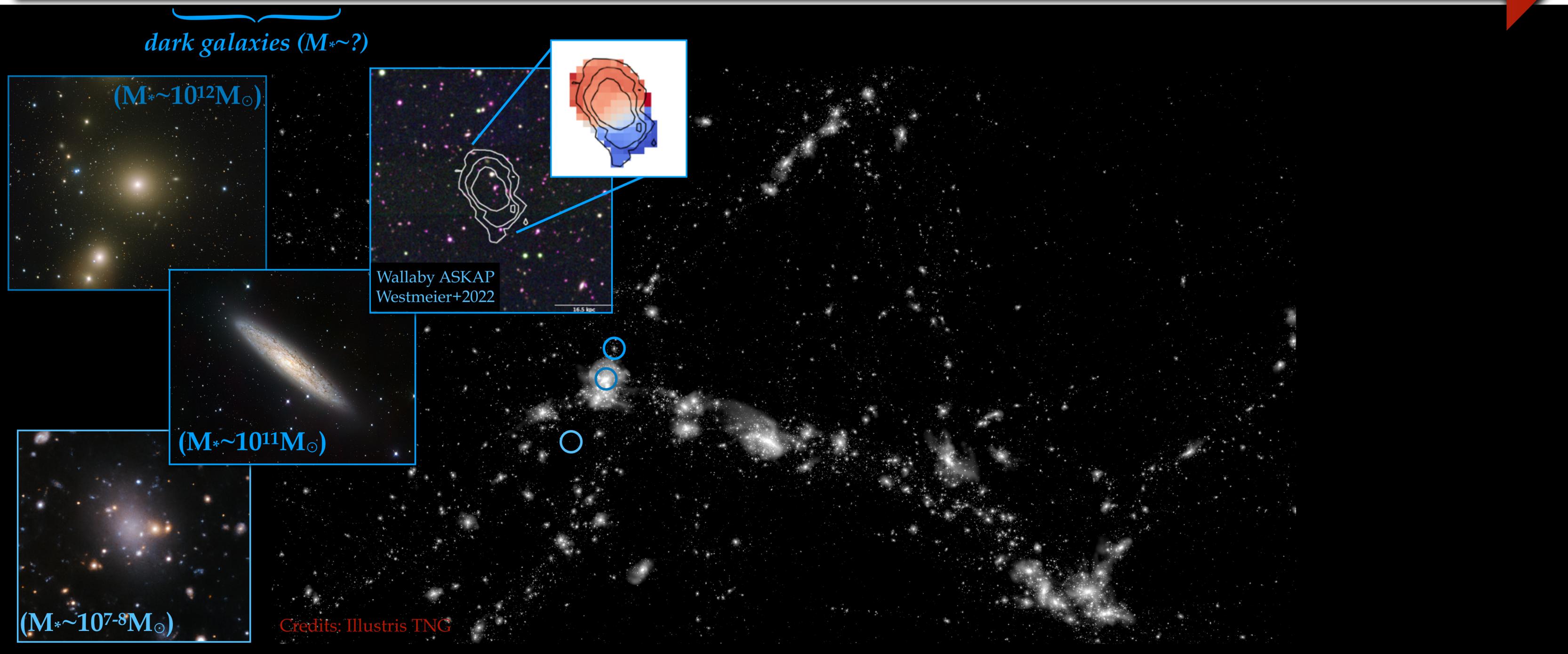
( $M_* \sim 10^{12} M_\odot$ )

( $M_* \sim 10^{11} M_\odot$ )

( $M_* \sim 10^{7-8} M_\odot$ )

Wallaby ASKAP  
Westmeier+2022

Credits: Illustris TNG



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



Physical Scale: stellar masses

LSB galaxies

Bright & massive galaxies

groups & clusters of galaxies



dark galaxies ( $M_* \sim ?$ )

( $M_* \sim 10^{12} M_\odot$ )

Wallaby ASKAP  
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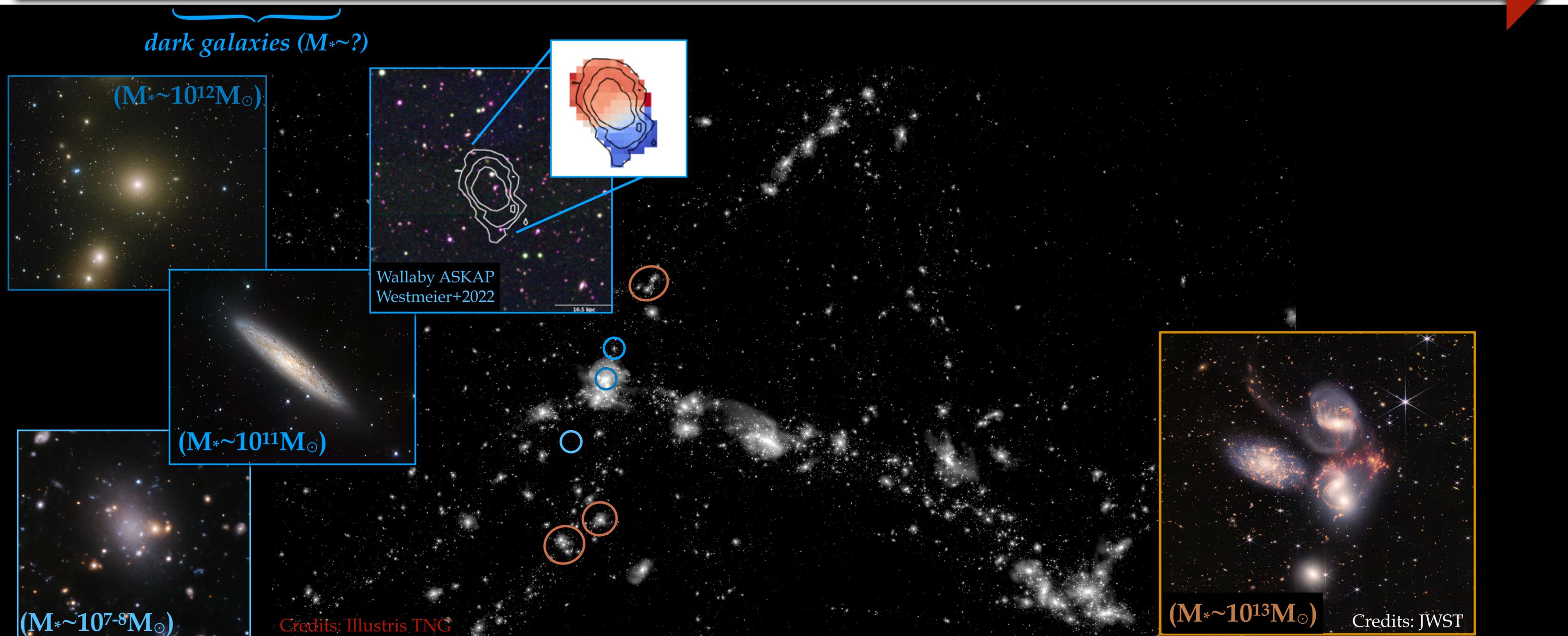
( $M_* \sim 10^{11} M_\odot$ )

( $M_* \sim 10^{7-8} M_\odot$ )

( $M_* \sim 10^{13} M_\odot$ )

Credits: JWST

Credits: Illustris TNG



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

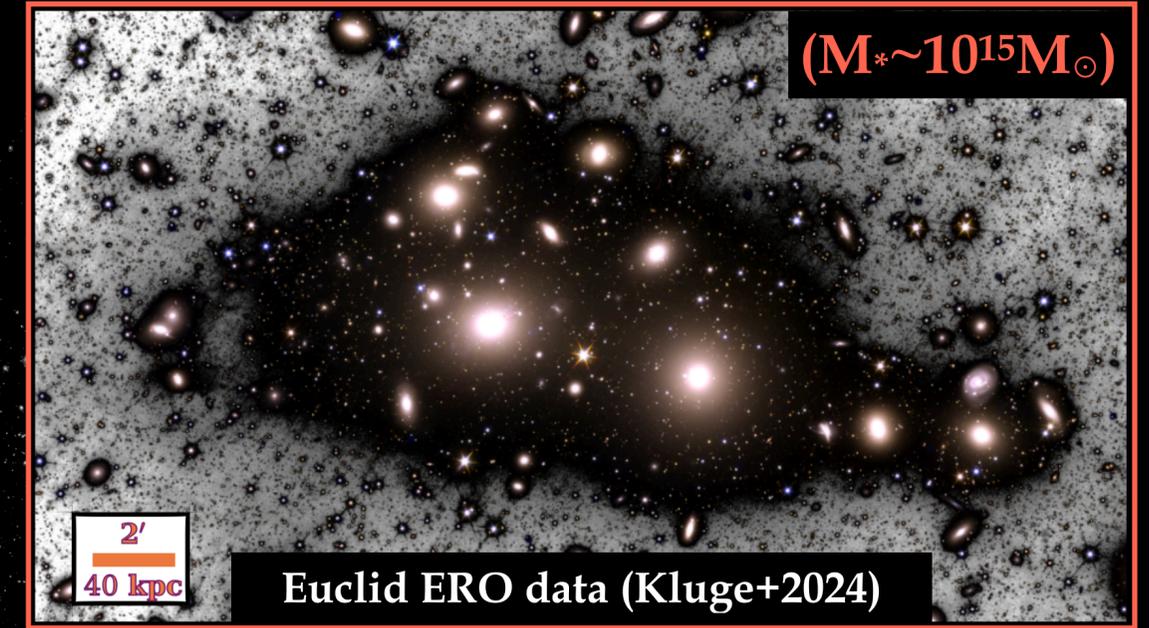
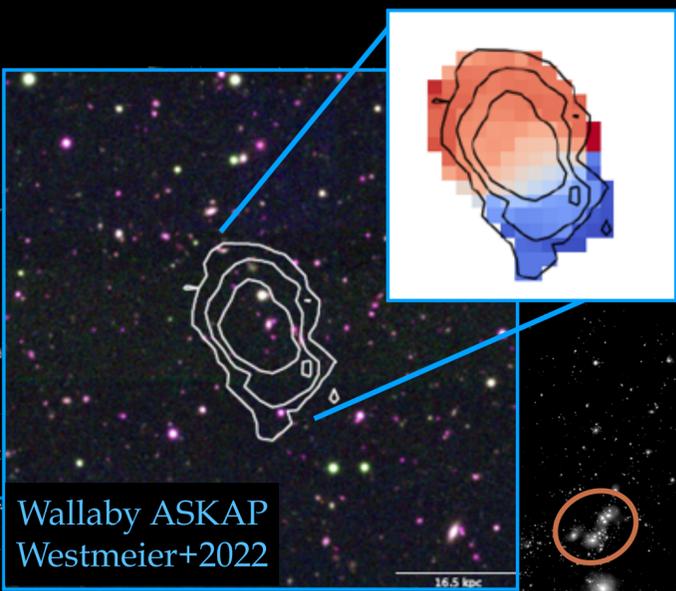


Physical Scale: stellar masses



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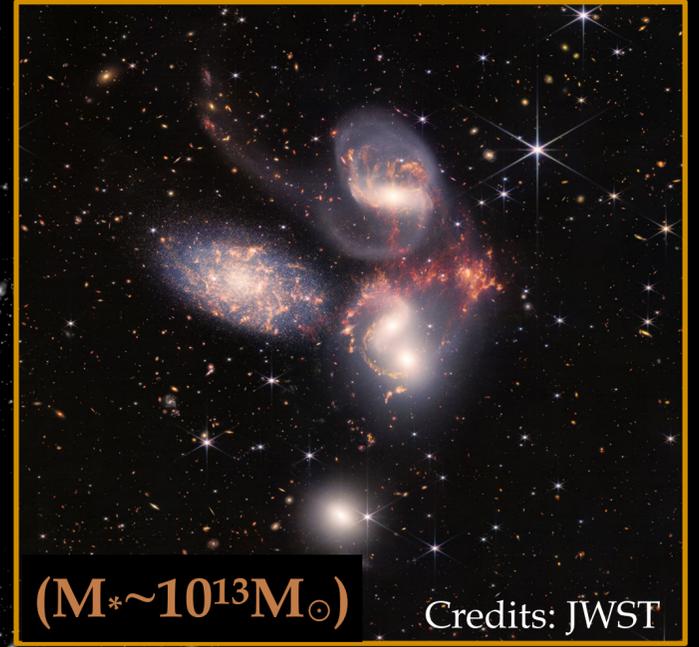
( $M_* \sim 10^{12} M_\odot$ )



( $M_* \sim 10^{15} M_\odot$ )

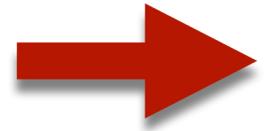
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# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

*LSB galaxies*

*Bright & massive galaxies*

*groups & clusters of galaxies*

*large-scale structure ( $M_* > 10^{16} M_\odot$ )*



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

LSB galaxies

Bright & massive galaxies

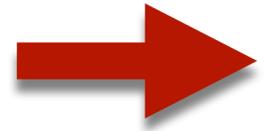
*dark galaxies ( $M_* \sim ?$ )*

*How we can map the galaxies' structure?*

*Trace the Baryonic content*



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

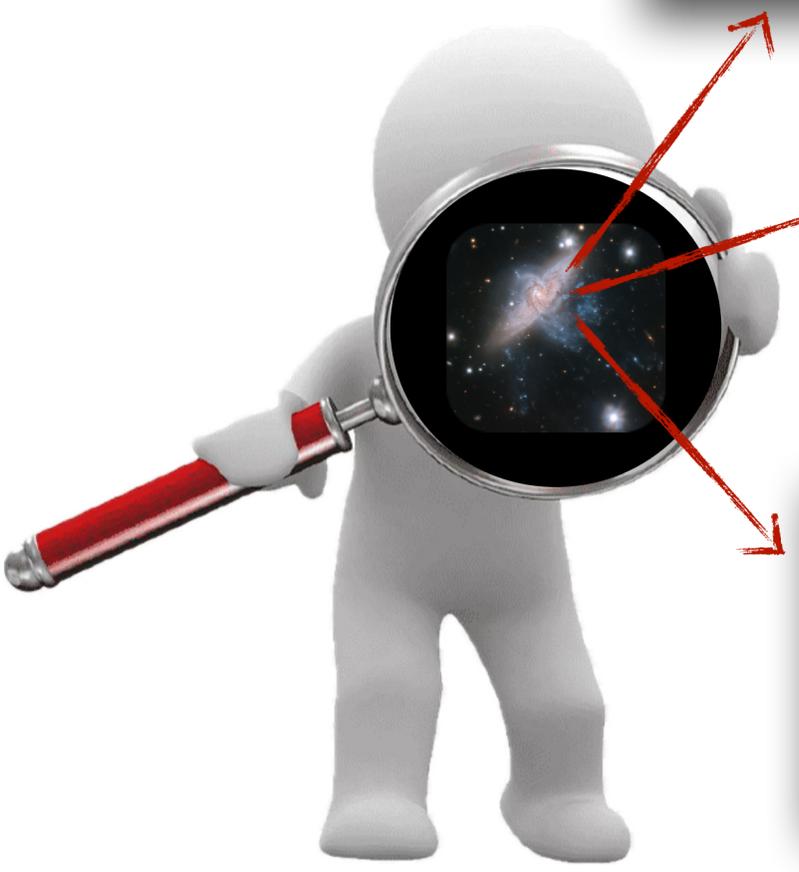
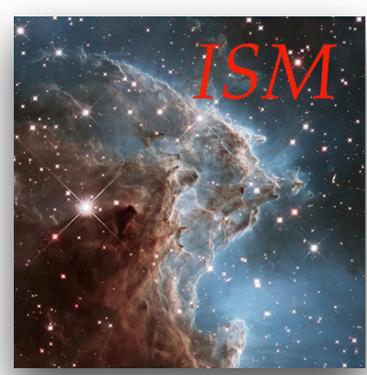
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*Physical Scale: stellar masses*

LSB galaxies

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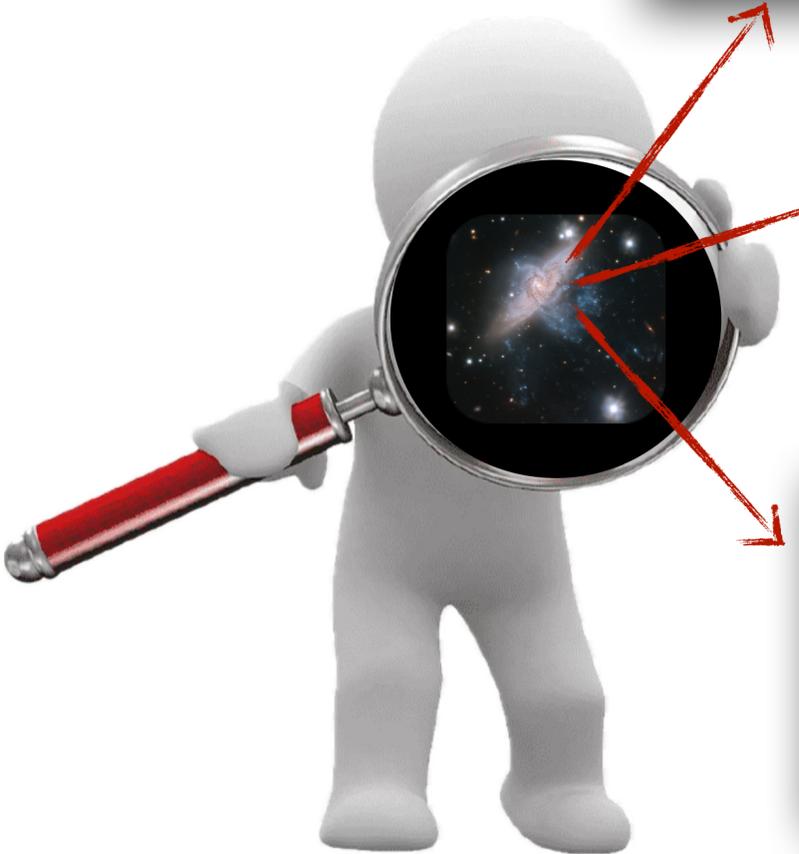
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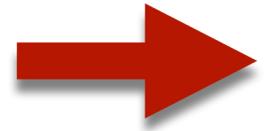
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*light distribution  
stellar kinematics  
stellar population*



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*Physical Scale: stellar masses*

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Bright & massive galaxies

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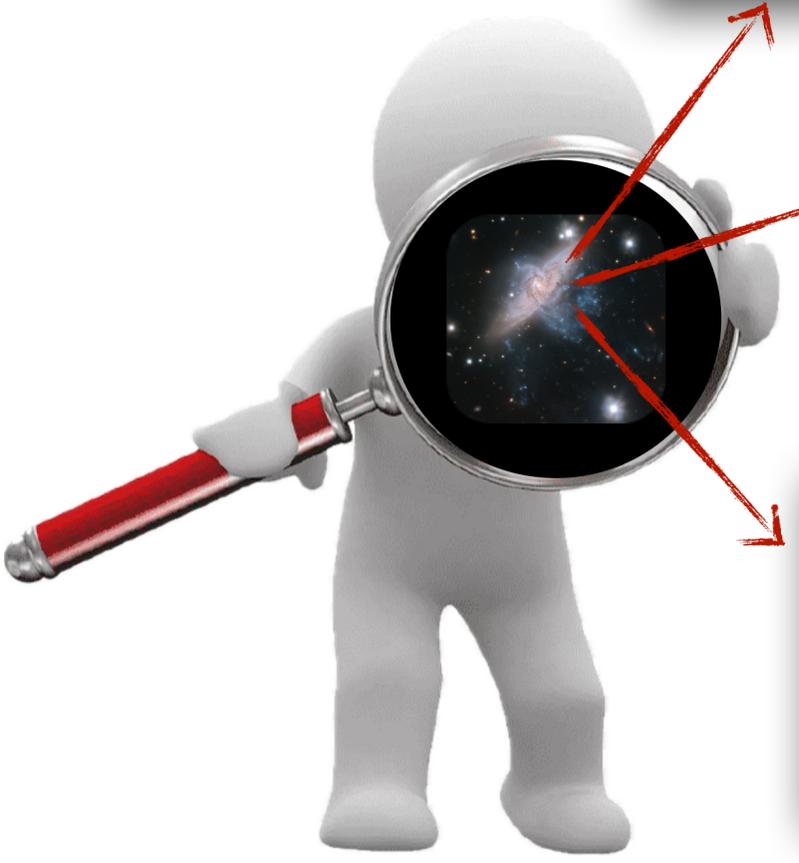
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*stars*



*light distribution  
stellar kinematics  
stellar population*



*star clusters*



*distances  
galaxies' outskirts  
stellar population*



*ISM*

# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

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Bright & massive galaxies

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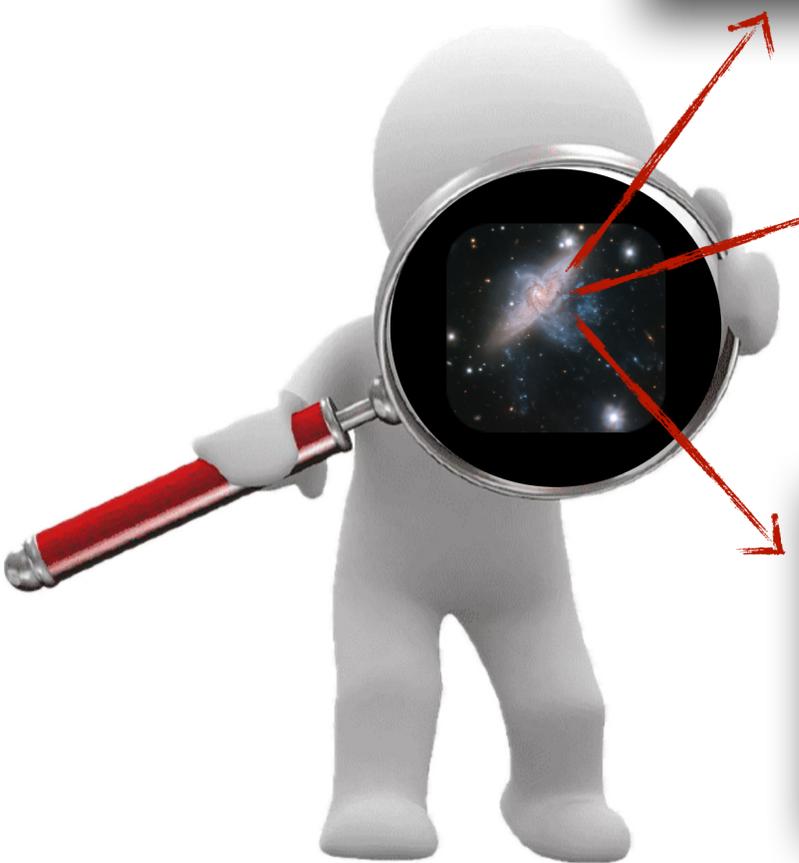
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*ISM*



*dust  
gas:  
cold, warm, hot*

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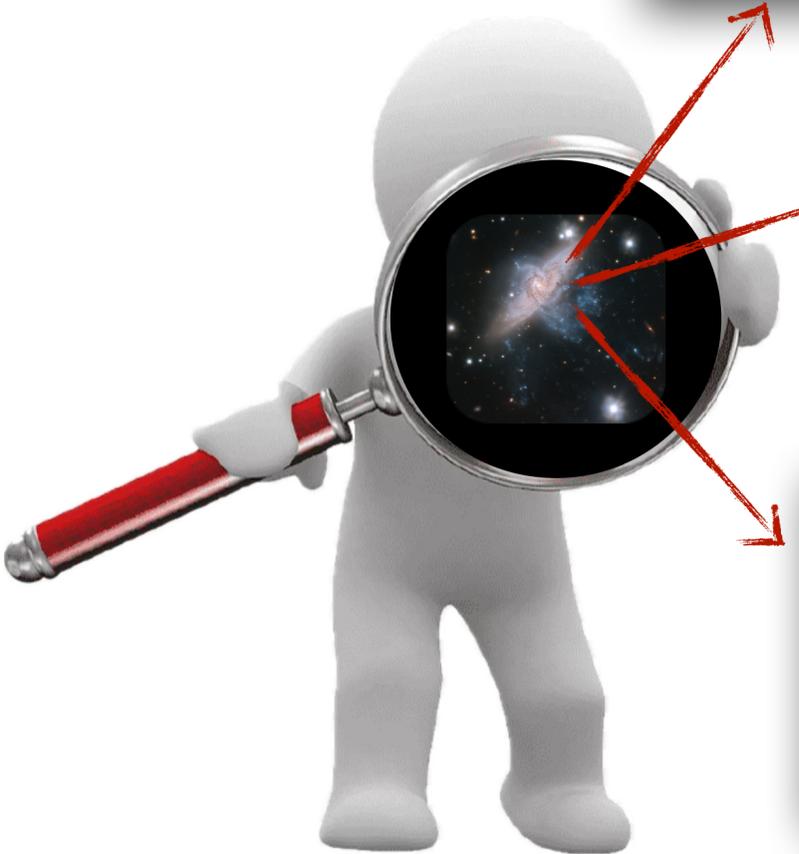
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stars



light distribution  
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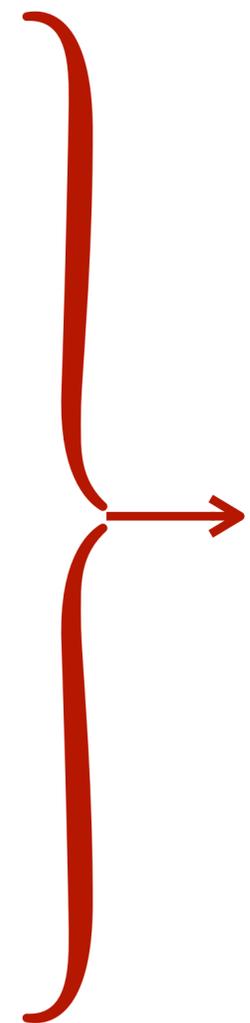
distances  
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ISM



dust  
gas:  
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galaxy's components  
 $M_{dyn}$   
SFH

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Physical Scale: stellar masses

LSB galaxies

Bright & massive galaxies

*dark galaxies (M\*~?)*

How we can map the galaxies' structure?

Trace the Baryonic content



stars



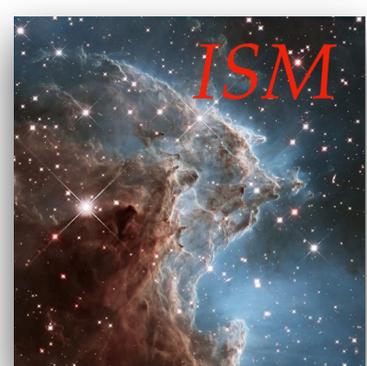
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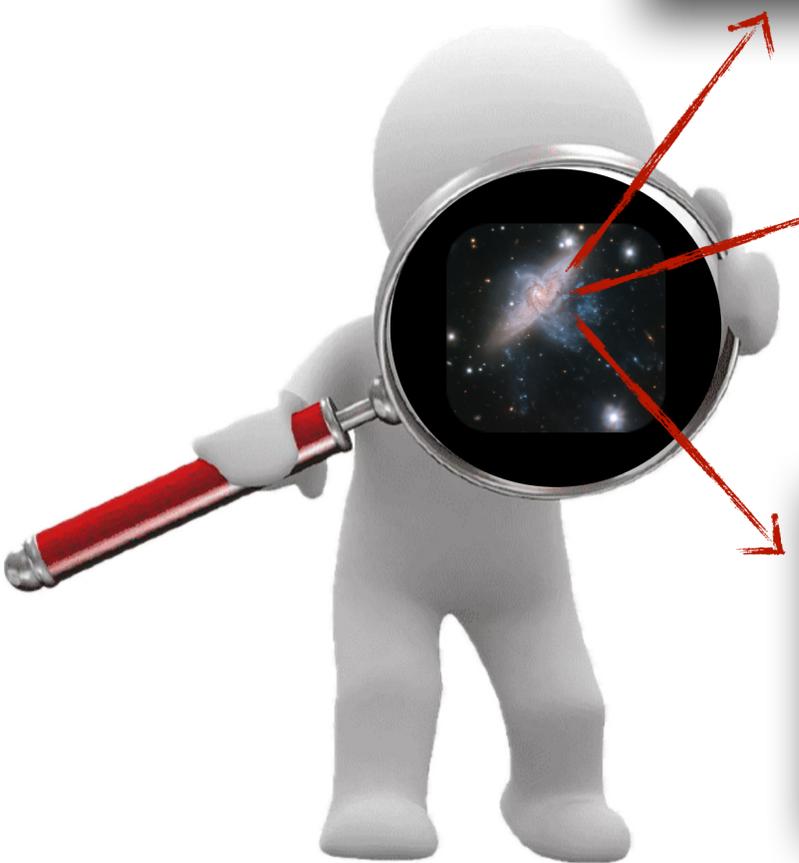
ISM



dust  
gas:  
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Imaging & Spectroscopy at different  $\lambda$

galaxy's components  
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# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



Physical Scale: stellar masses



dark galaxies ( $M_* \sim ?$ )

How we can map the galaxies' structure?

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star clusters

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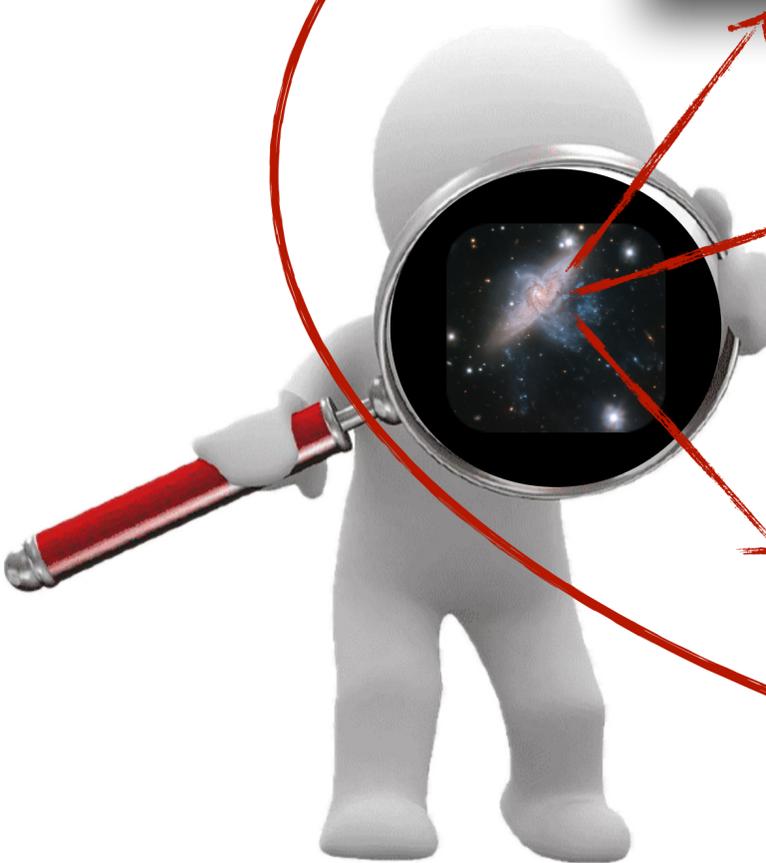
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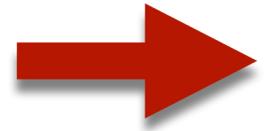
Imaging & Spectroscopy at different  $\lambda$

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SFH

Astrophysics of galaxies in the Local Universe ( $z < 0.5$ )



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

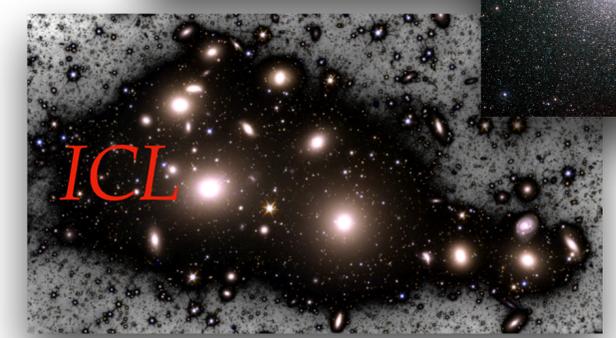
*groups & clusters of galaxies*



*How we can map the formation & evolution?*



*Galaxies*



*IGM*

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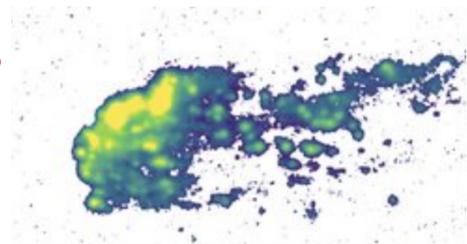
*How we can map the formation & evolution?*



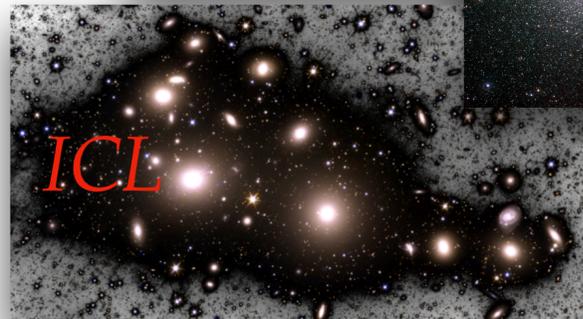
*Galaxies*



▶ *Galaxies' structure vs environment*



▶ *Gravitational interactions & merging*



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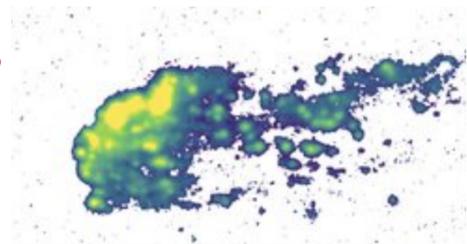
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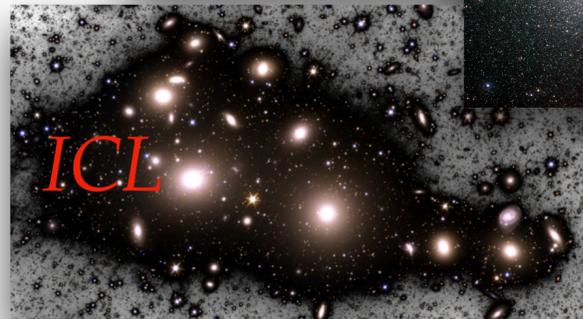


*Hot gas*



*IC-GCs*

IC baryons



*ICL*

*IGM*

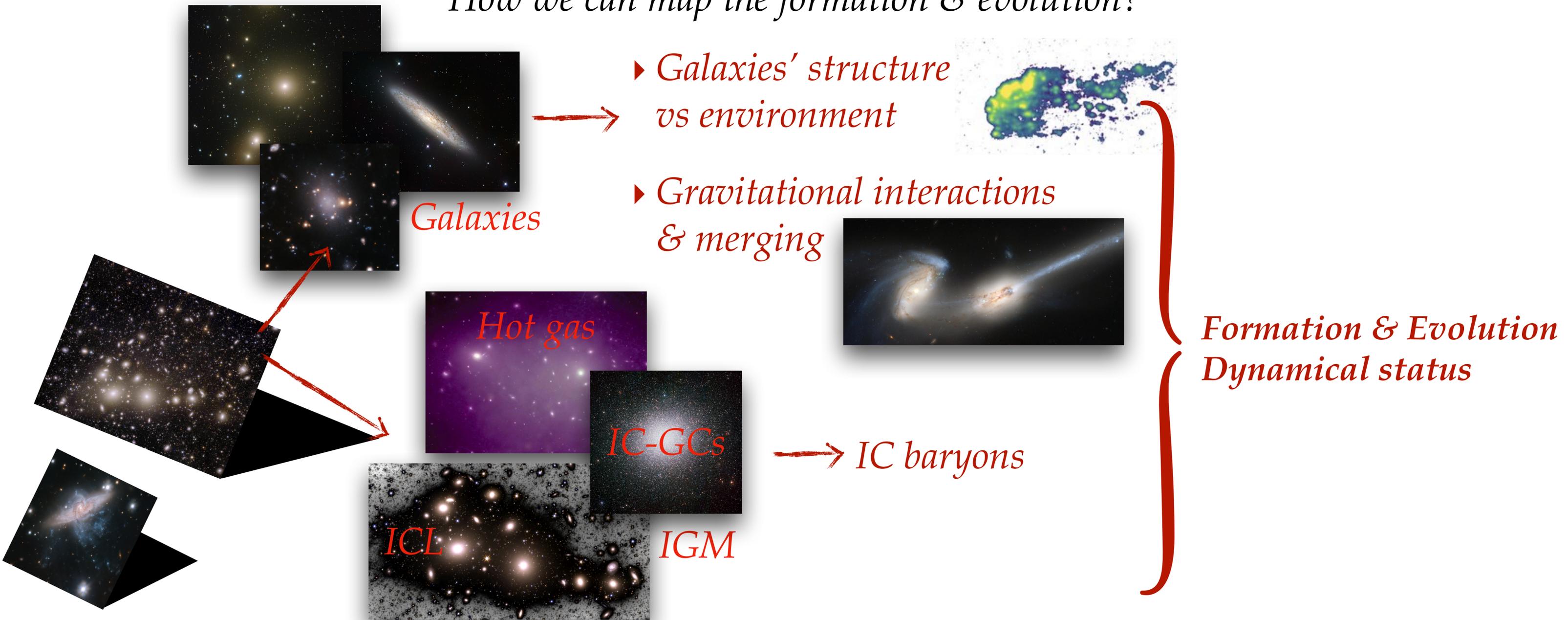


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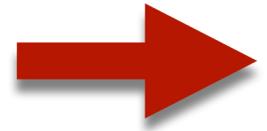
Physical Scale: stellar masses

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# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*

*large-scale structure ( $M_* > 10^{16} M_\odot$ )*

*How we can map the large-scale structure of the Universe?*

*→ Groups, clusters, filaments, walls, voids, superclusters*



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

Physical Scale: stellar masses

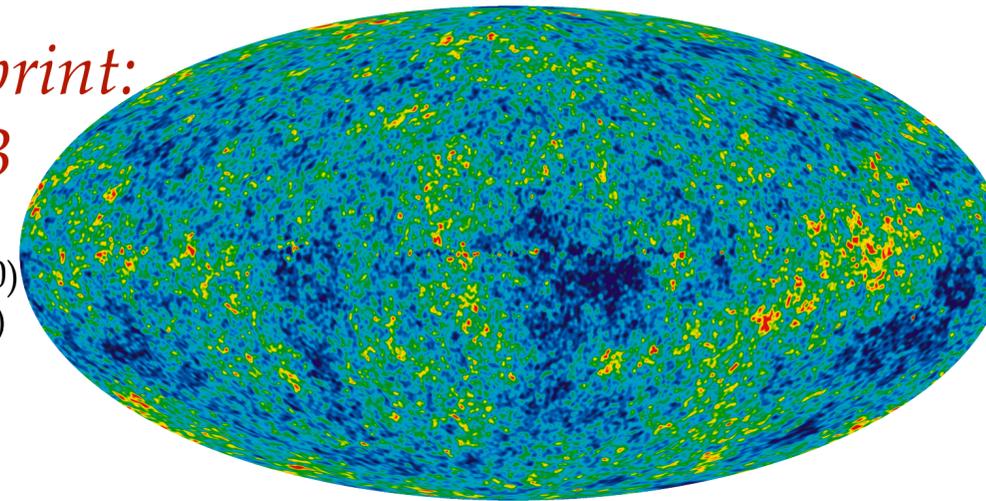
large-scale structure ( $M_* > 10^{16} M_\odot$ )

*How we can map the large-scale structure of the Universe?*

*Groups, clusters, filaments, walls, voids, superclusters*

*The blueprint:  
CMB*

- ▶ COBE (1989–1993)
- ▶ WMAP (2001–2010)
- ▶ Planck (2009–2013)



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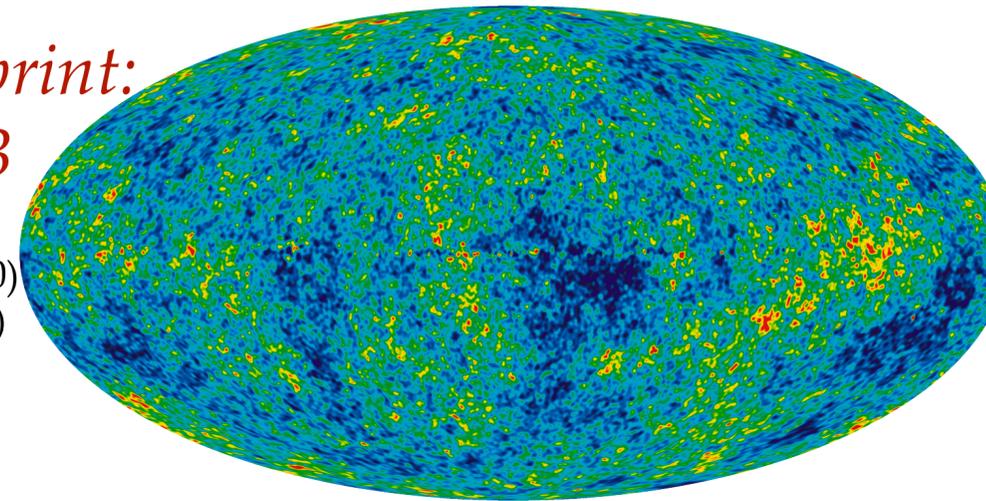
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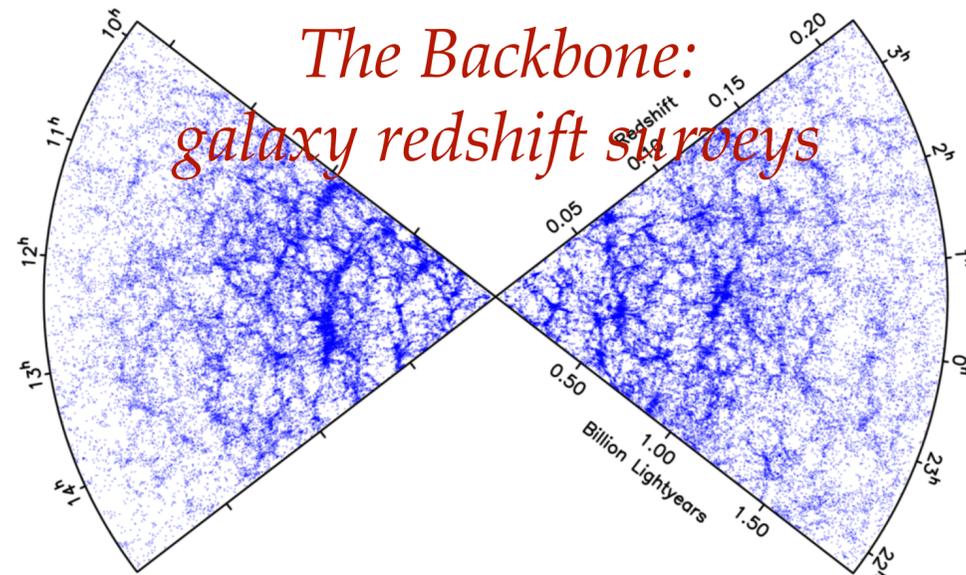
Groups, clusters, filaments, walls, voids, superclusters

The blueprint:  
CMB

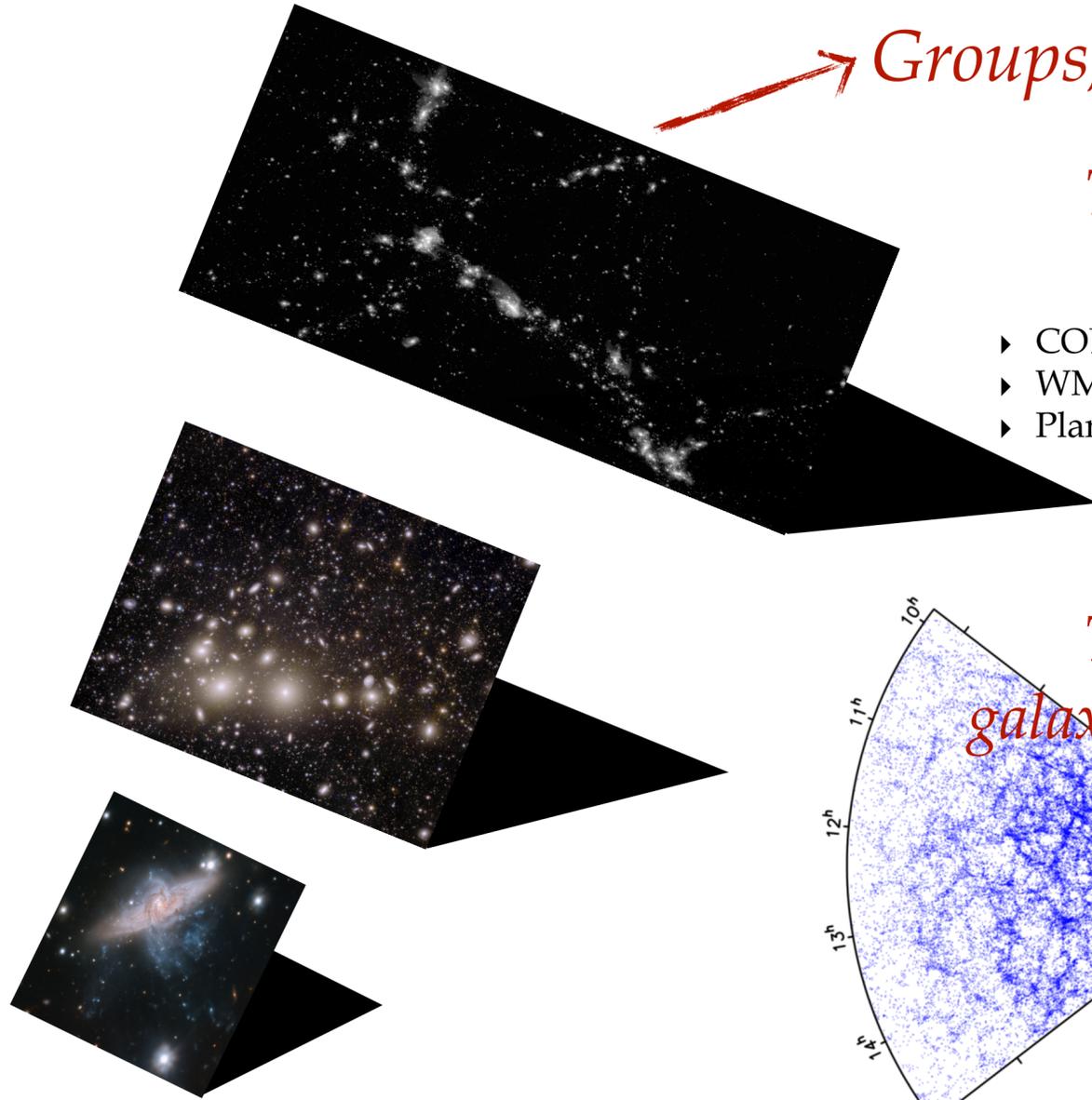
- ▶ COBE (1989–1993)
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The Backbone:  
galaxy redshift surveys



- Key surveys
- ▶ CfA Redshift Survey (1980s)
  - ▶ 2dF Galaxy Redshift Survey
  - ▶ Sloan Digital Sky Survey (SDSS)
  - ▶ DESI (ongoing)



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Physical Scale: stellar masses

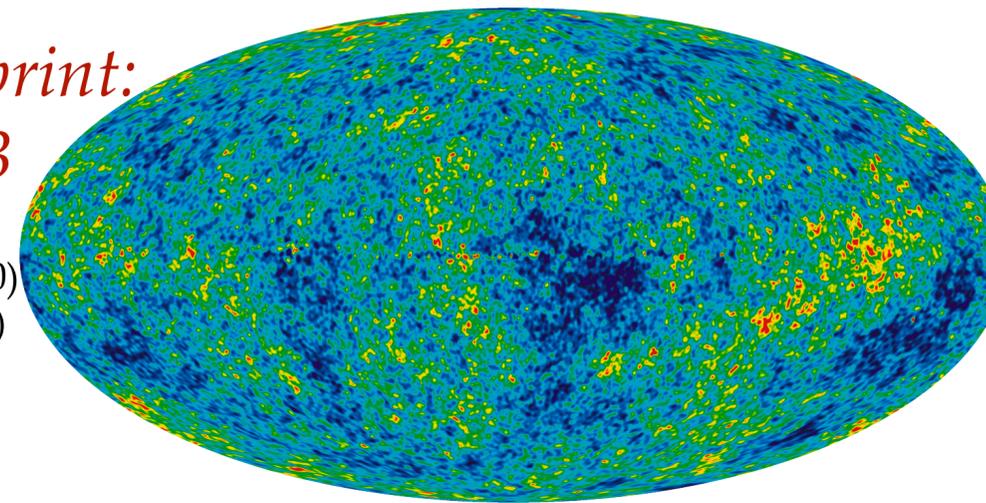
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How we can map the large-scale structure of the Universe?

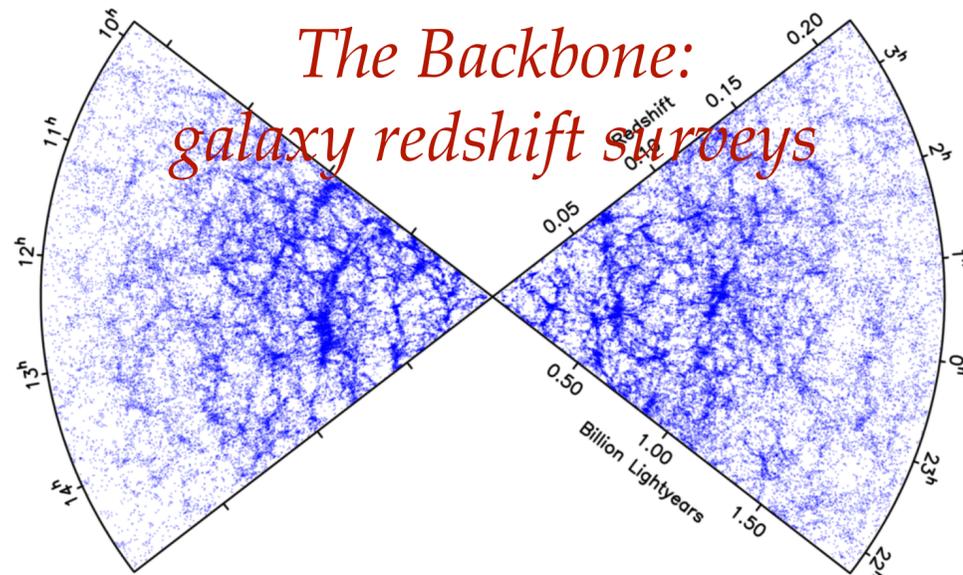
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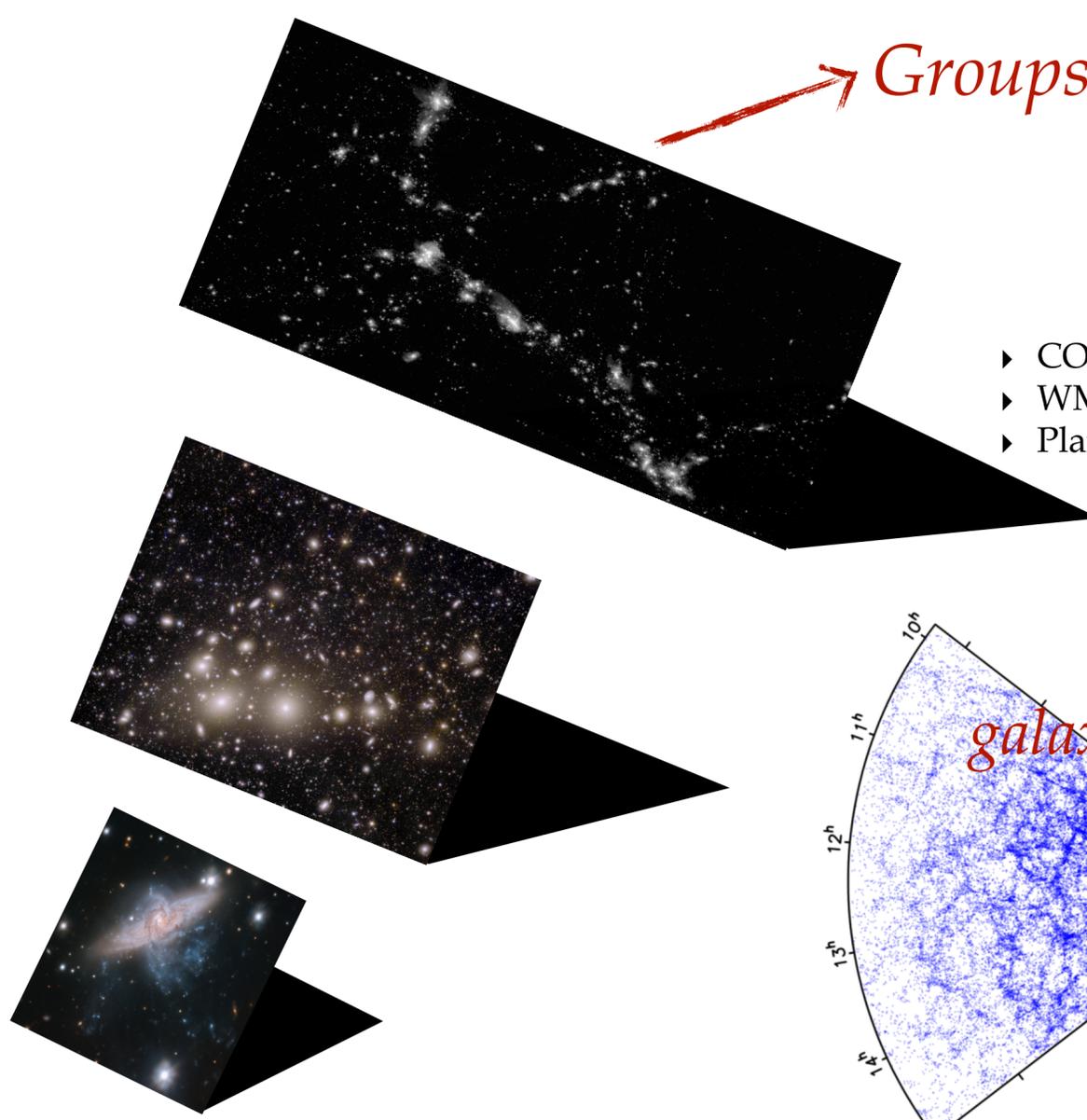
The Backbone:  
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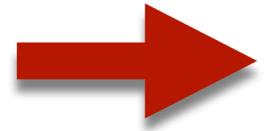
- + Weak lensing → dark matter web
- + BAO & statistics → precision cosmology
- + Lyman- $\alpha$  forest → early-Universe structure

Key surveys

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- ▶ 2dF Galaxy Redshift Survey
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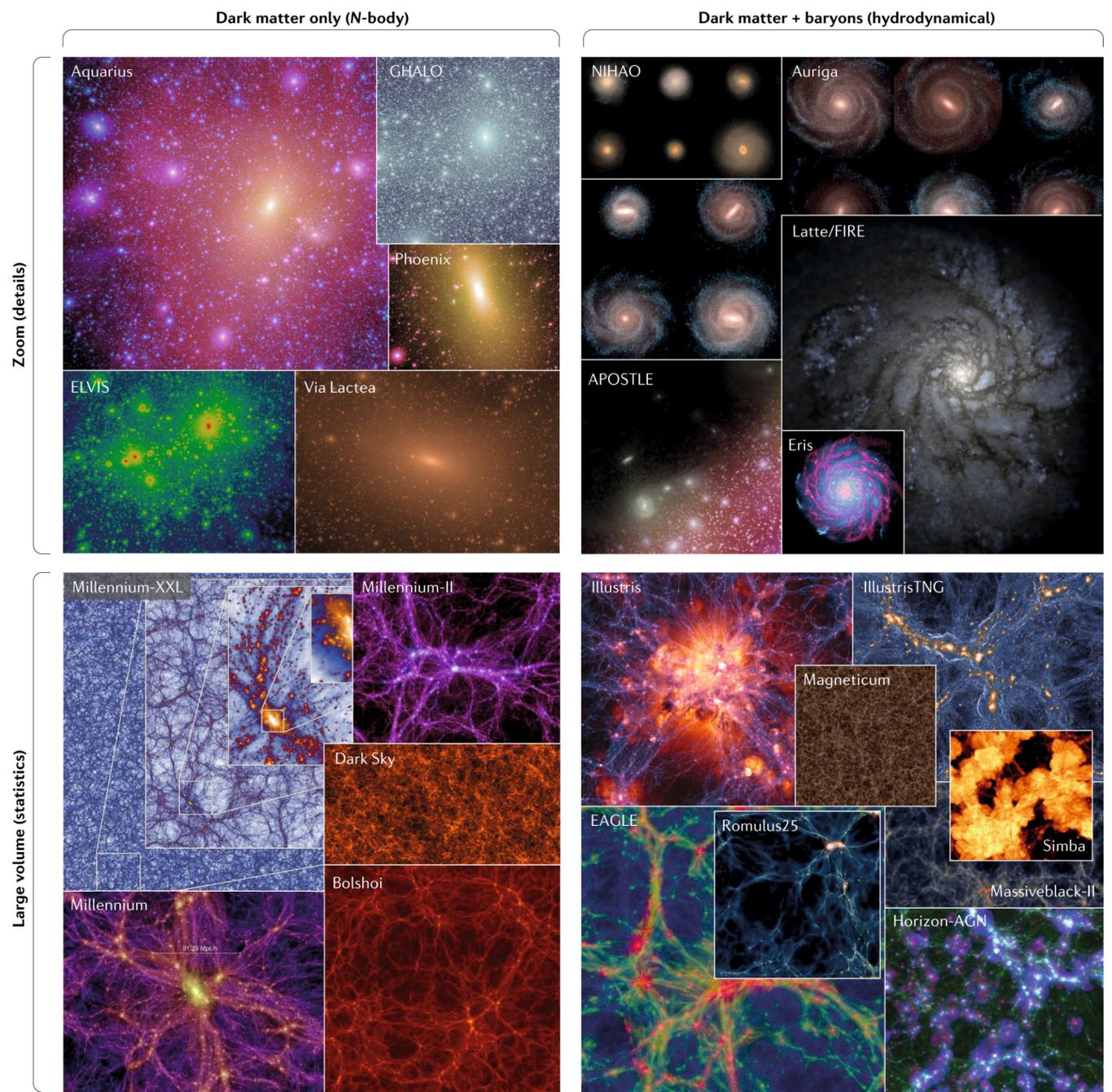
# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*Physical Scale: stellar masses*



*On the theoretical side → map the entire range of stellar masses*



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

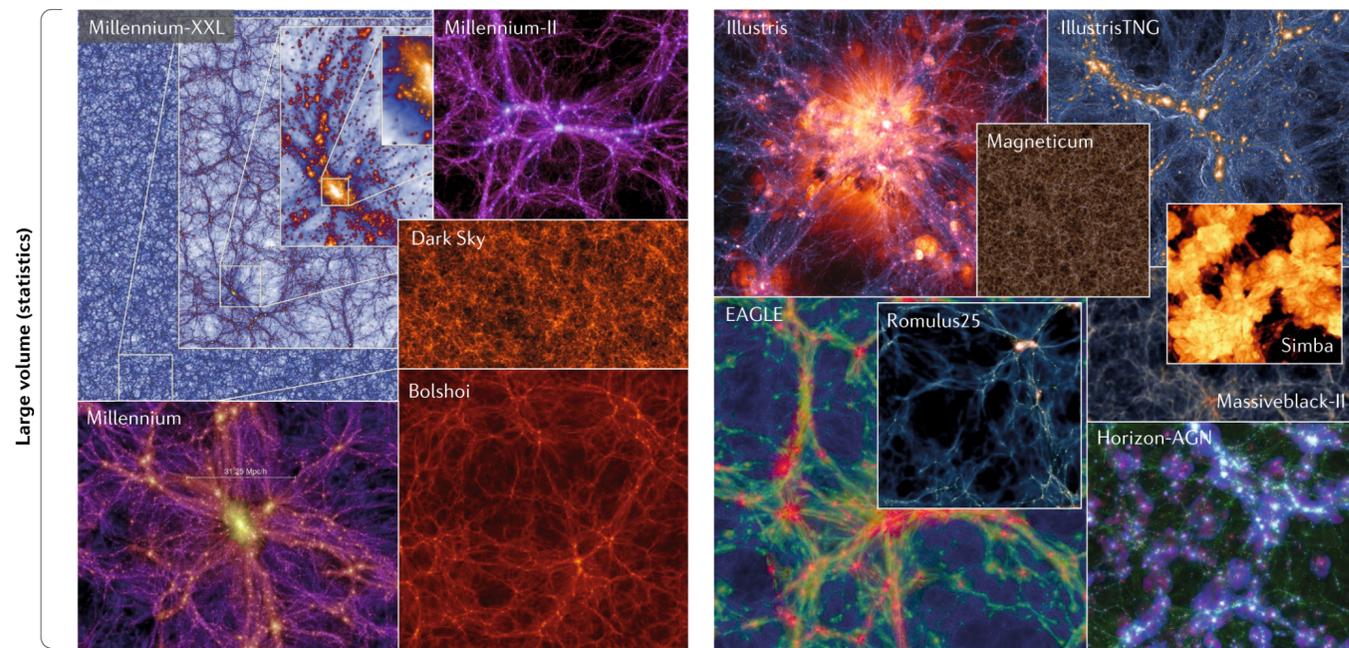
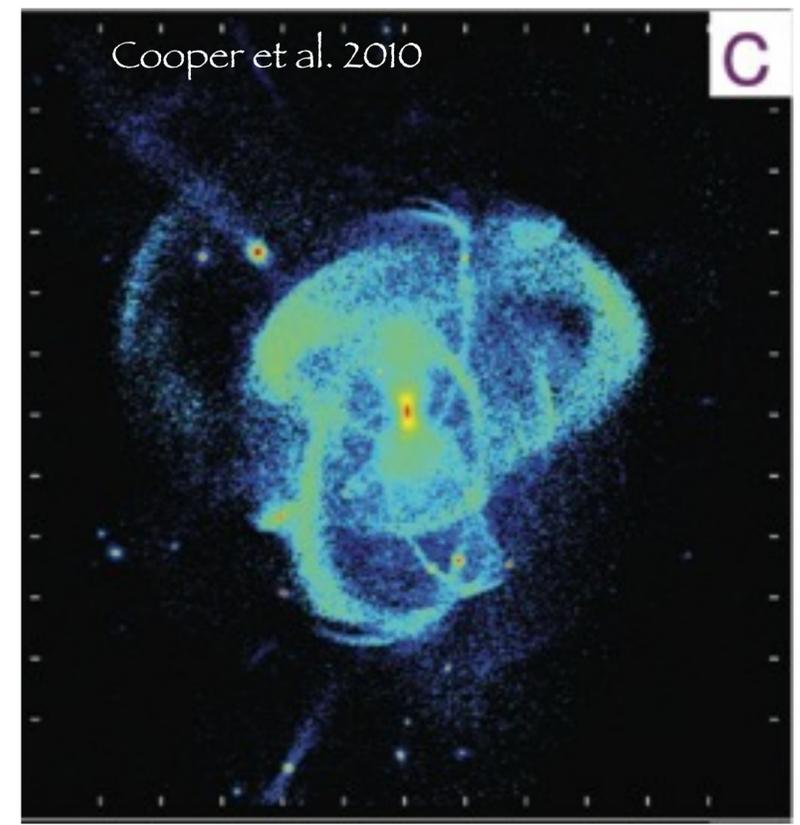
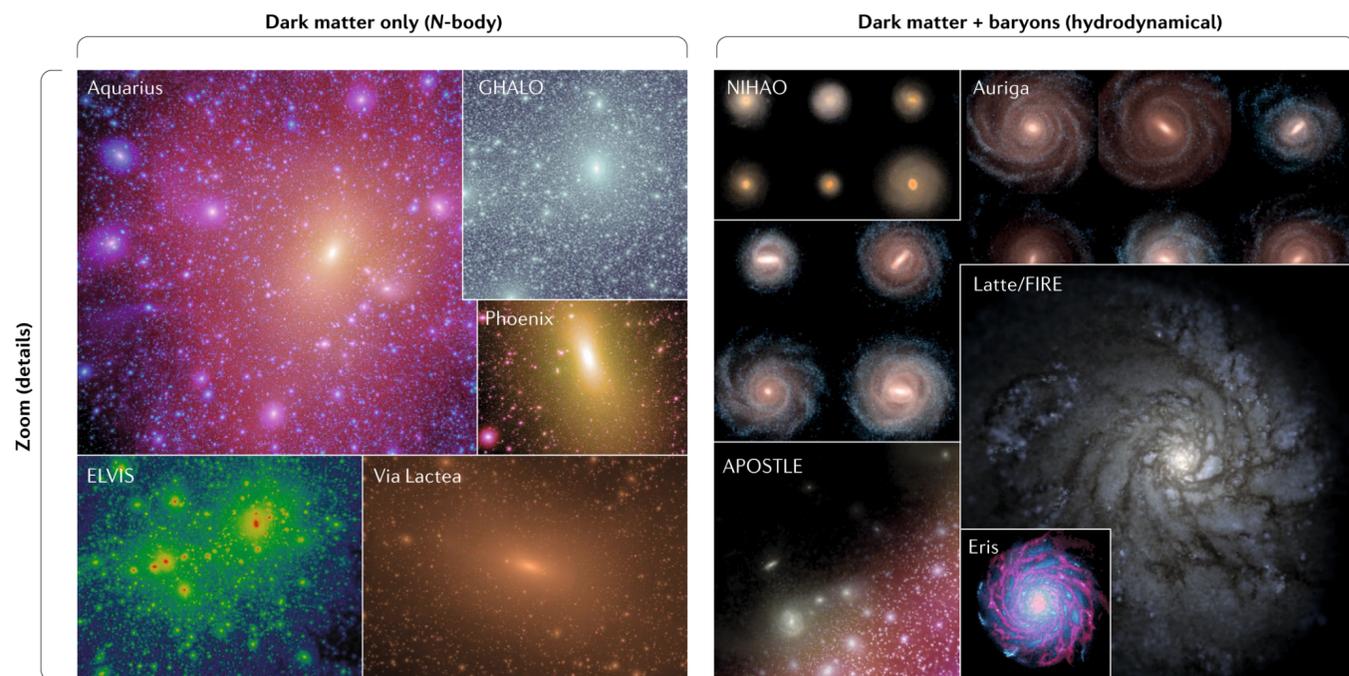


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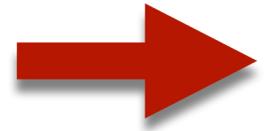
LSB galaxies      Bright & massive galaxies      groups & clusters of galaxies      large-scale structure ( $M_* > 10^{16} M_\odot$ )



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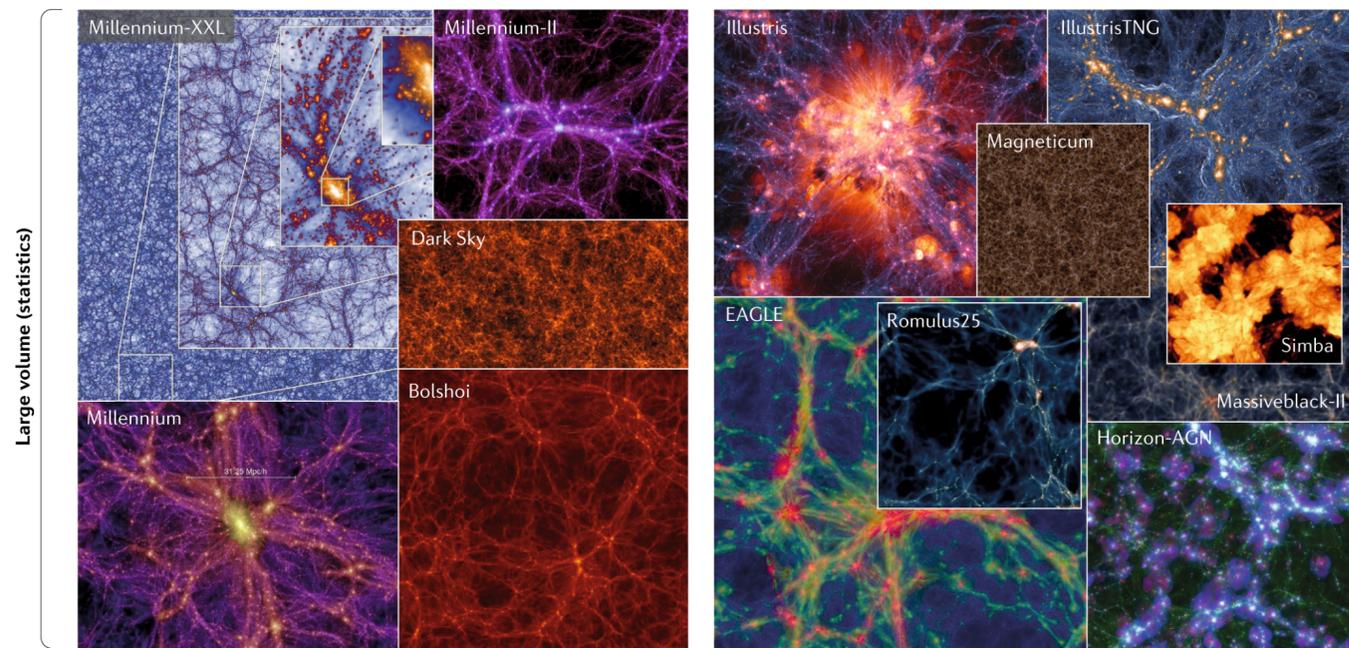
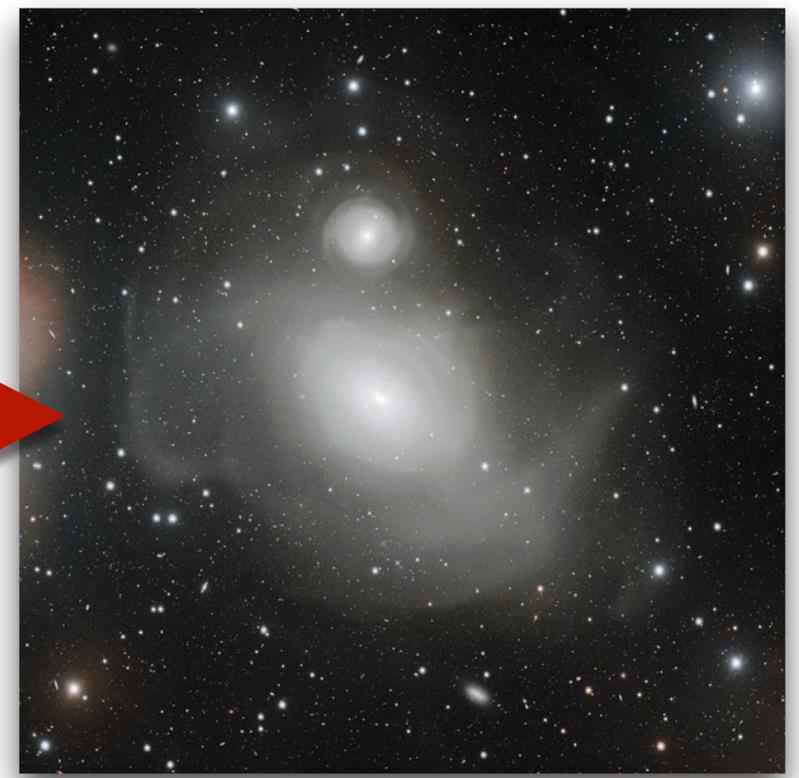
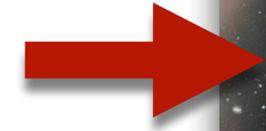
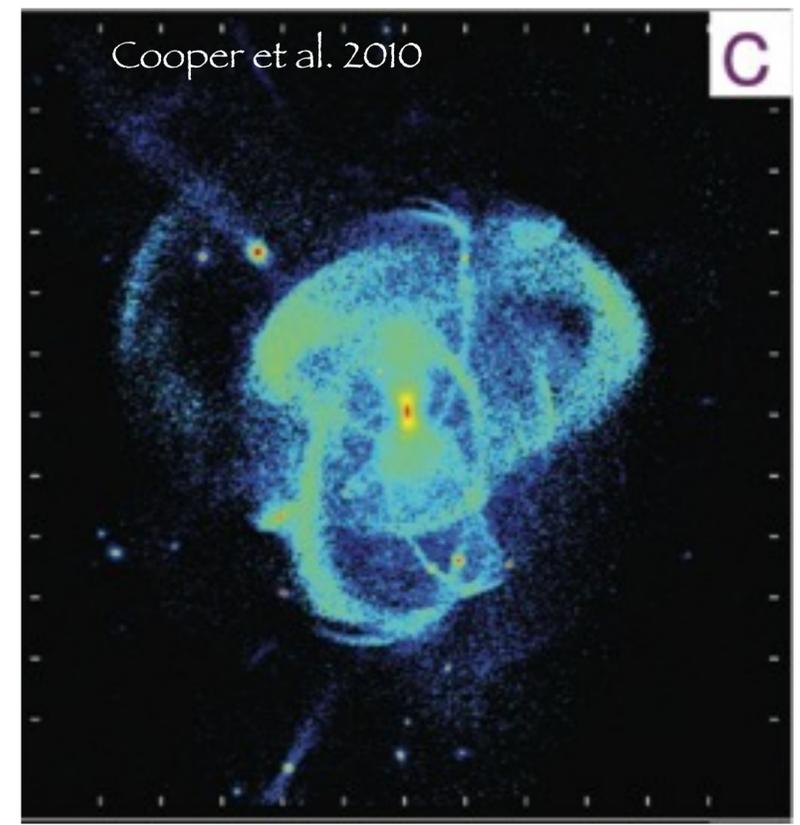
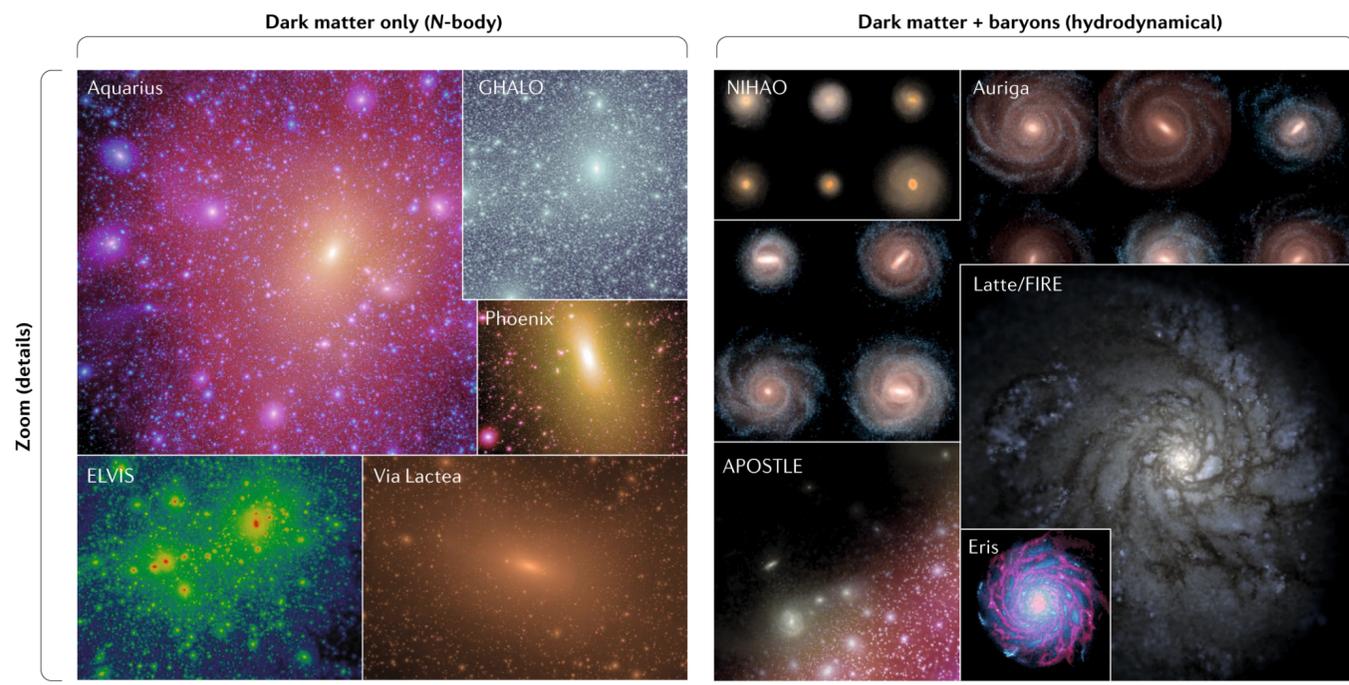


*Physical Scale: stellar masses*

LSB galaxies      Bright & massive galaxies      groups & clusters of galaxies      large-scale structure ( $M_* > 10^{16} M_\odot$ )



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*Physical Scale: stellar masses*

LSB galaxies

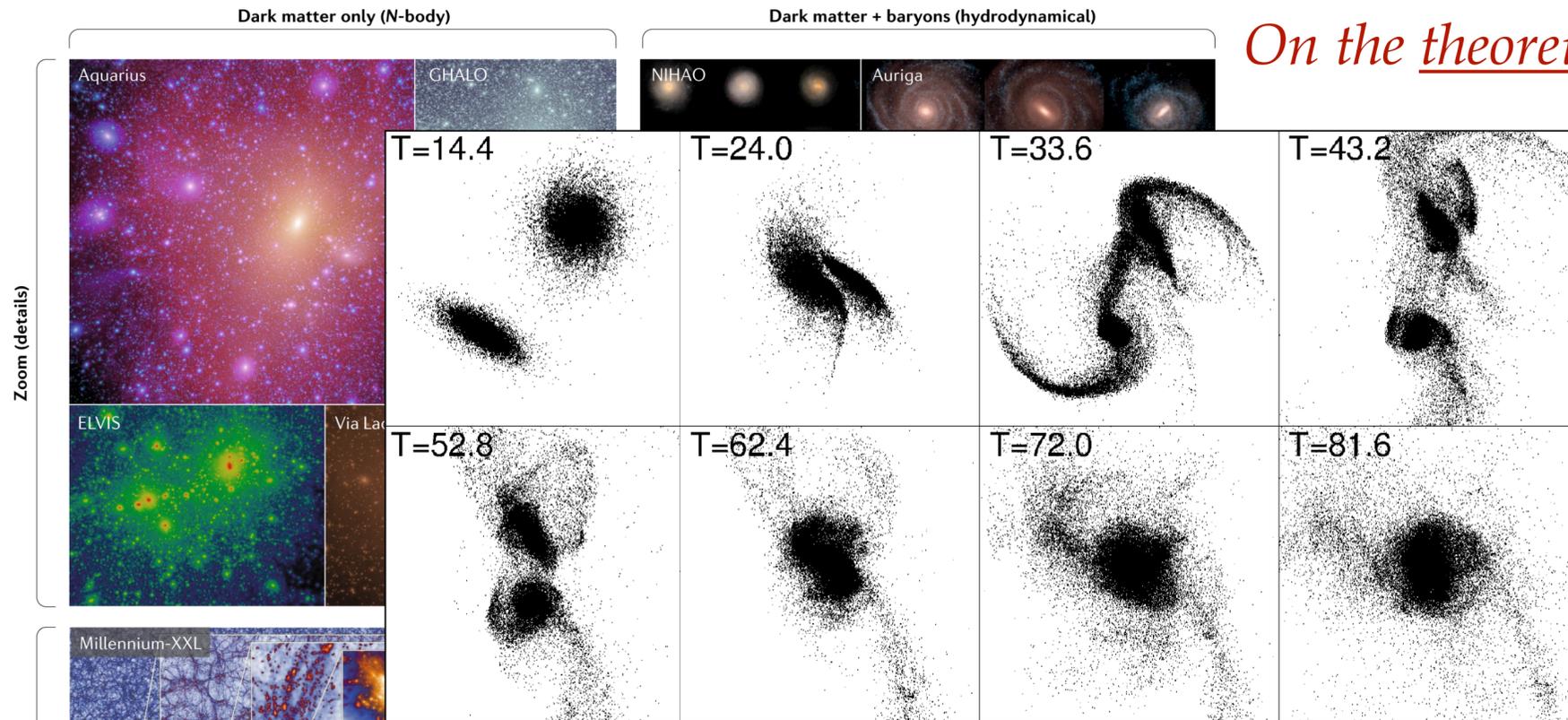
Bright & massive galaxies

groups & clusters of galaxies

large-scale structure ( $M_* > 10^{16} M_\odot$ )

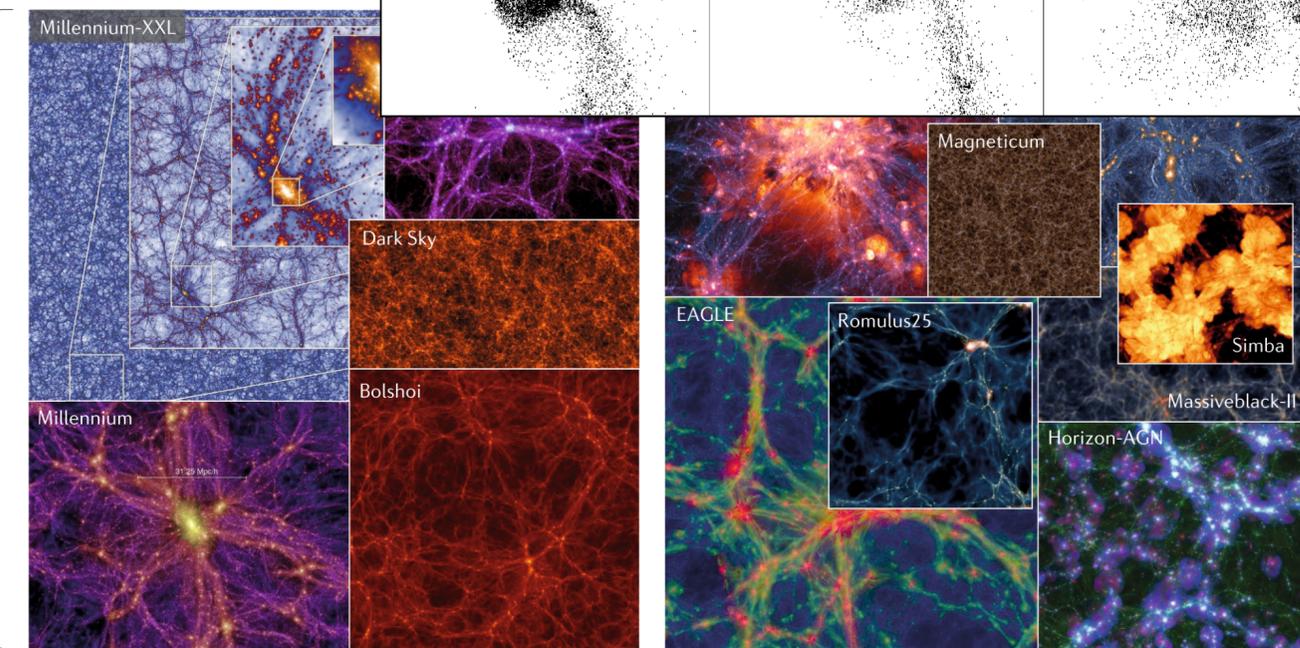


*On the theoretical side → map the entire range of stellar masses*



Zoom (details)

Large volume (statistics)



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

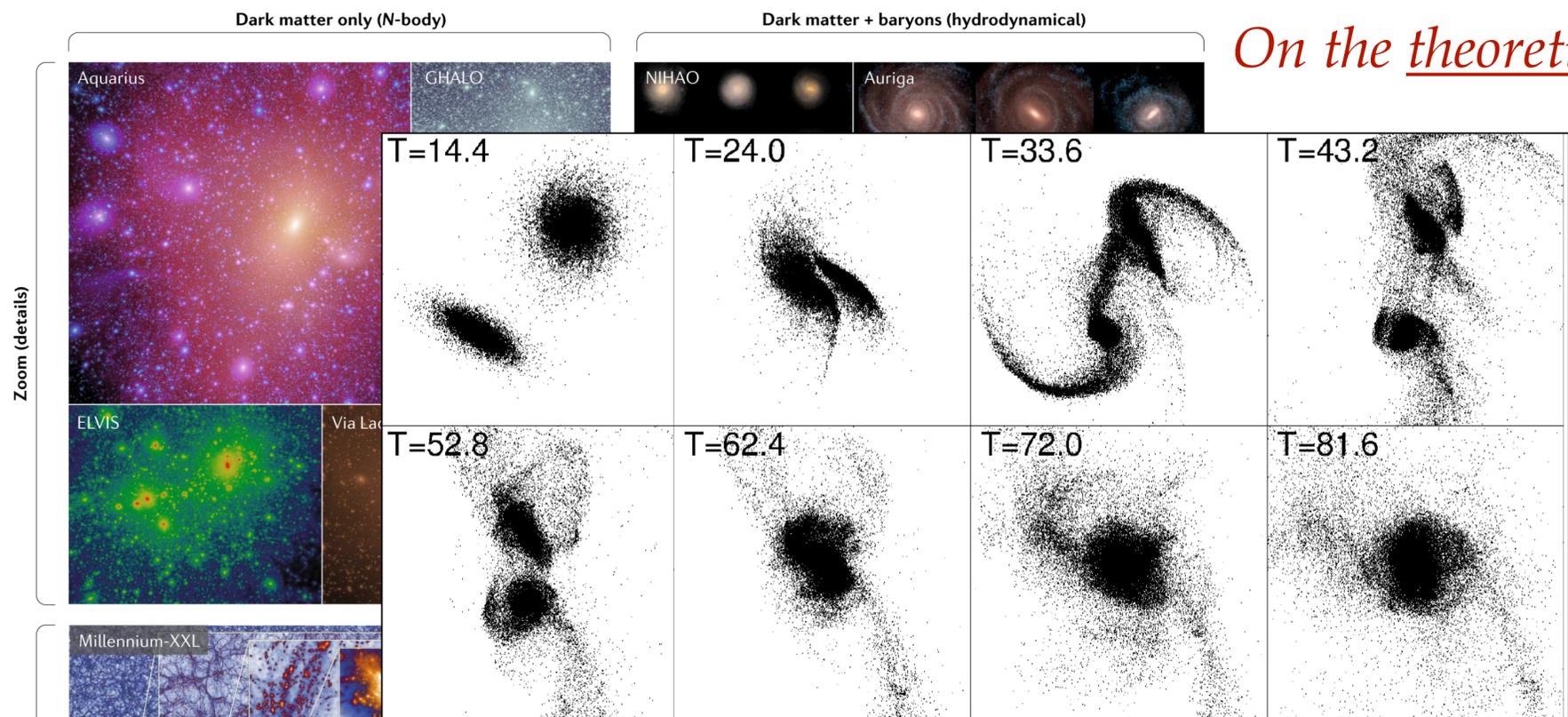


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LSB galaxies      Bright & massive galaxies      groups & clusters of galaxies      large-scale structure ( $M_* > 10^{16} M_\odot$ )

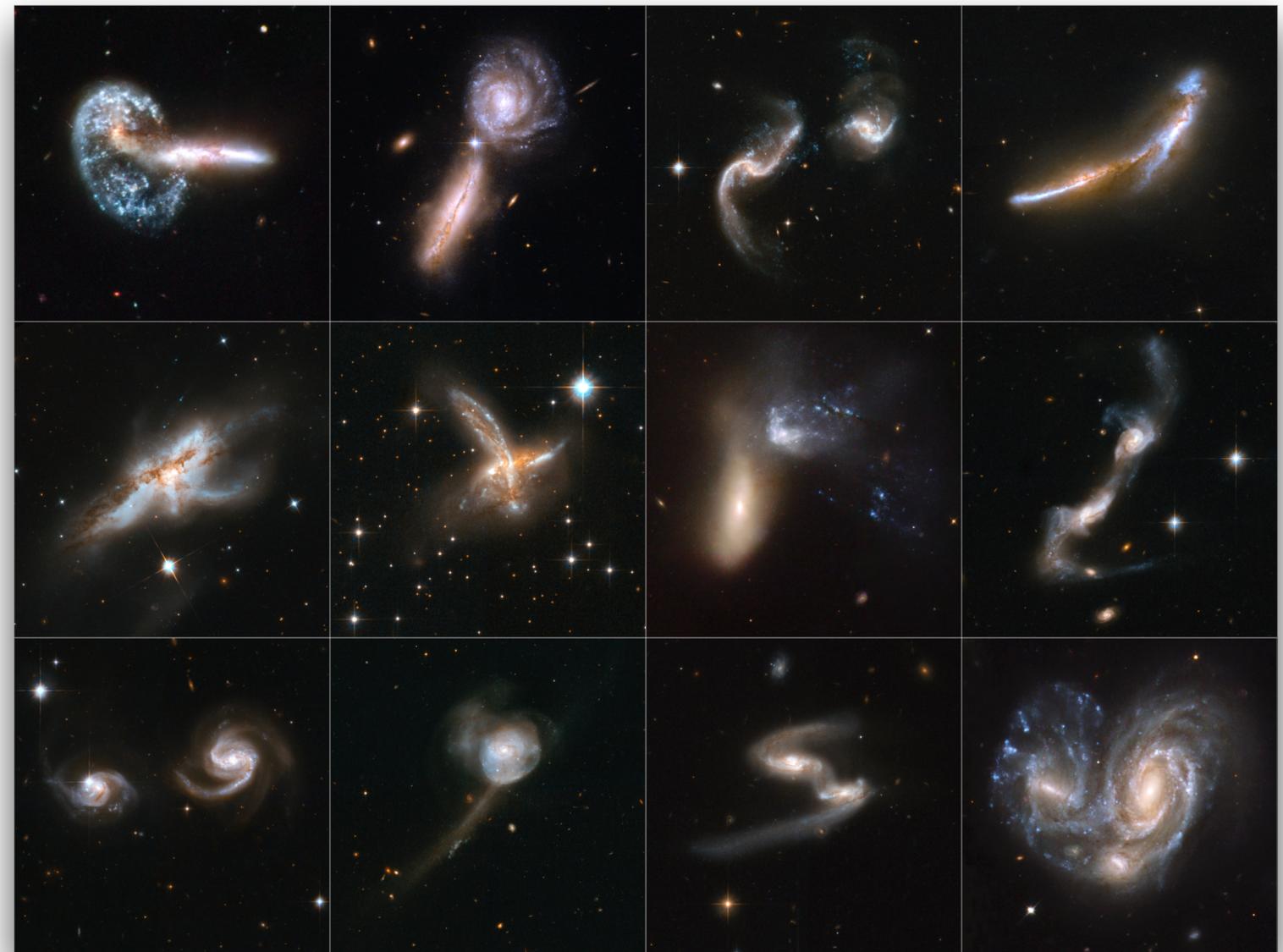
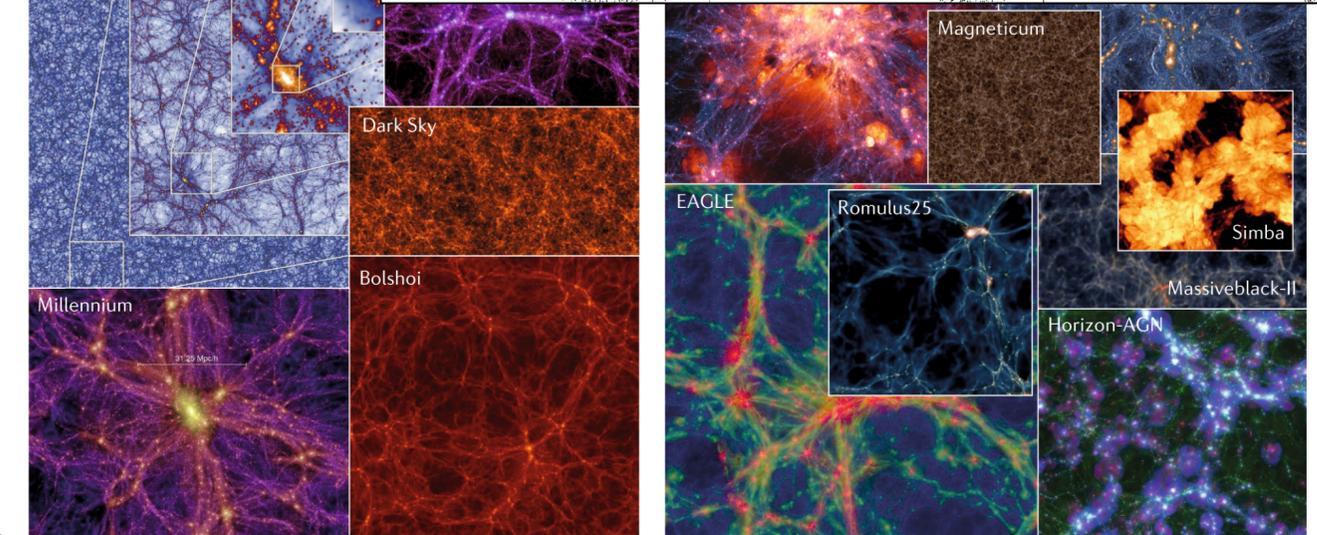


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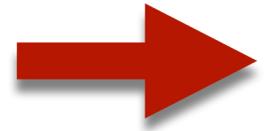


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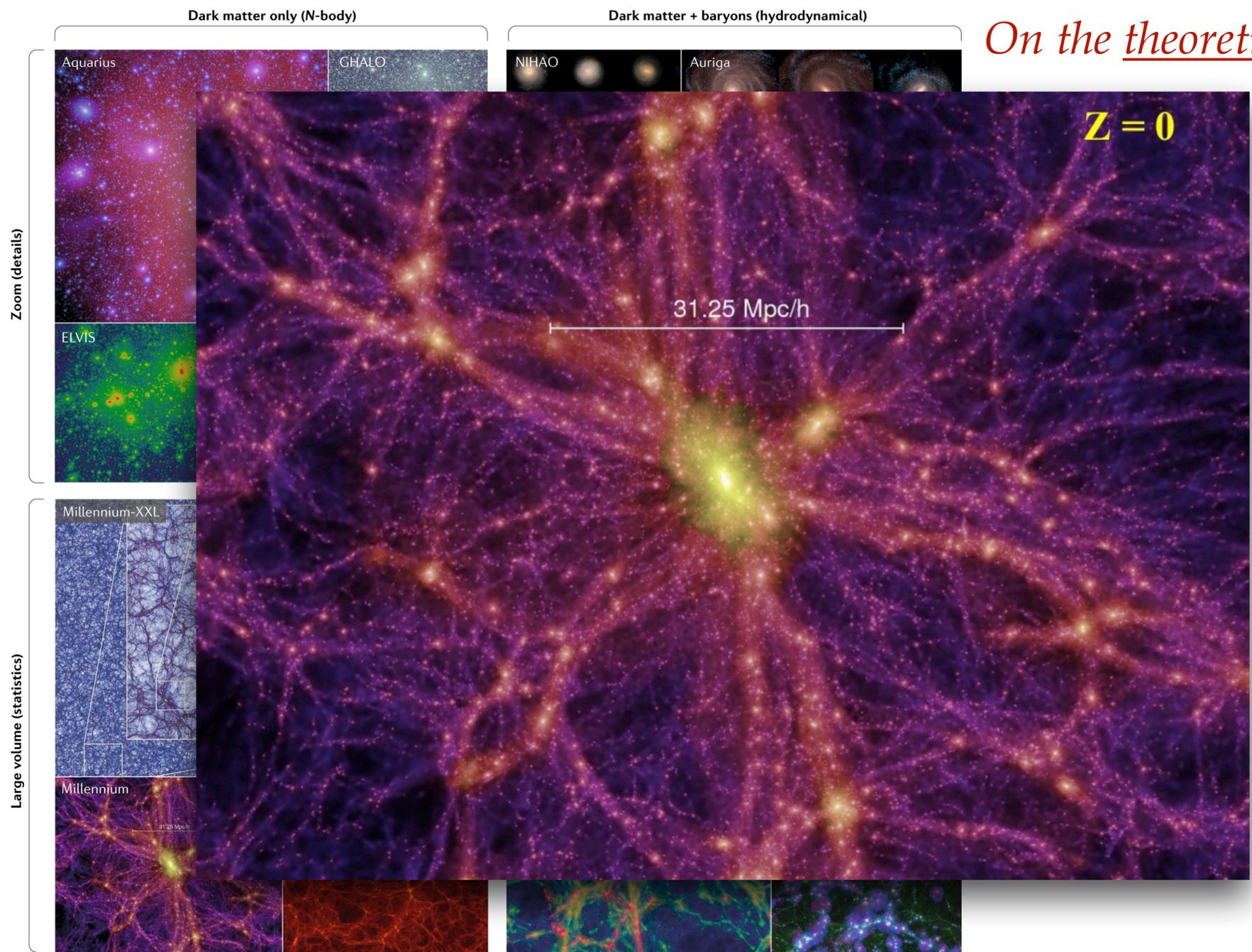
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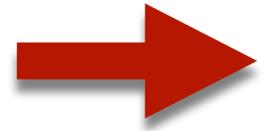


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**Part 2**

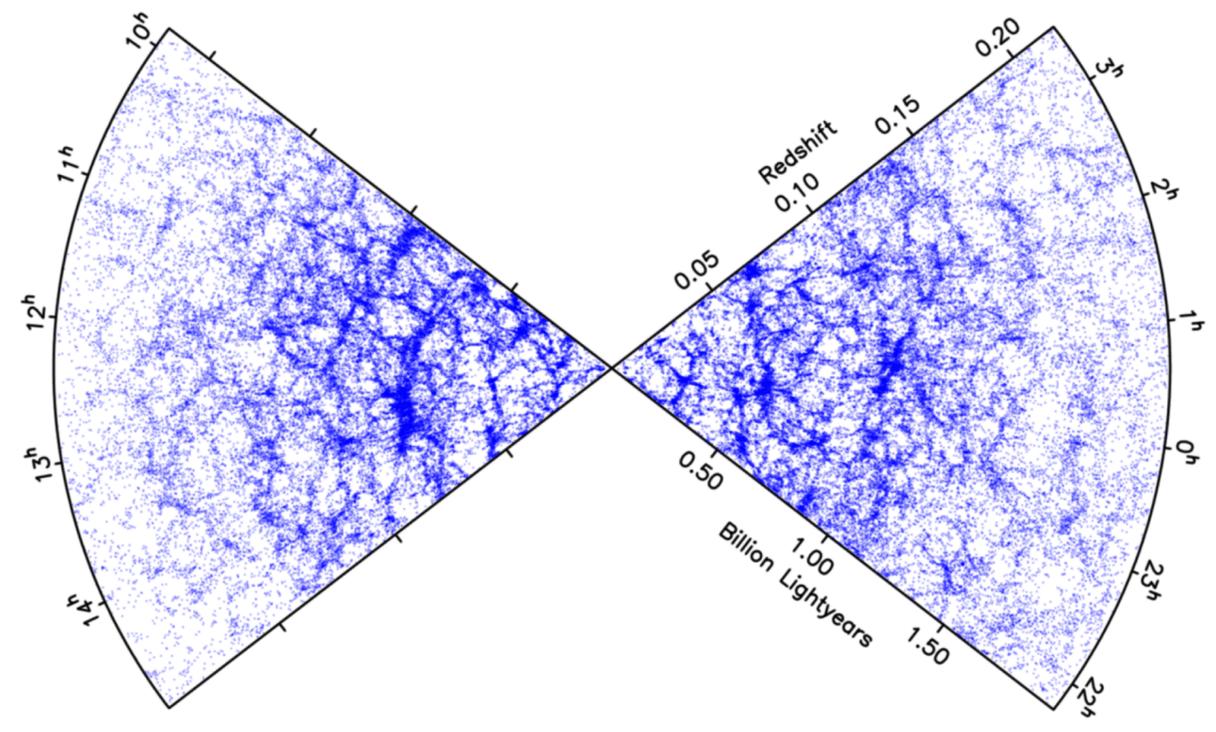
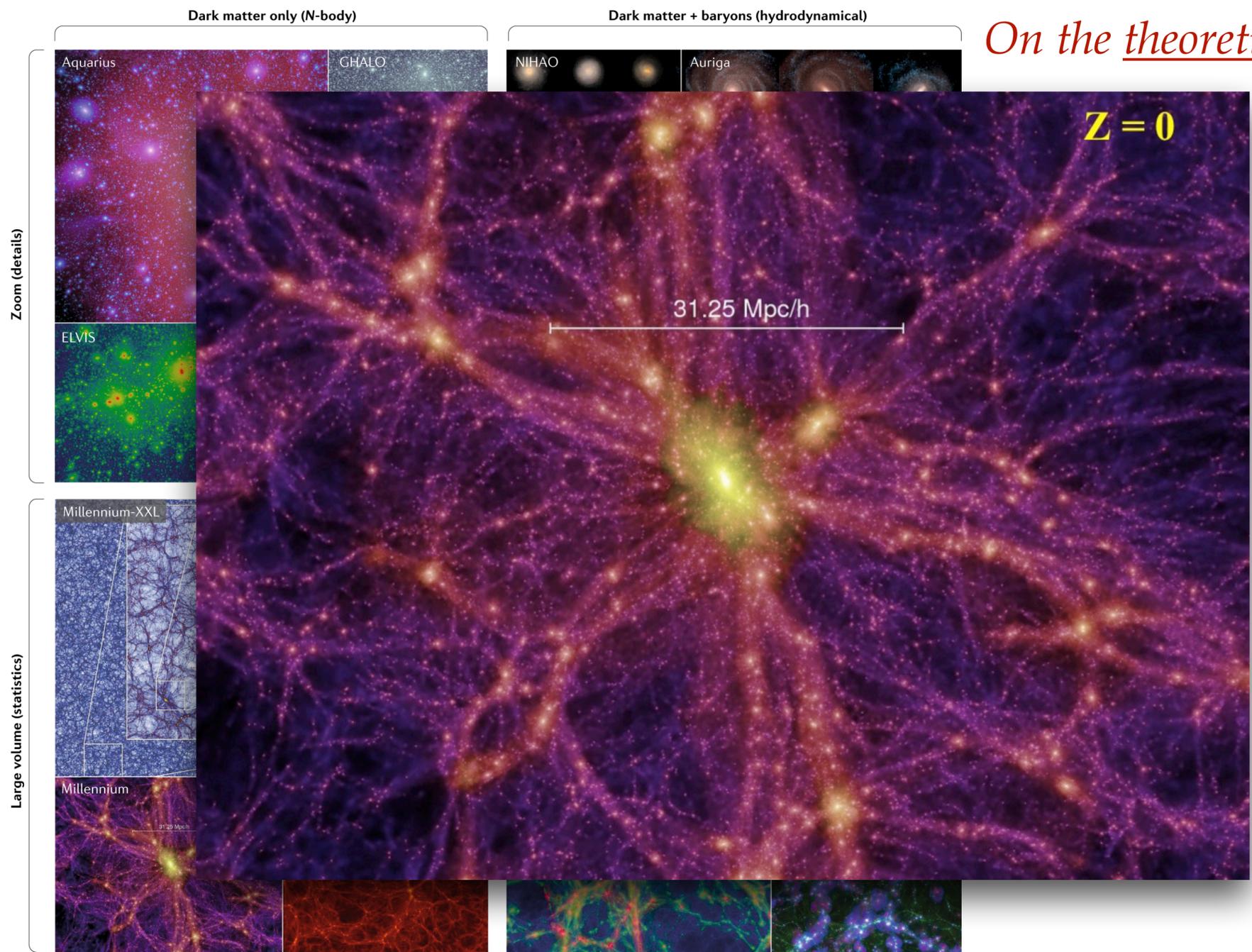
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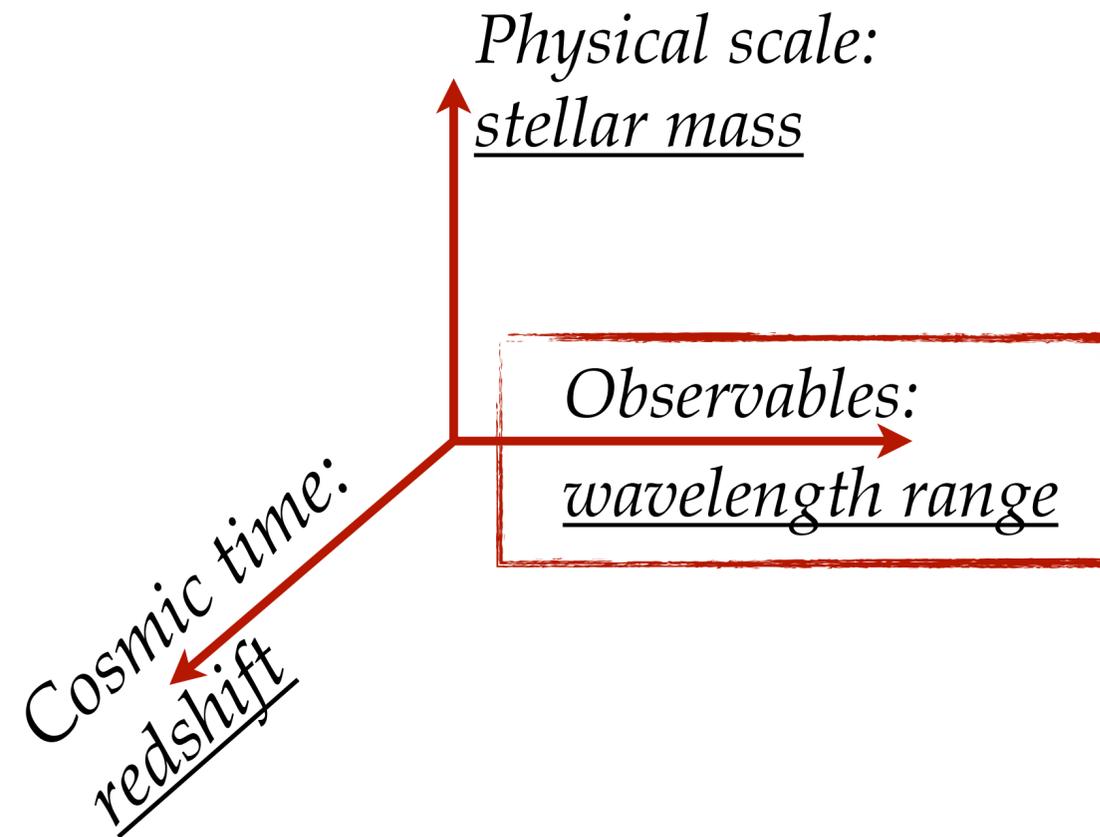
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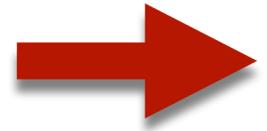
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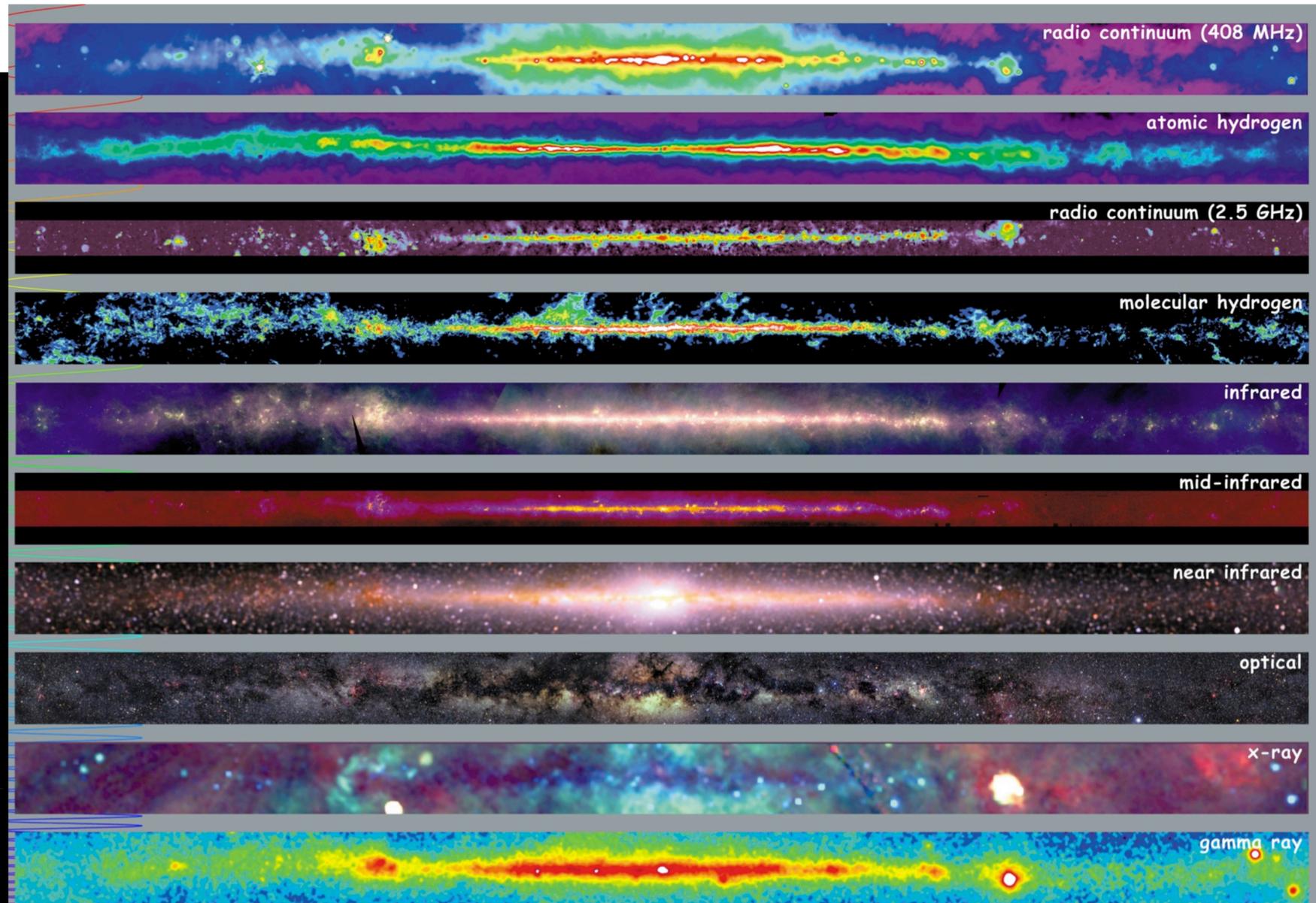
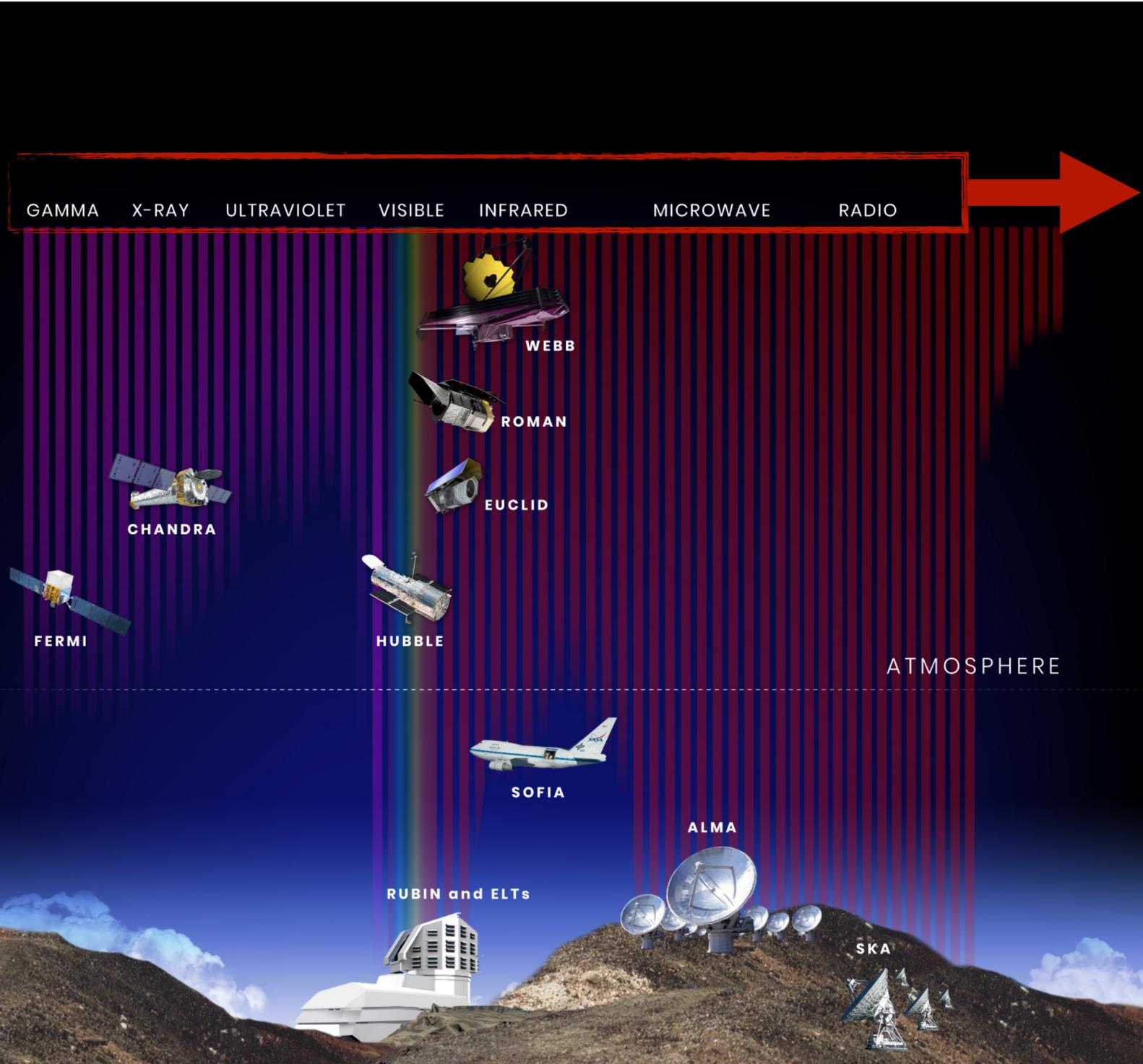
*Three physical quantities*



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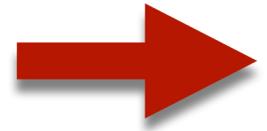


Observables: wavelength range



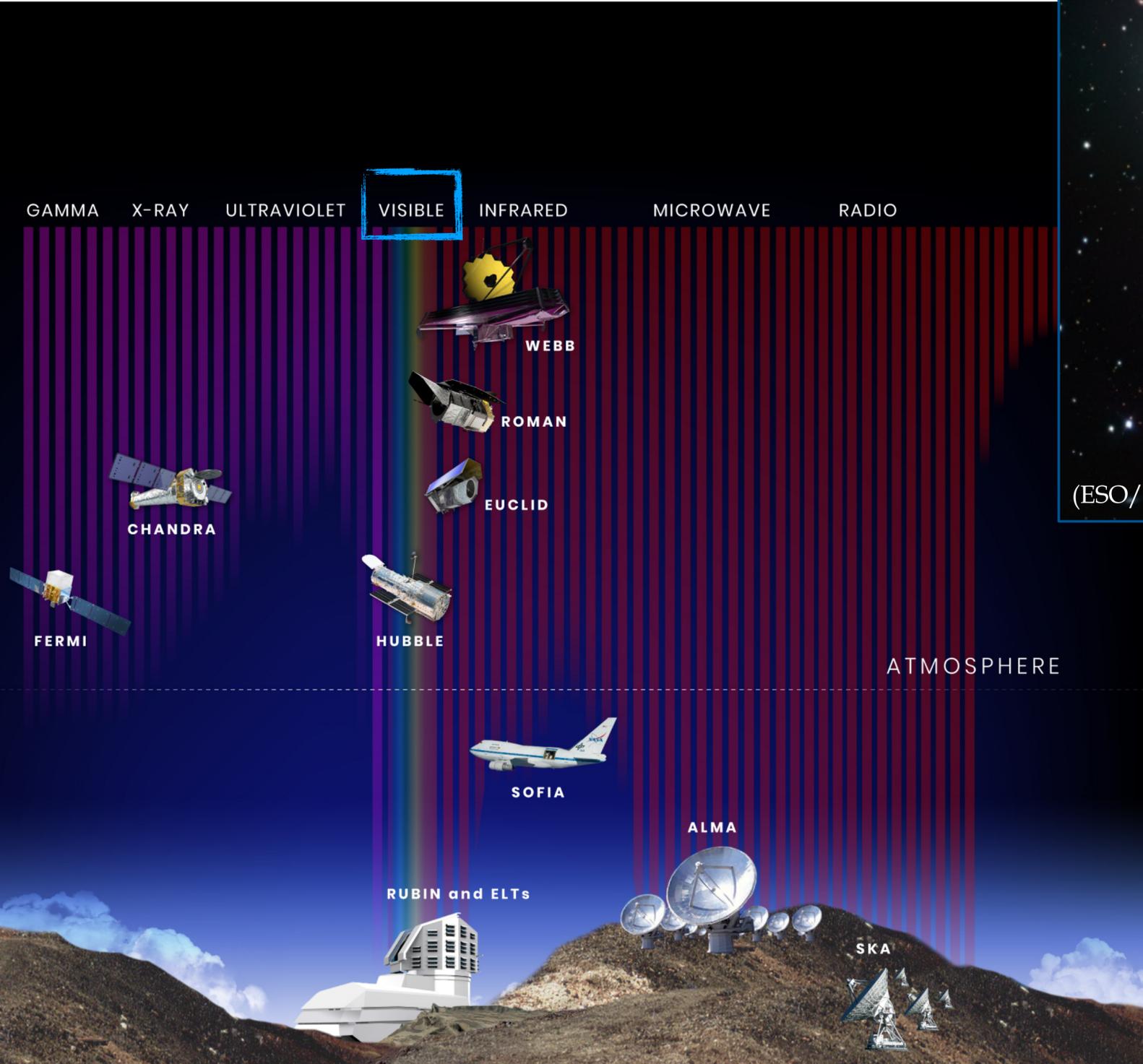
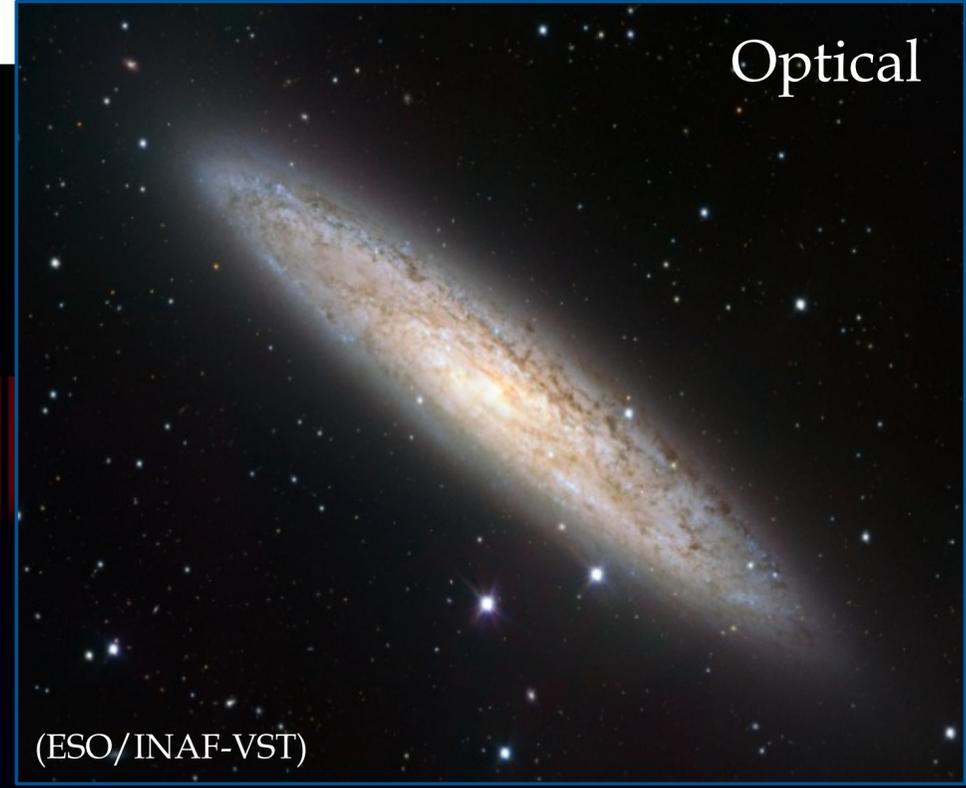
NASA Multiwavelength Milky Way

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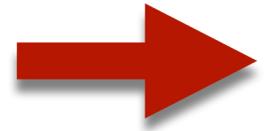


Observables: wavelength range

NGC253



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

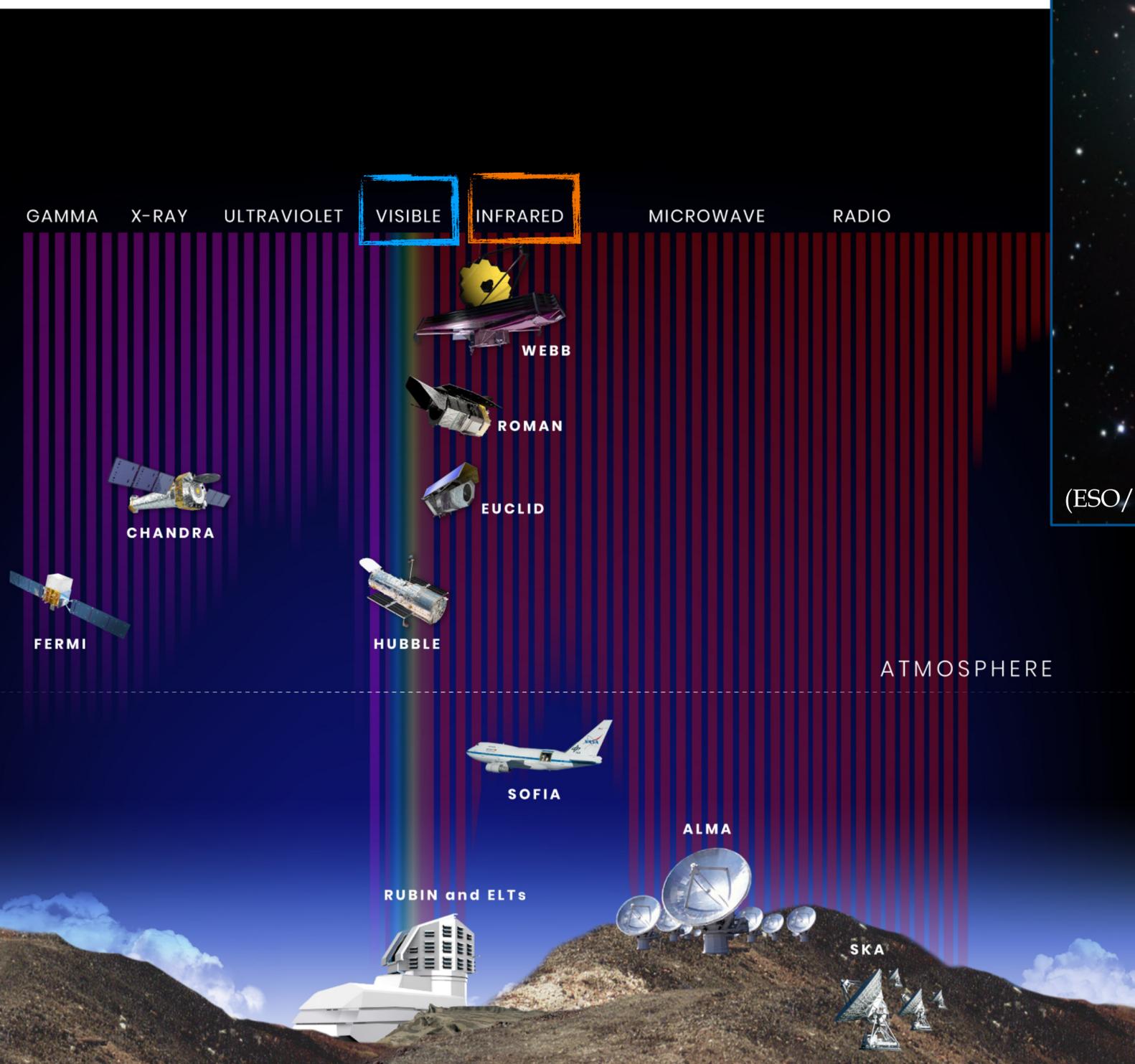
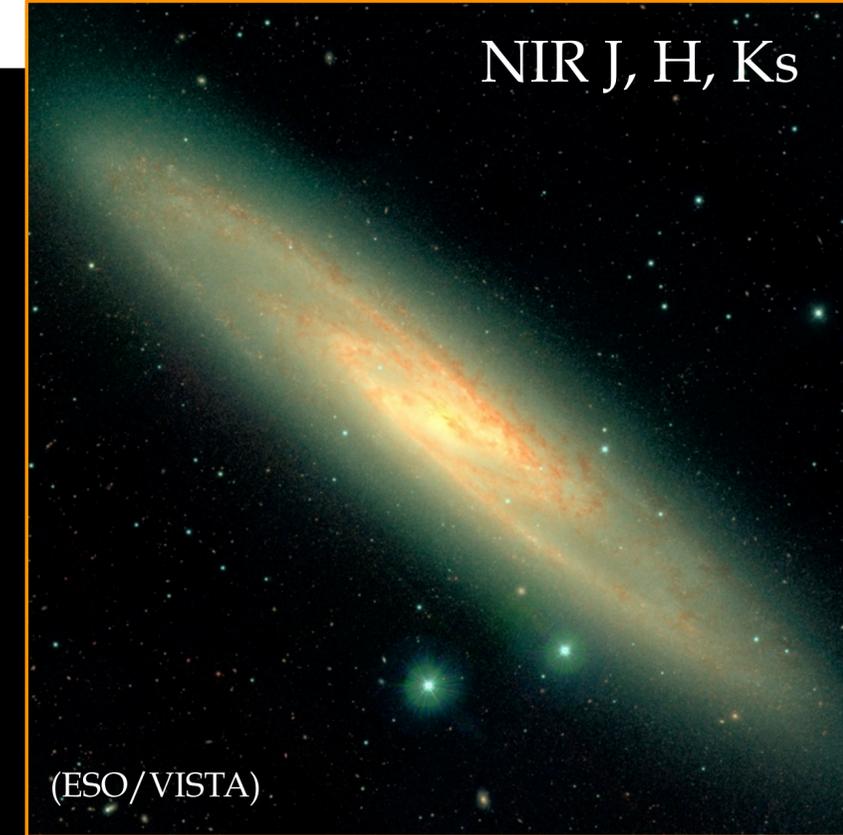
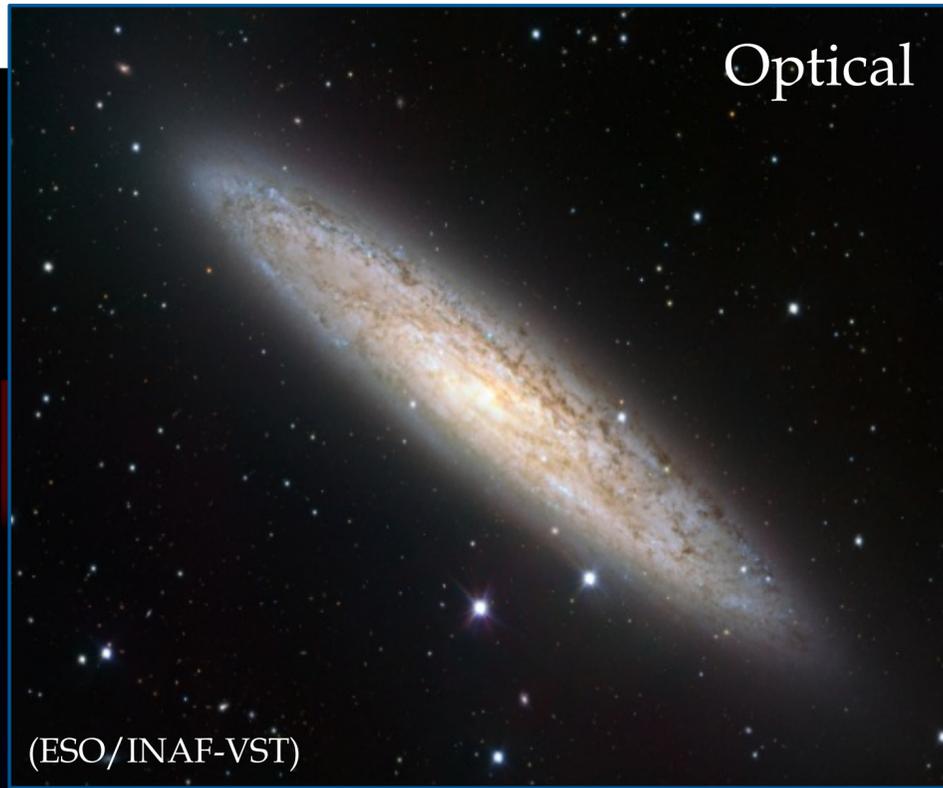


Observables: wavelength range

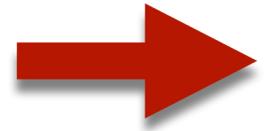
NGC253

Optical

NIR J, H, K<sub>s</sub>

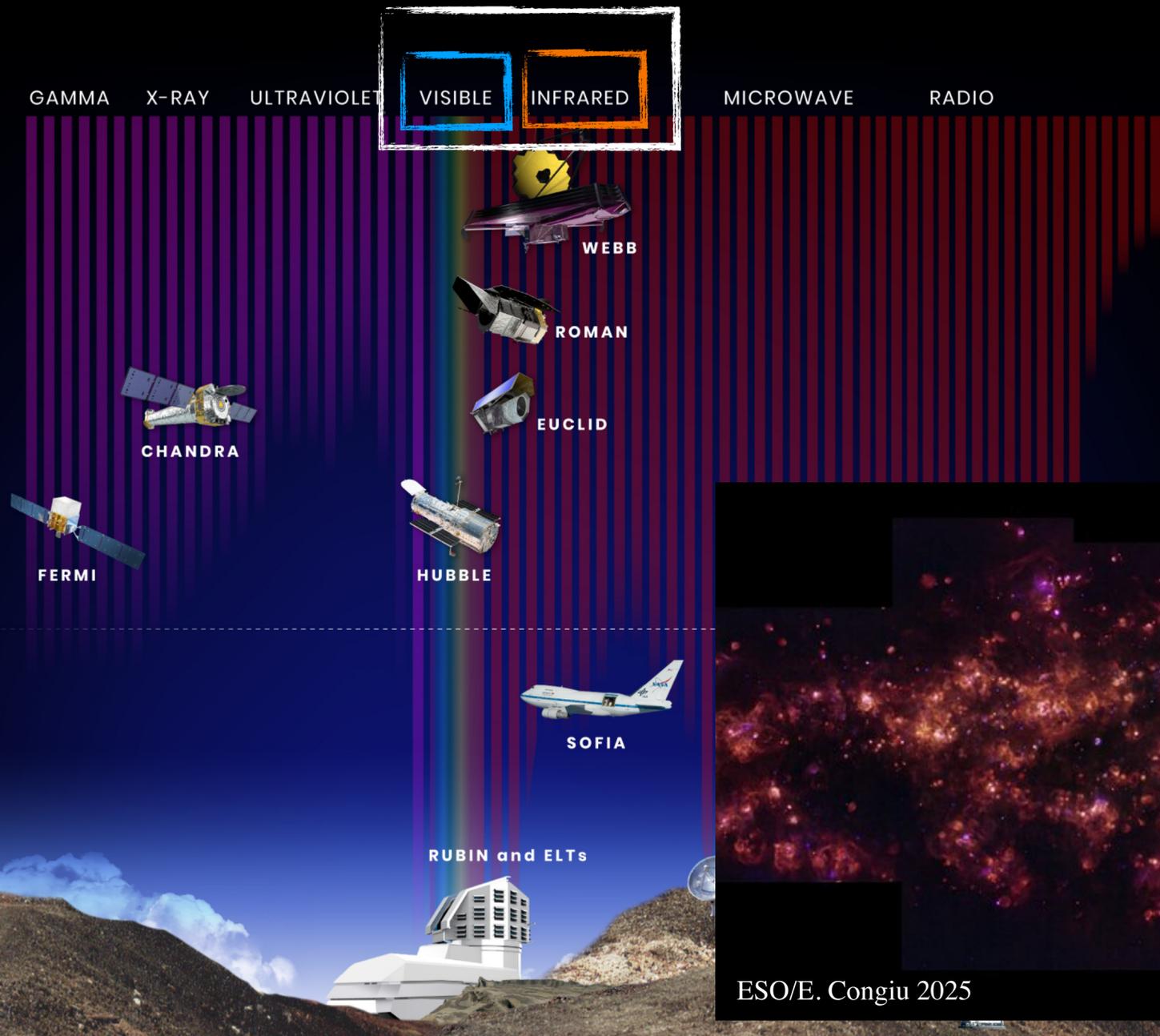
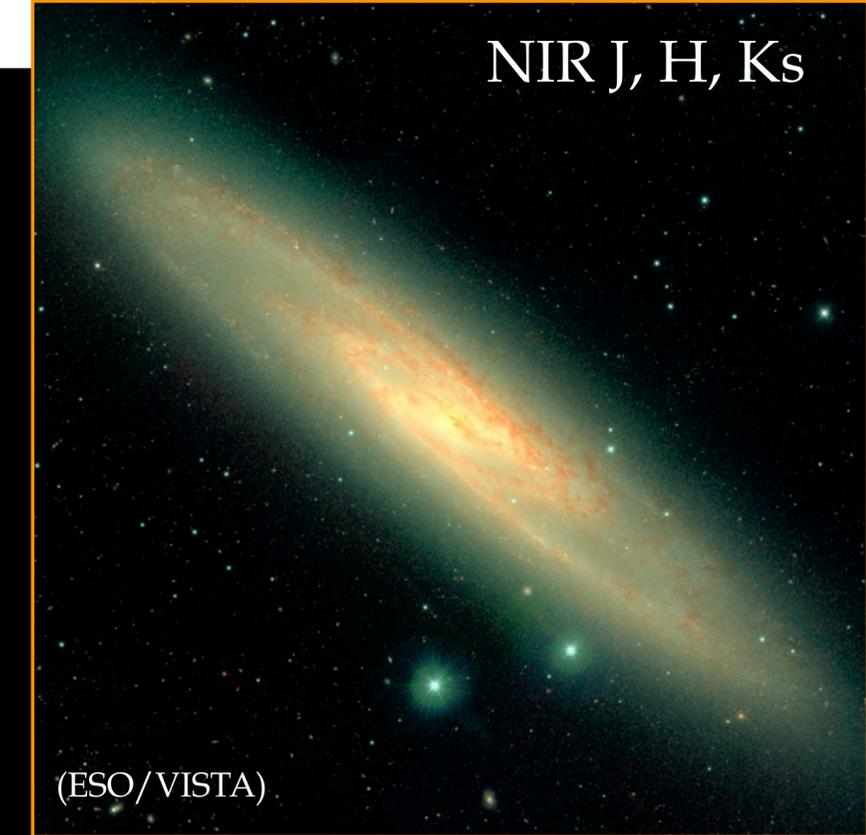
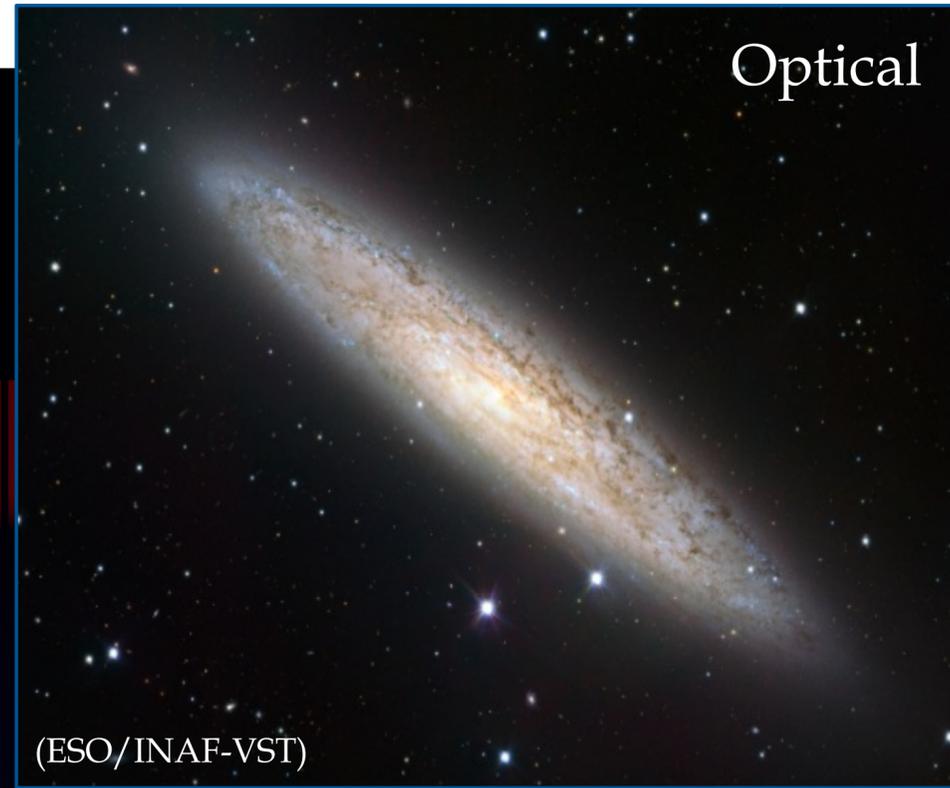


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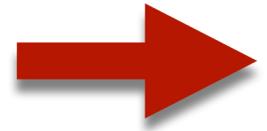


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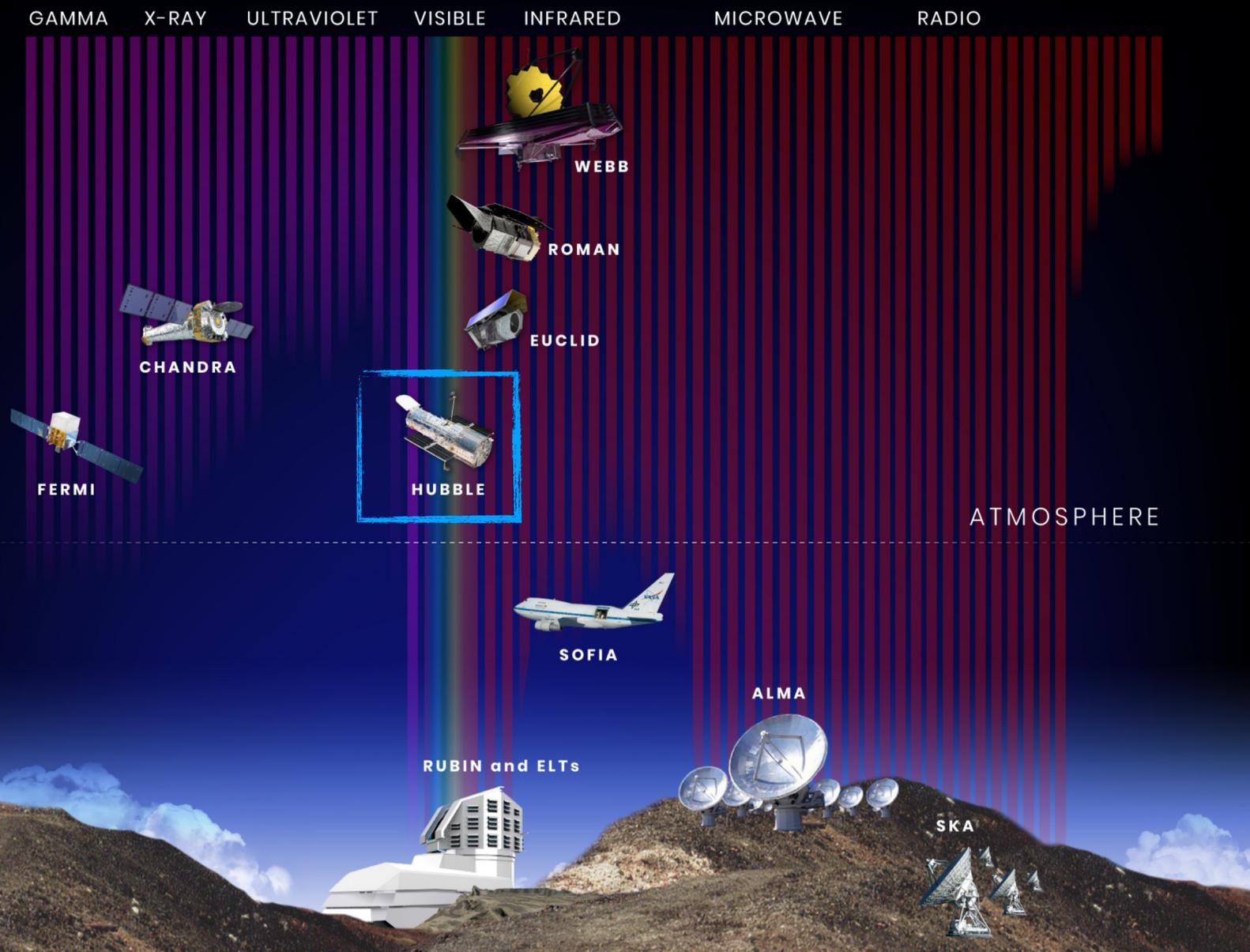
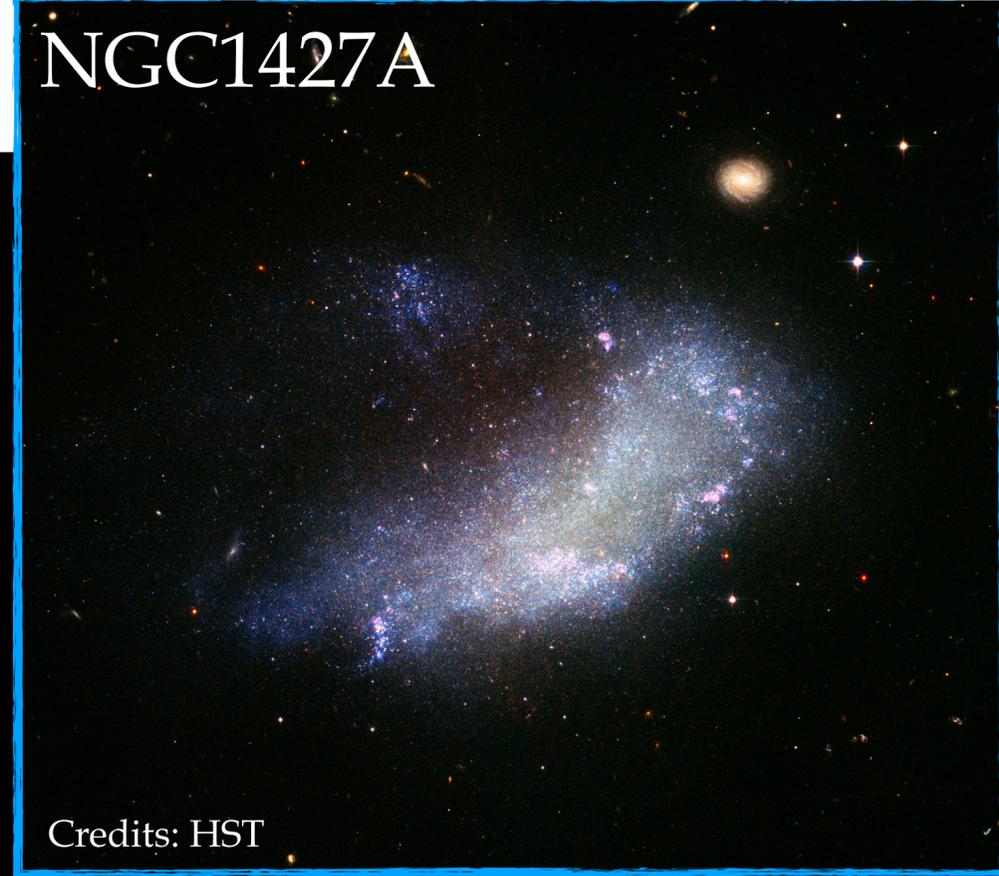
## NGC253



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



Observables: wavelength range



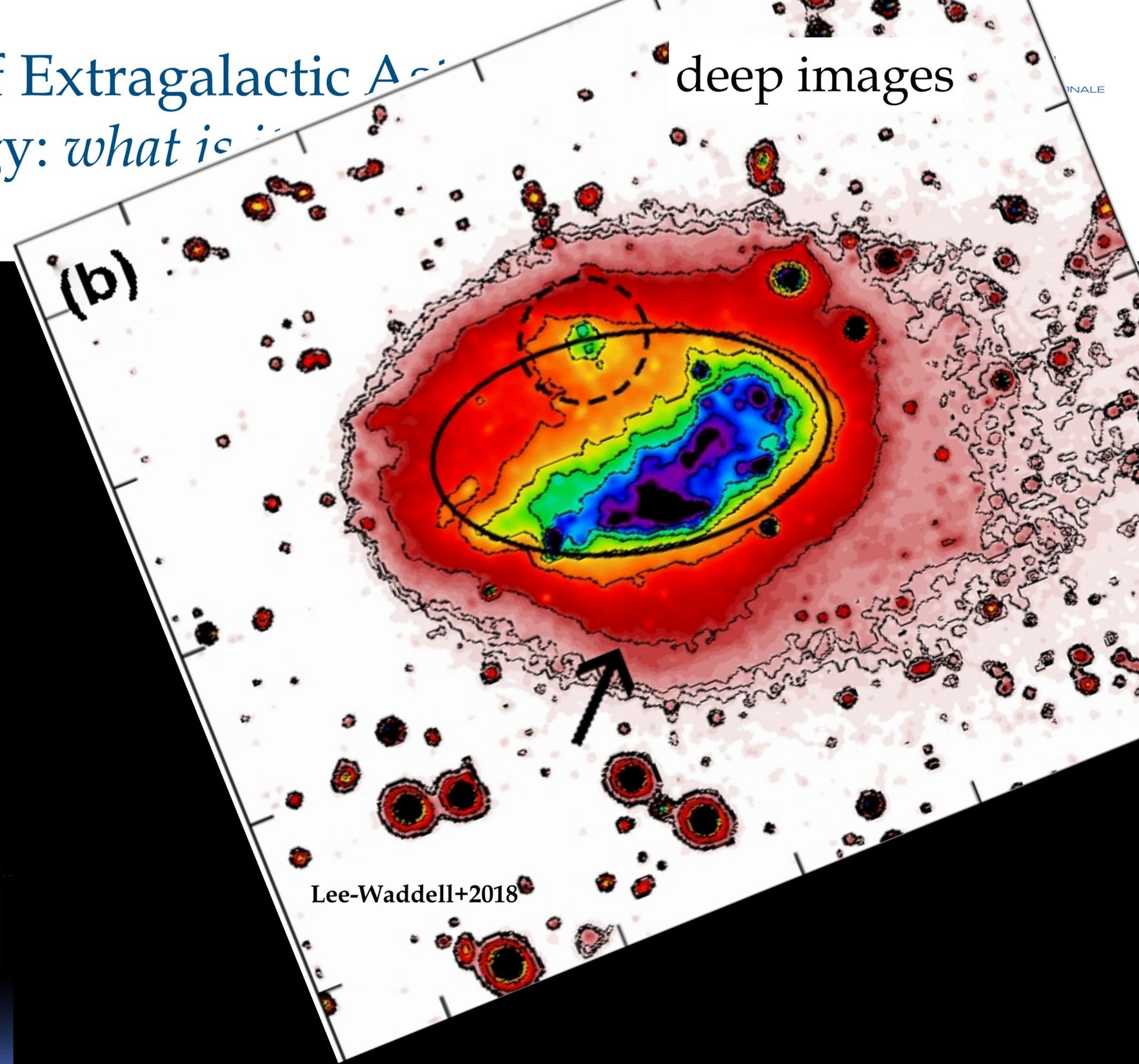
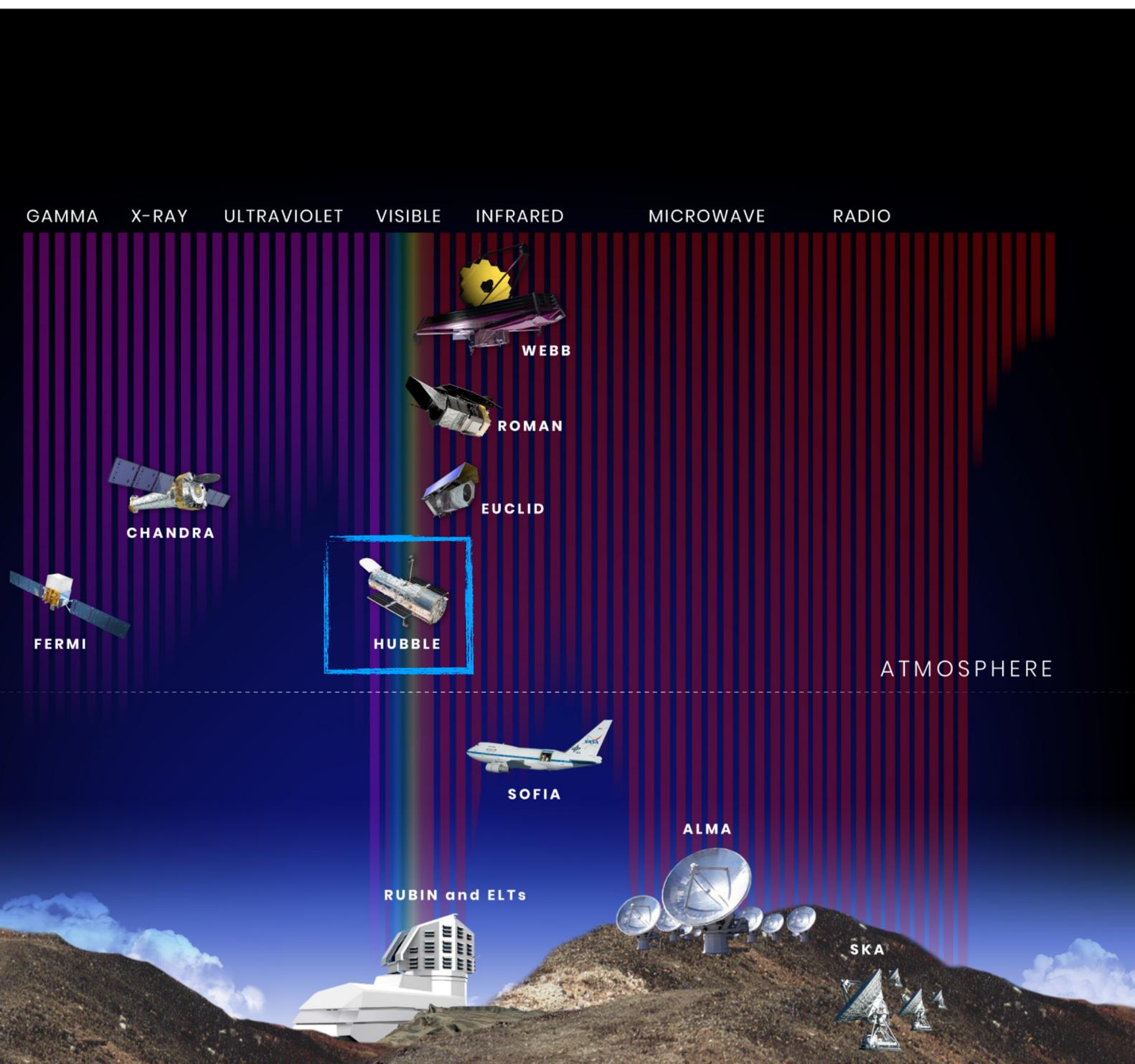
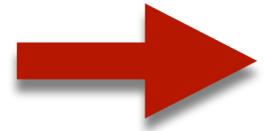
Part 2

# Drawing the panorama of Extragalactic Astronomy

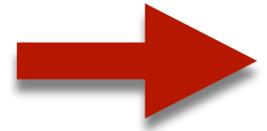
deep images

Cosmology: *what is it?*

Observables: wavelength range



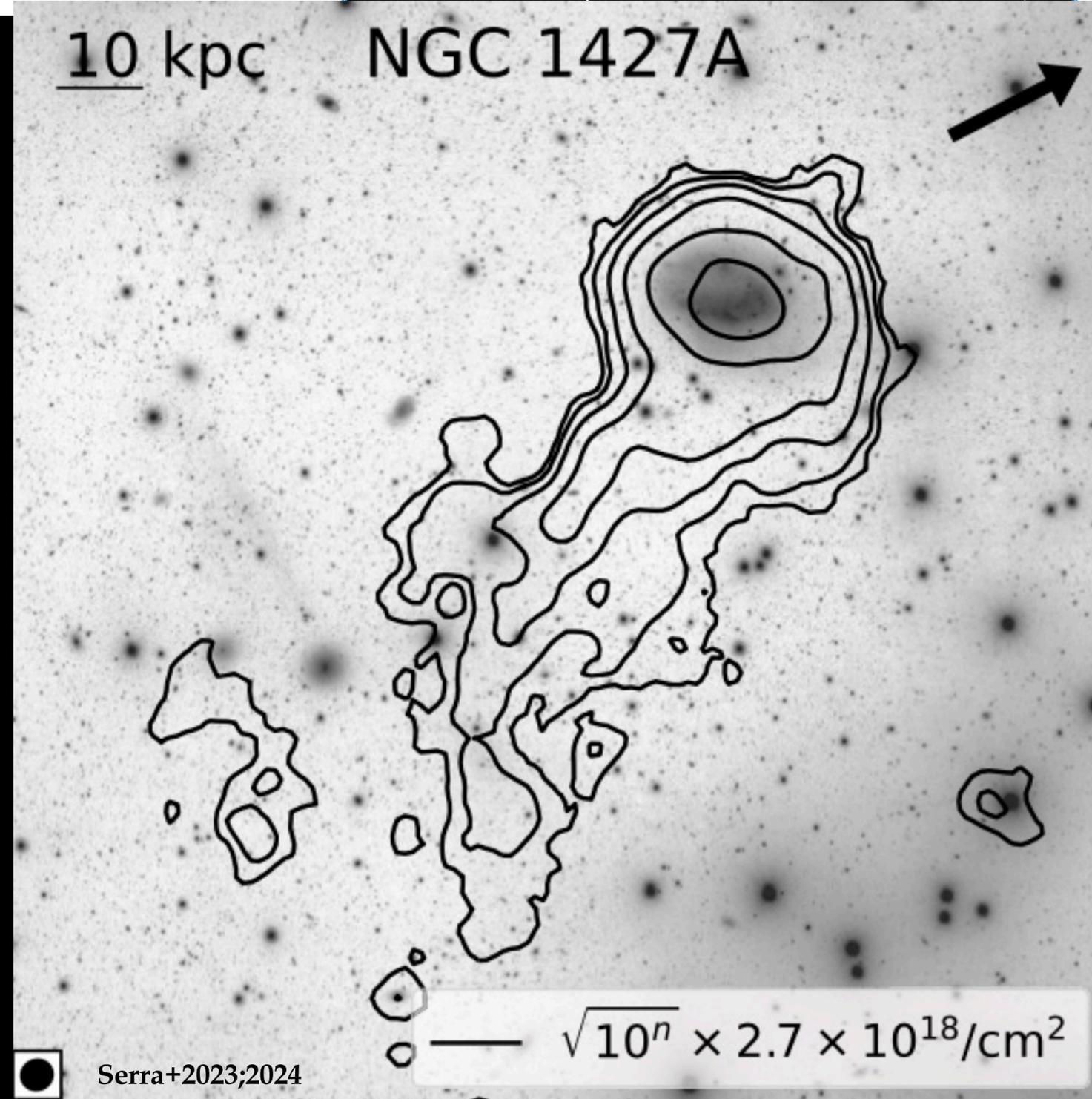
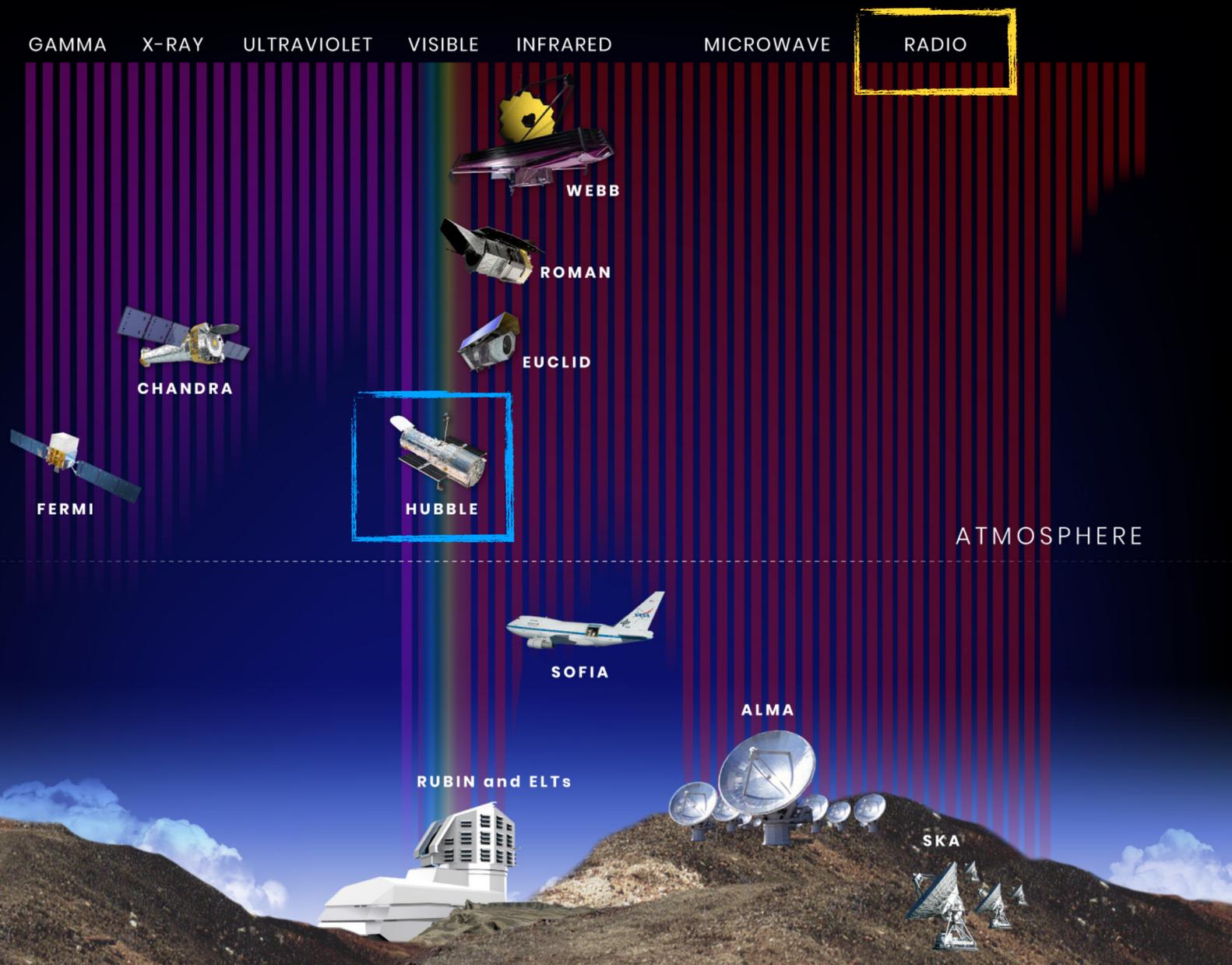
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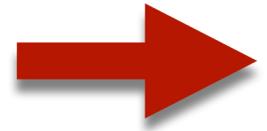
Observables: wavelength range

NGC1427A

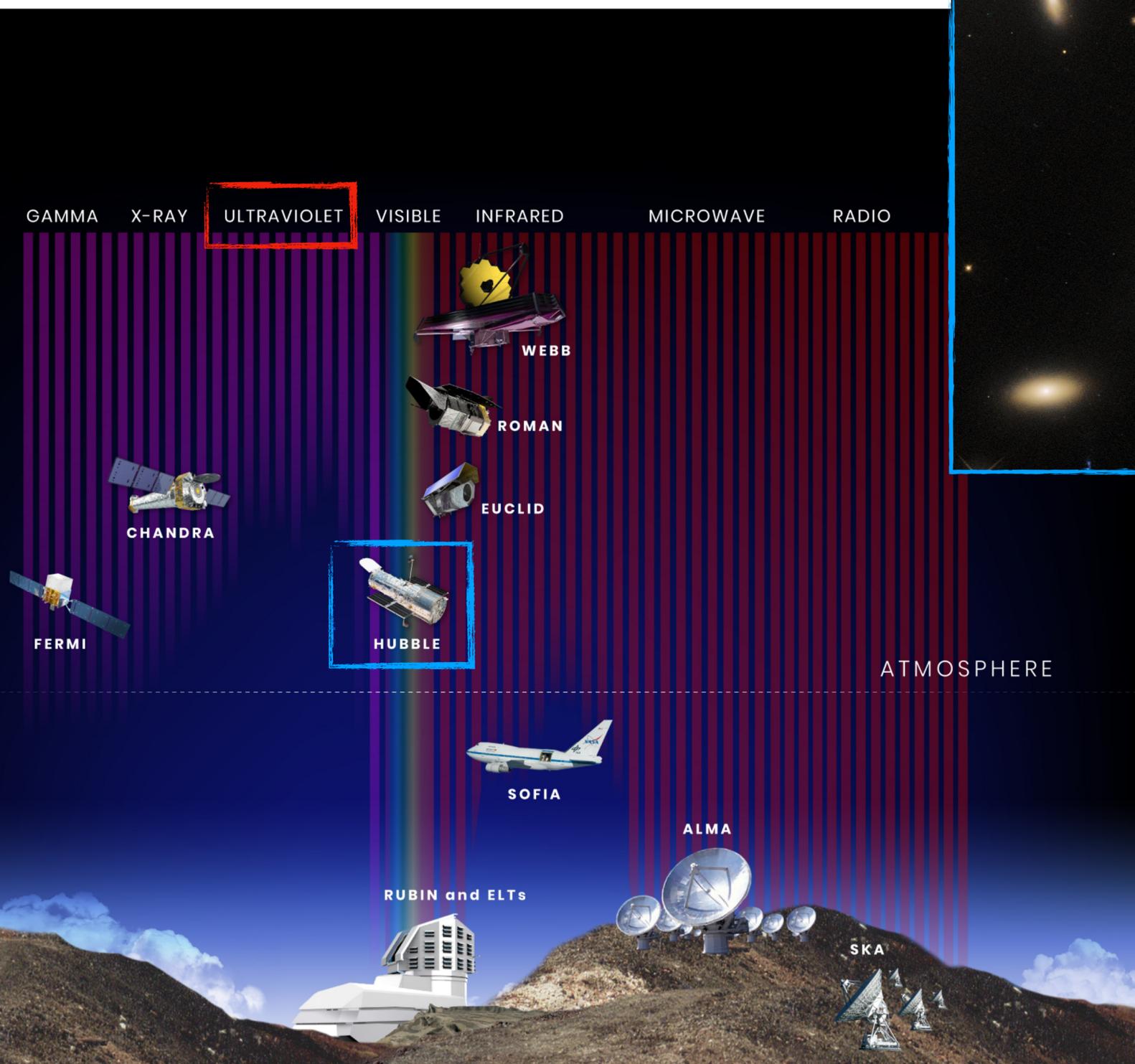
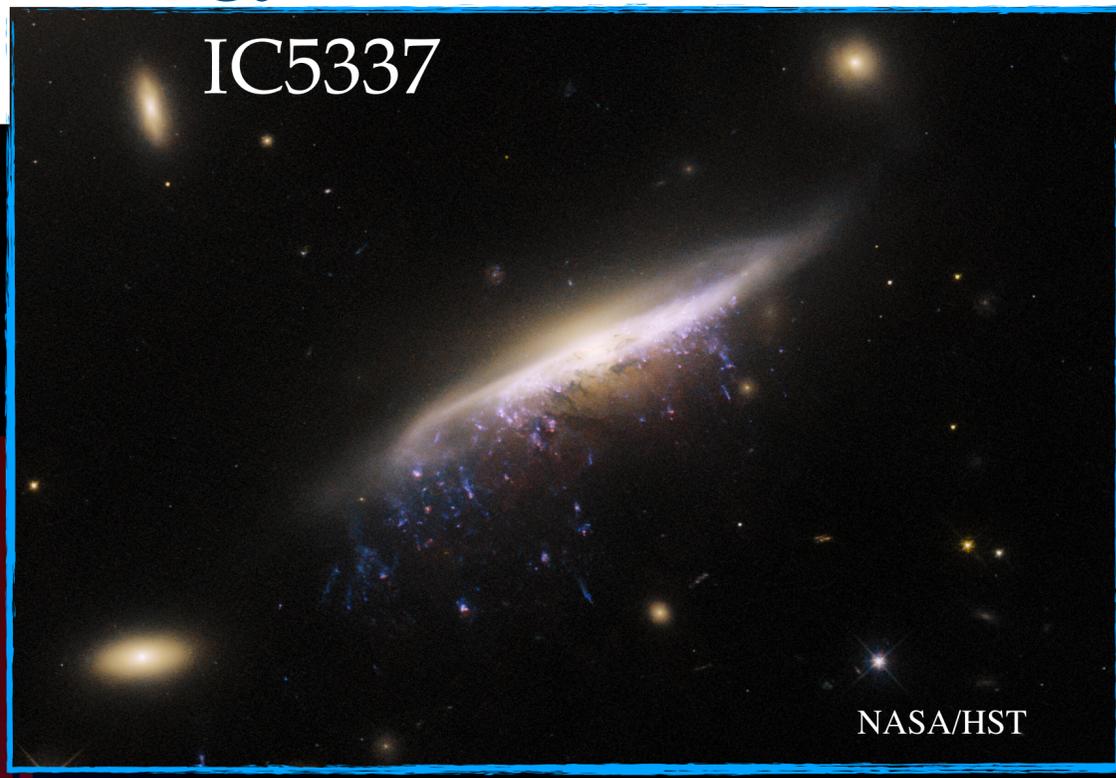
## MeerKAT HI data



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

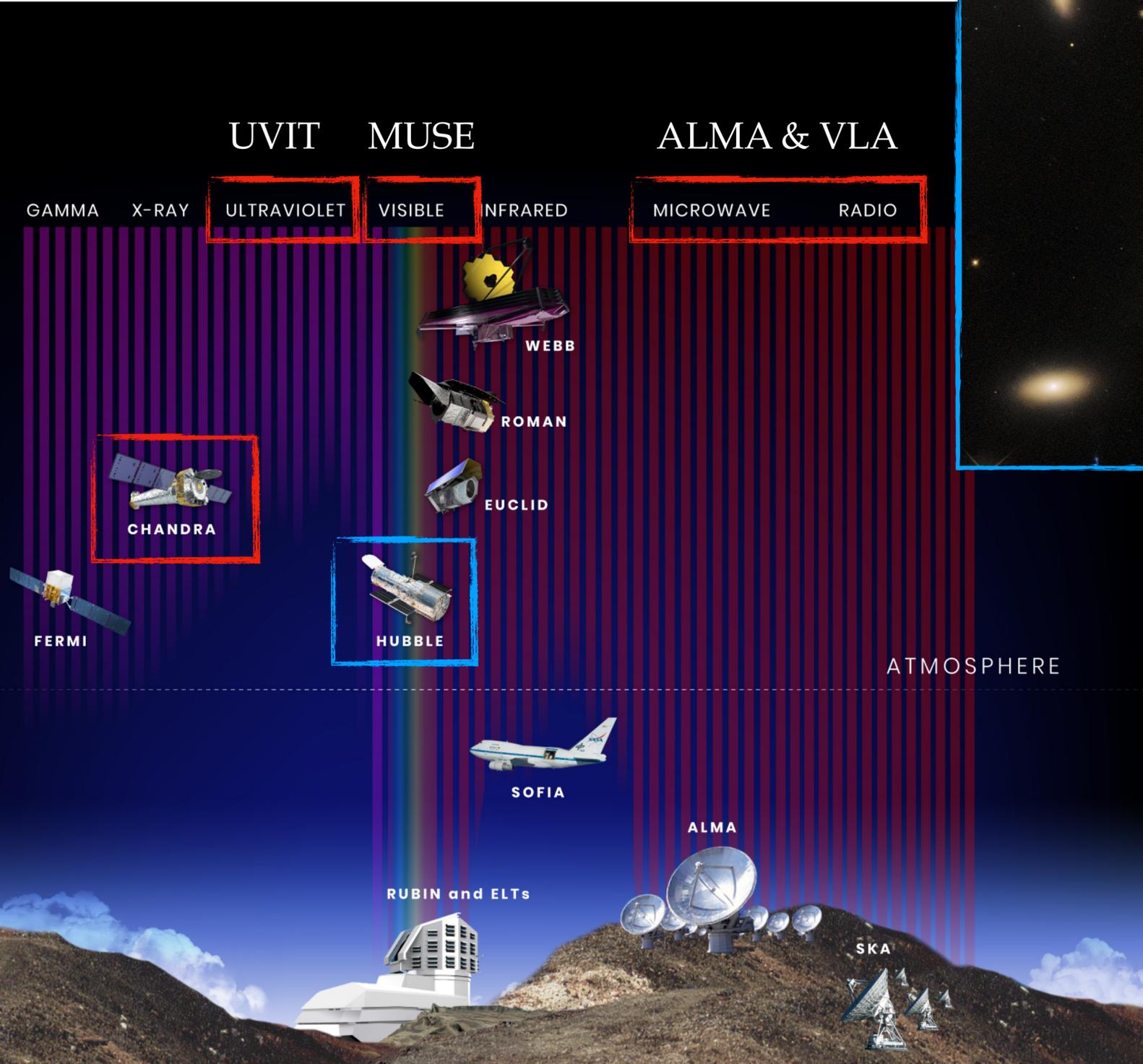
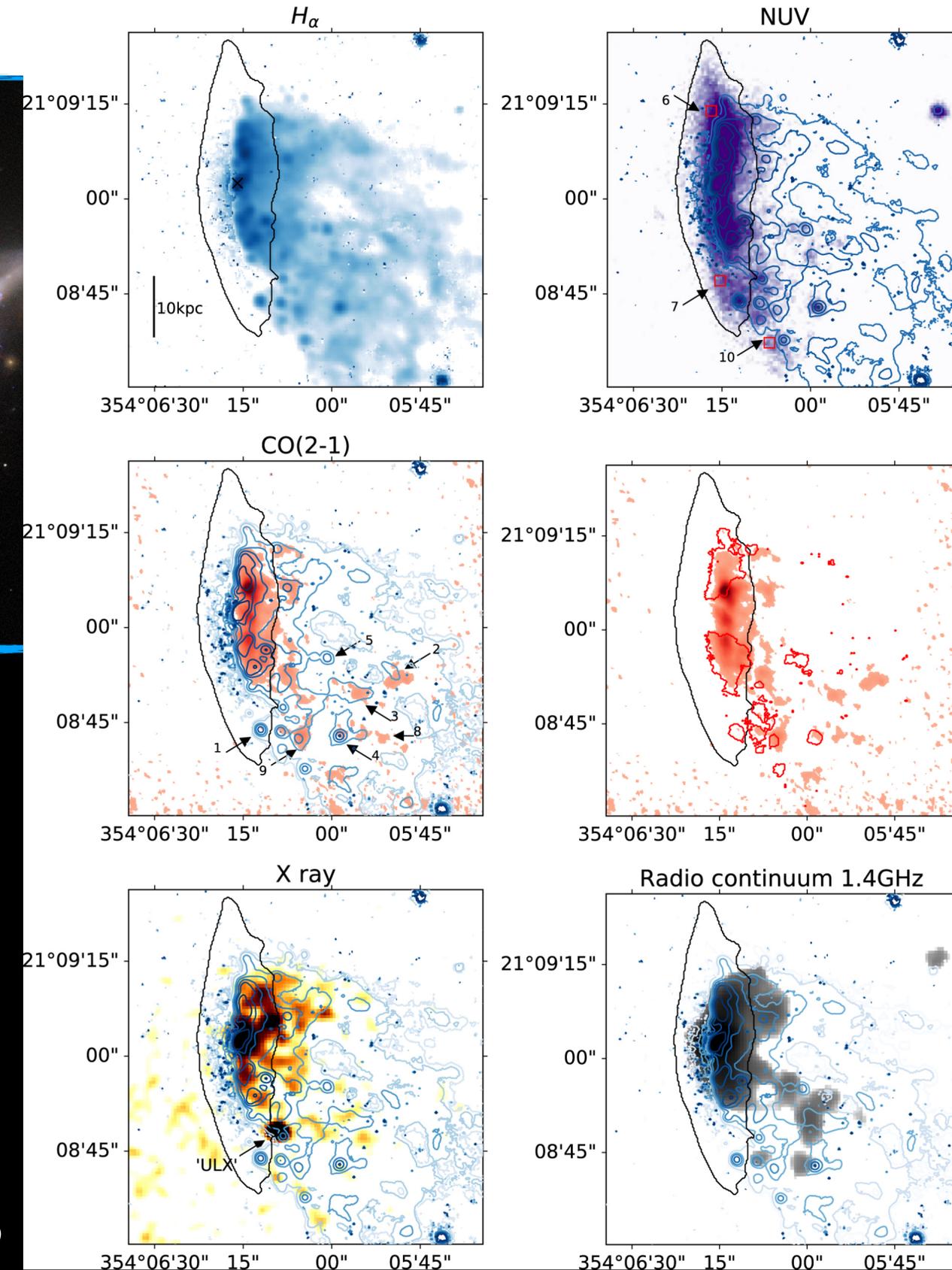
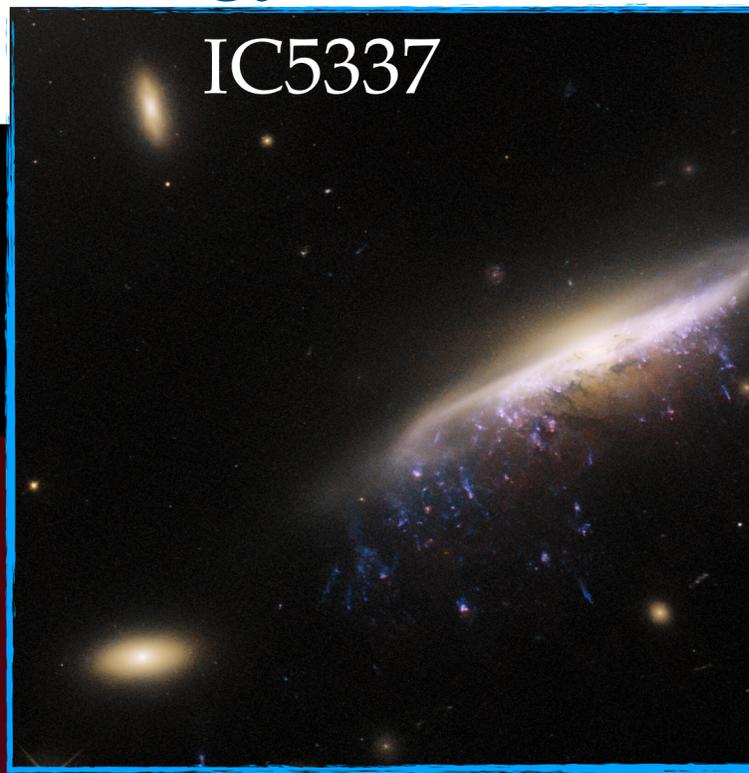


Observables: wavelength range



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

Observables: wavelength range



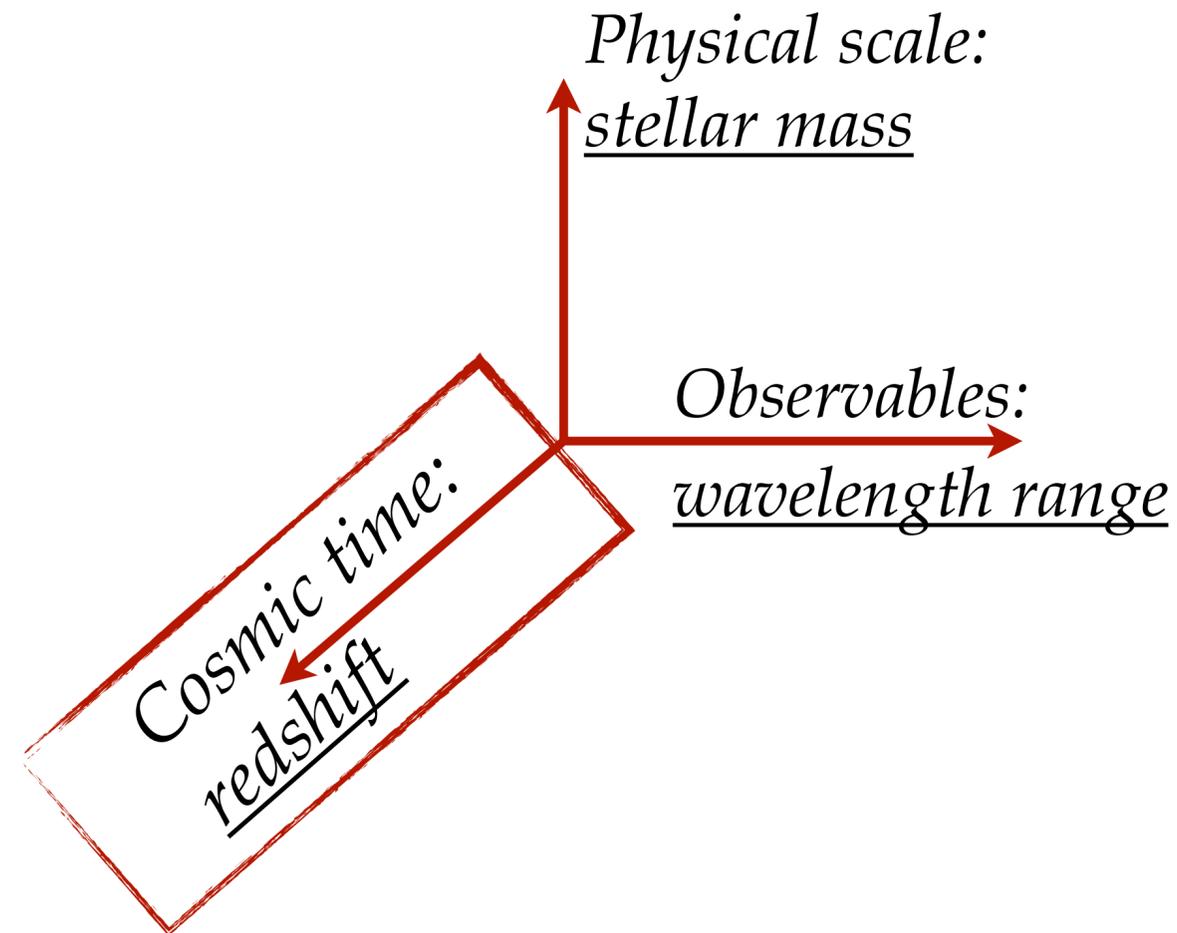
# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*



*which is the picture we got from the science presentations of this workshop?*



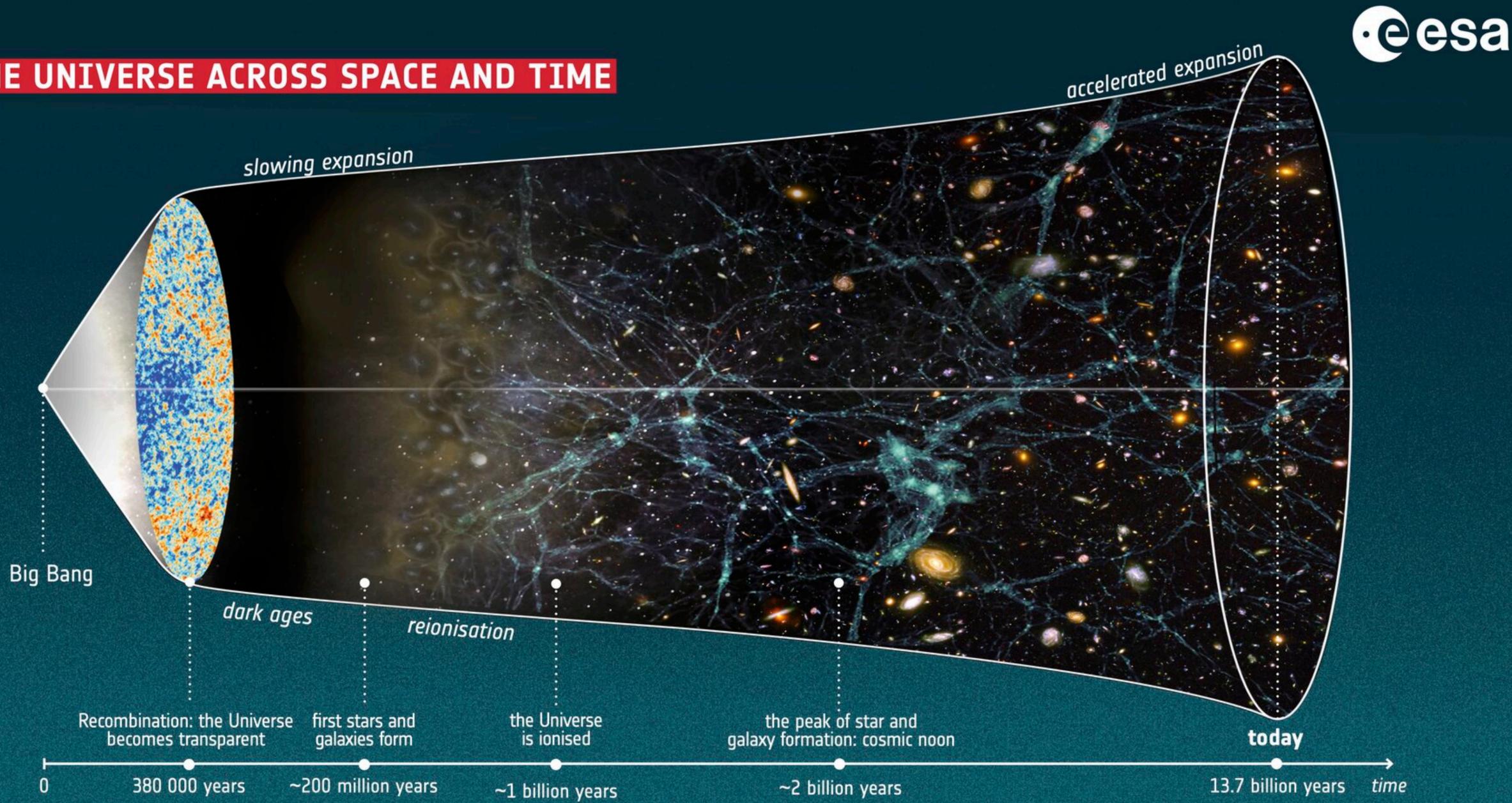
*Three physical quantities*



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

→ *Cosmic time: redshift*

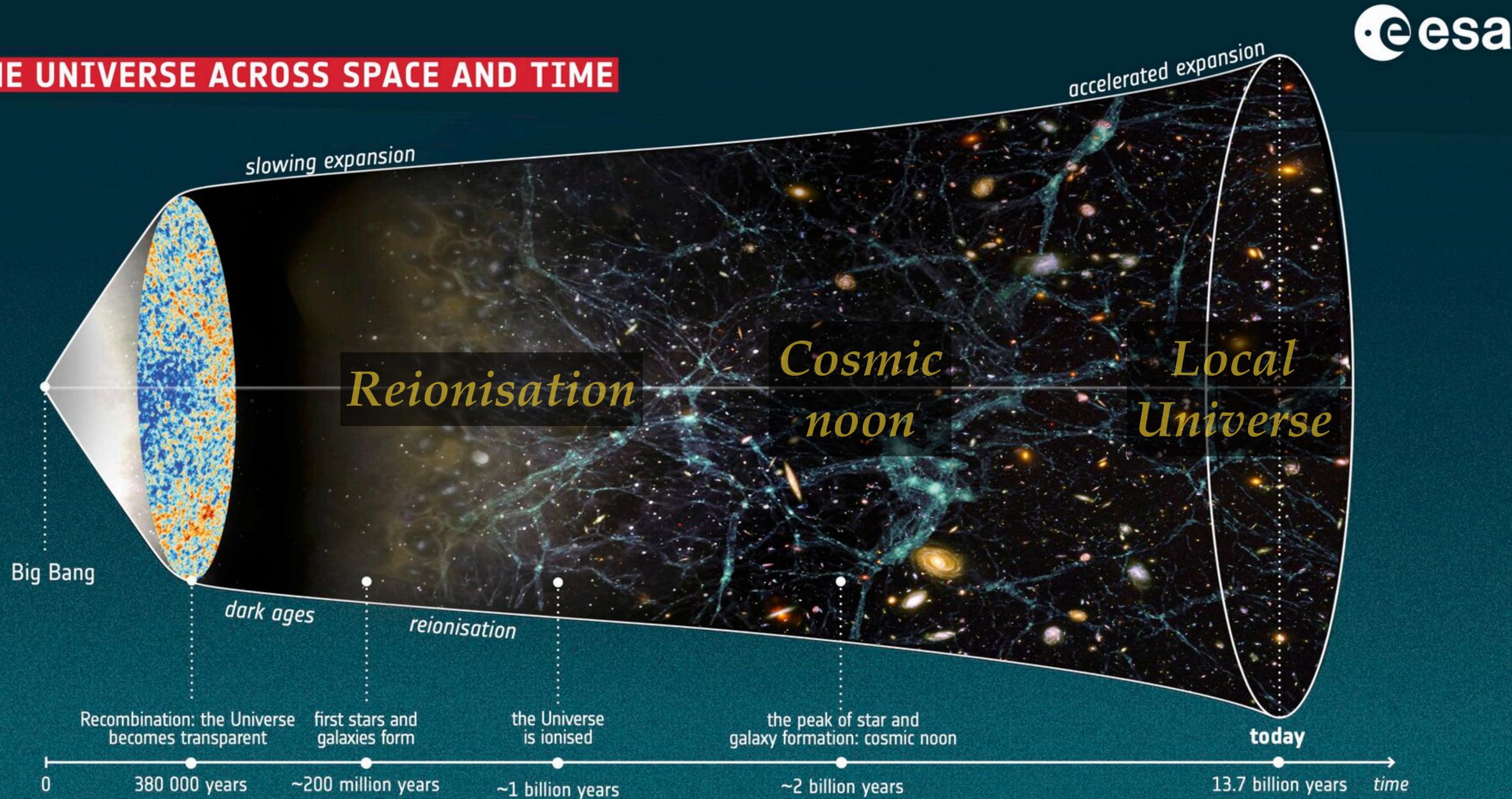
## THE UNIVERSE ACROSS SPACE AND TIME



# Drawing the panorama of Extragalactic Astronomy & Cosmology: *what is it?*

→ *Cosmic time: redshift*

## THE UNIVERSE ACROSS SPACE AND TIME



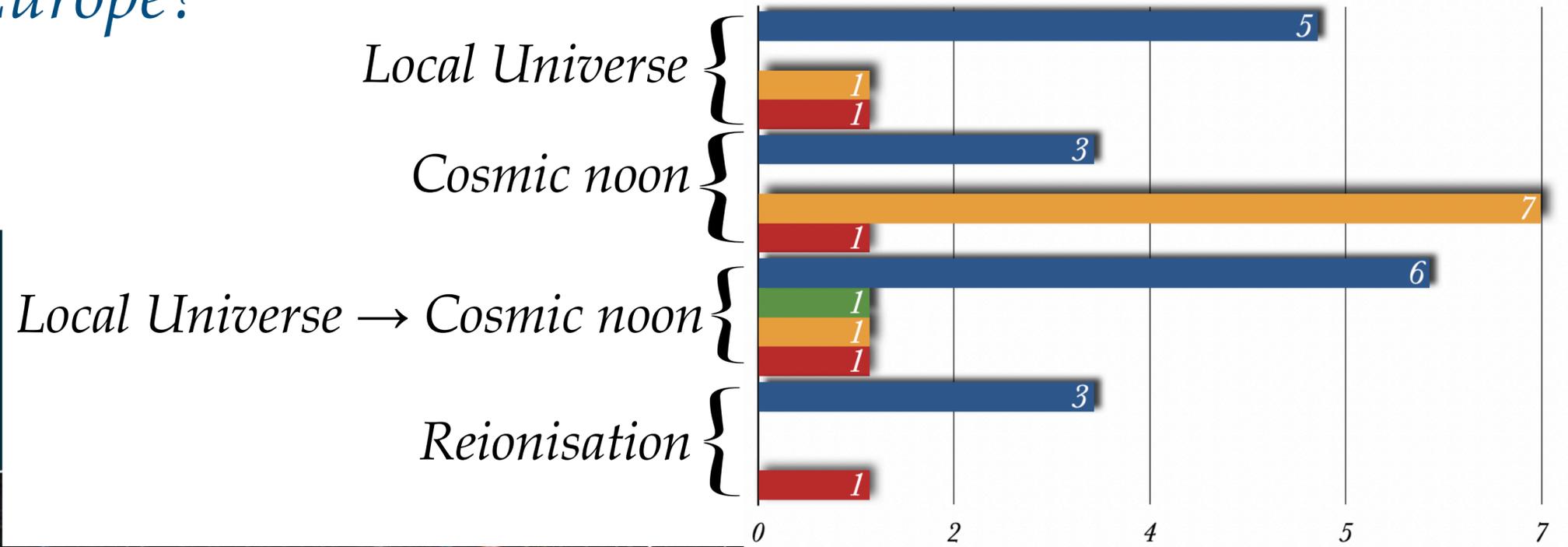
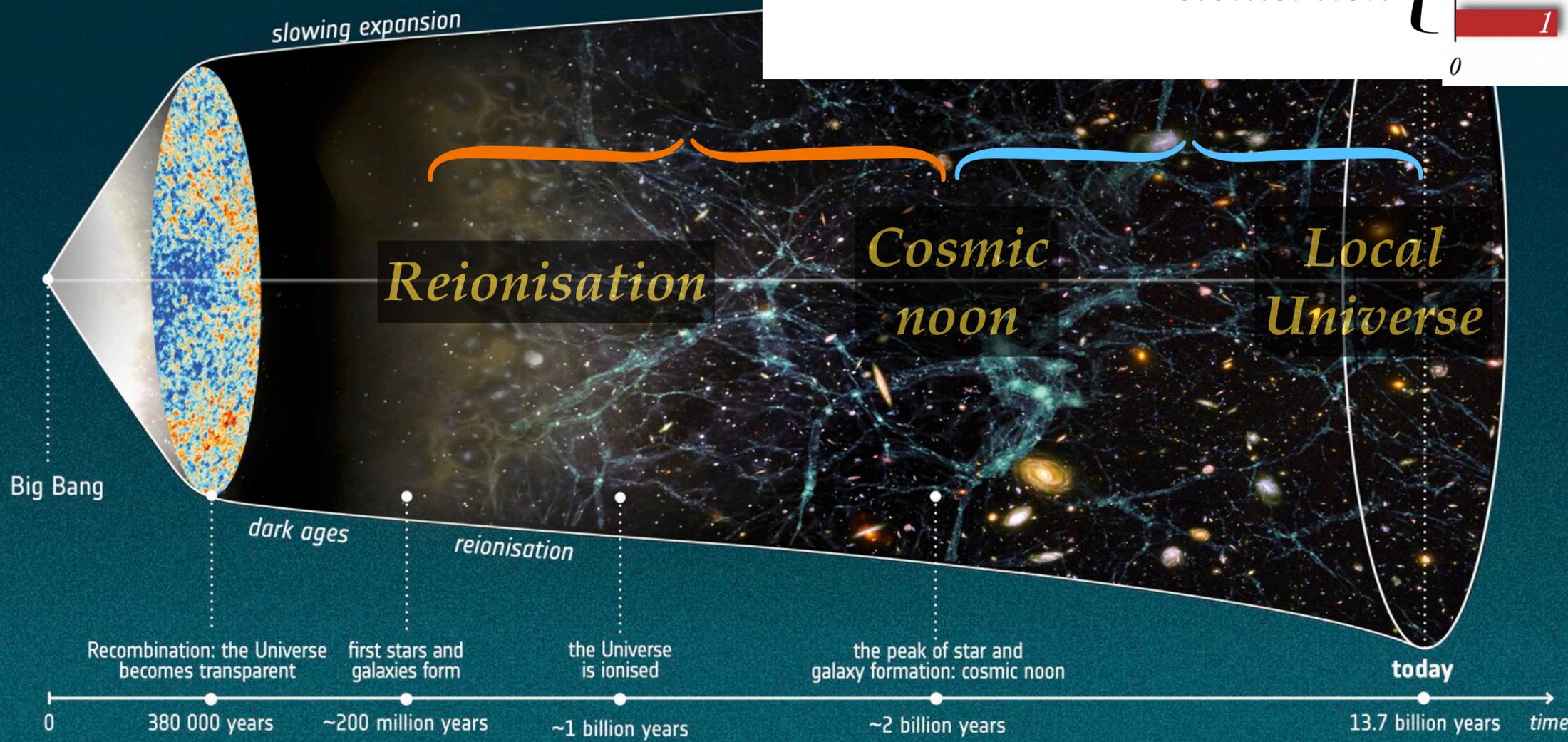
Part 2

# Which science topics attracted more funds? In INAF, in Italy, in Europe?



# Grants  $\geq 100$  keuro

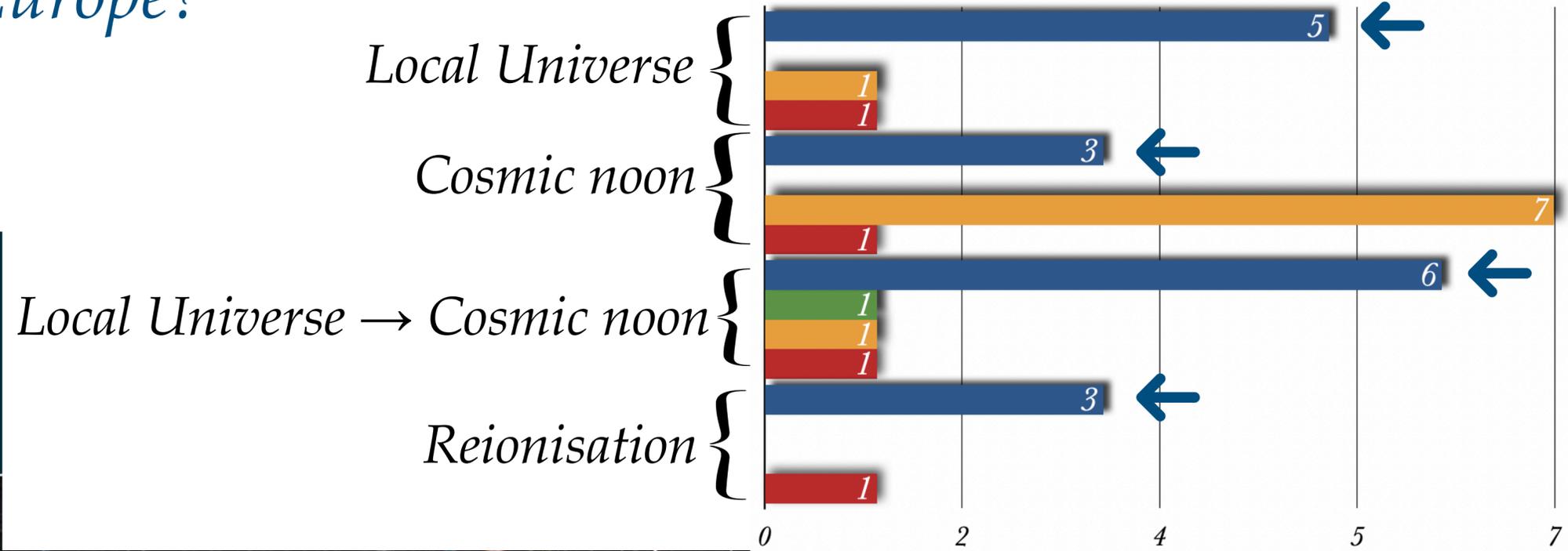
## THE UNIVERSE ACROSS SPACE AND TIME



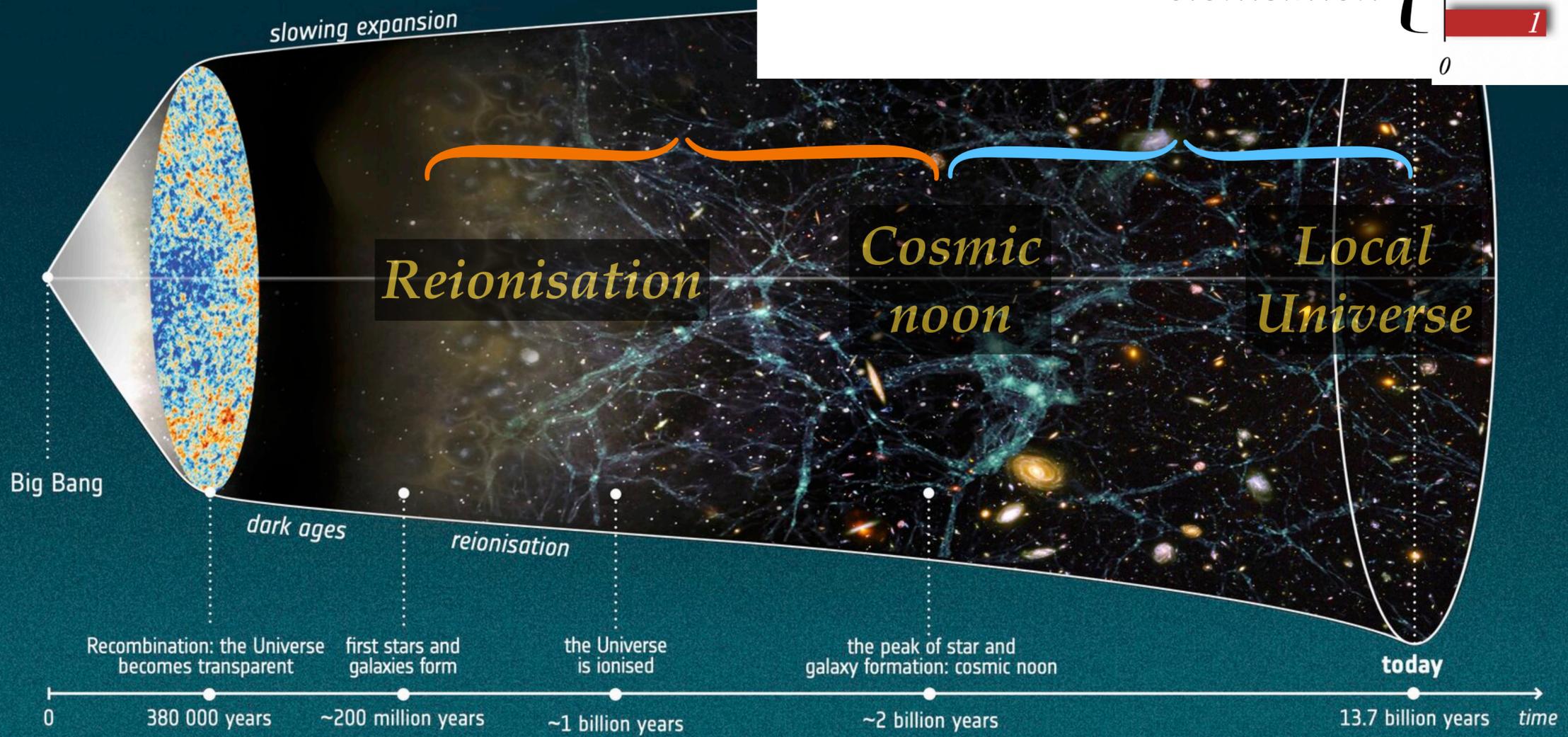
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**THE UNIVERSE ACROSS SPACE AND TIME**

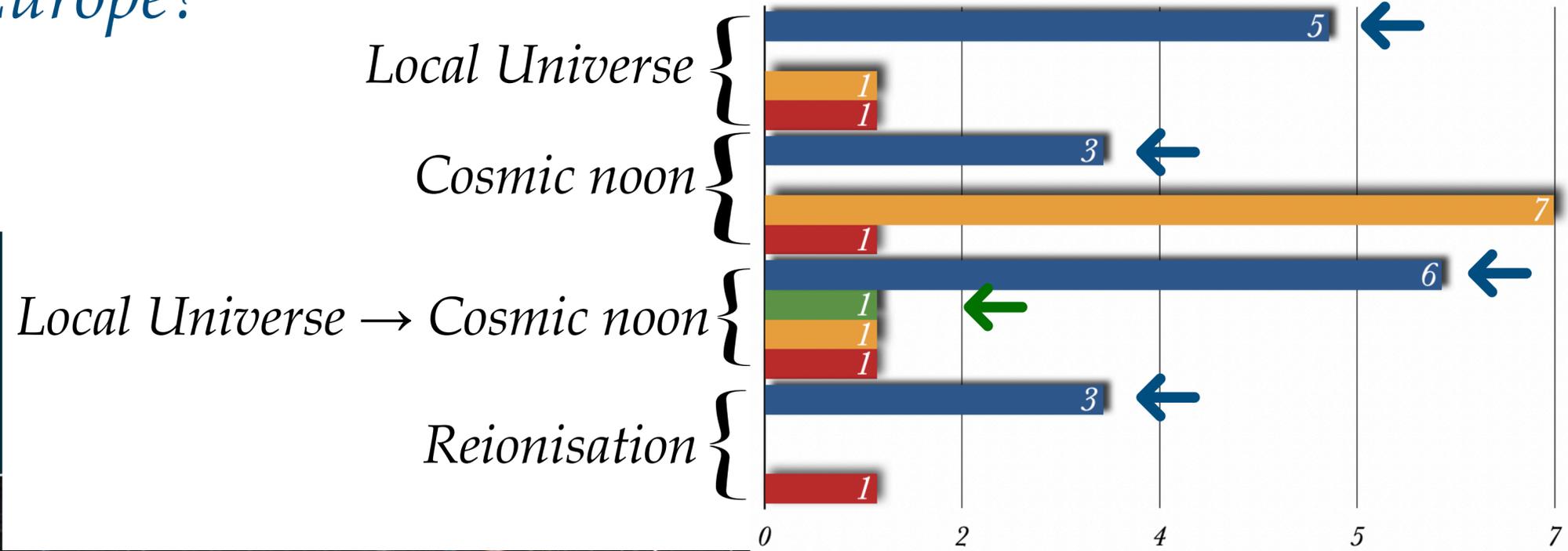


INAF 2022-2024

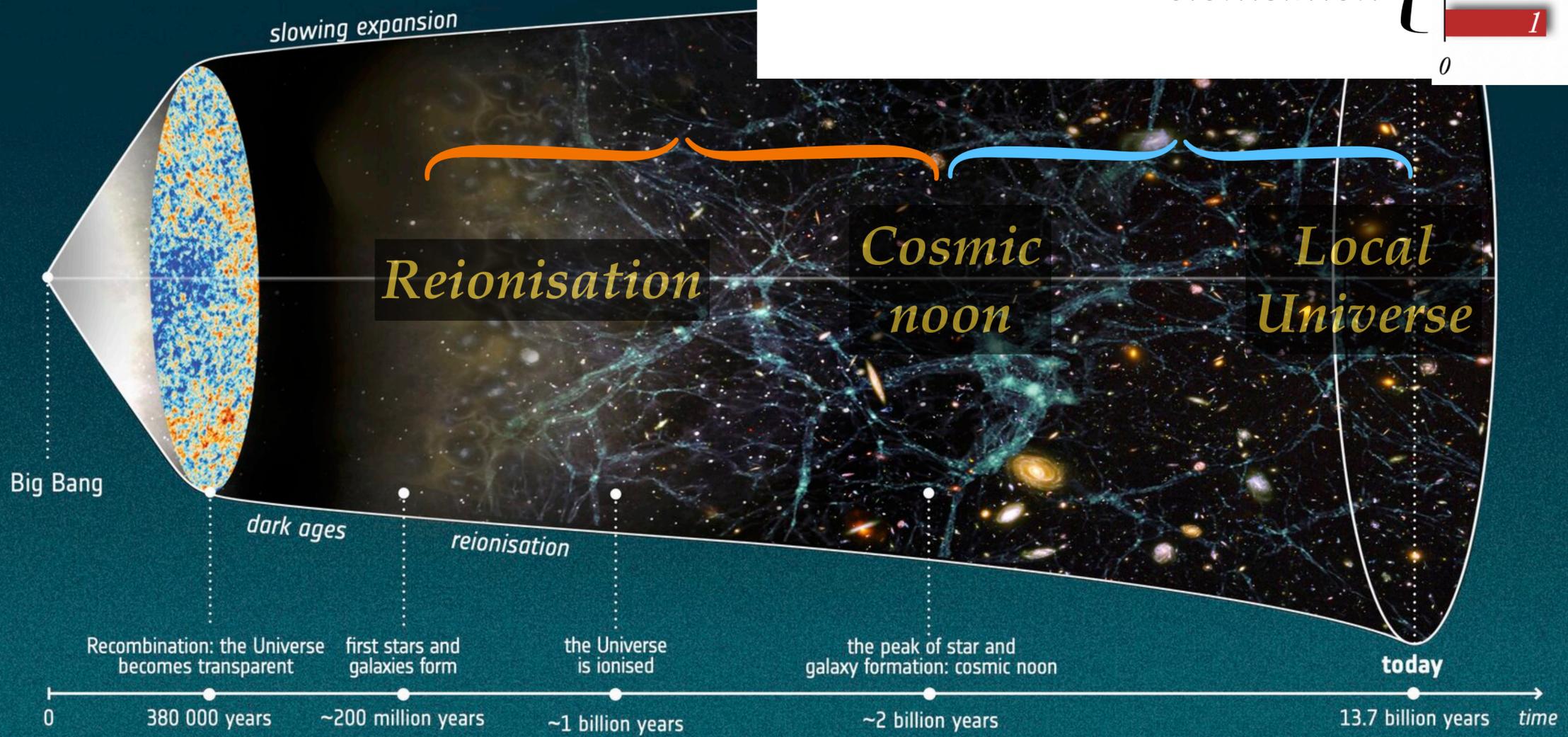
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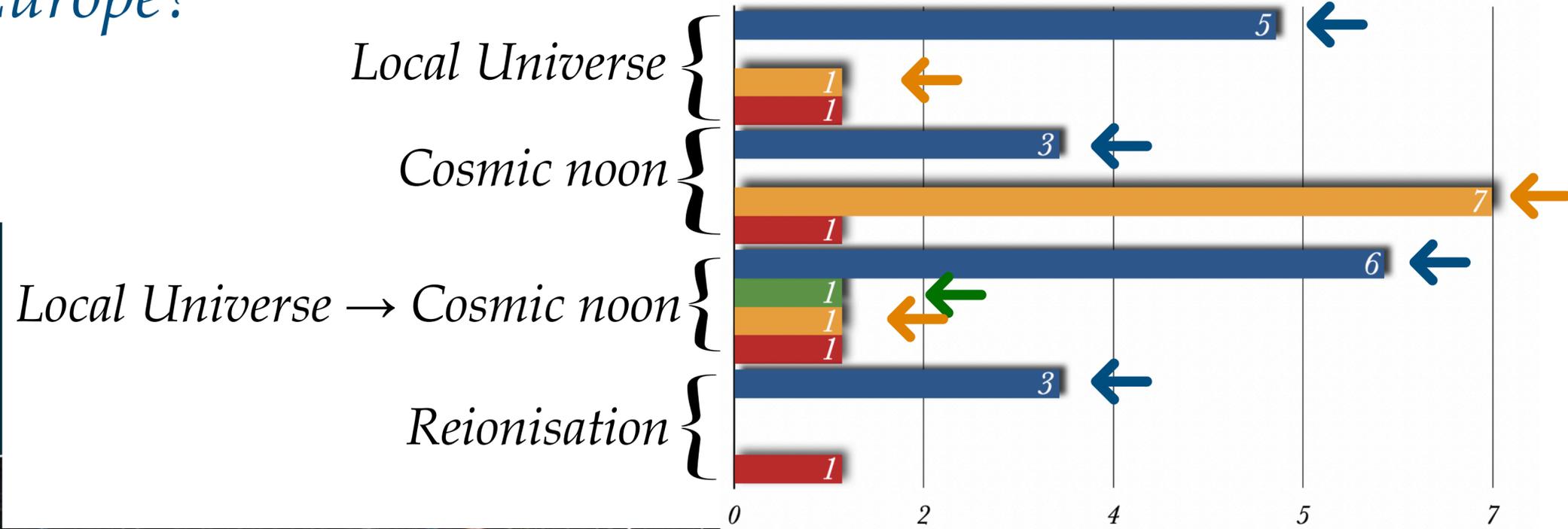
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PRORIS 2025

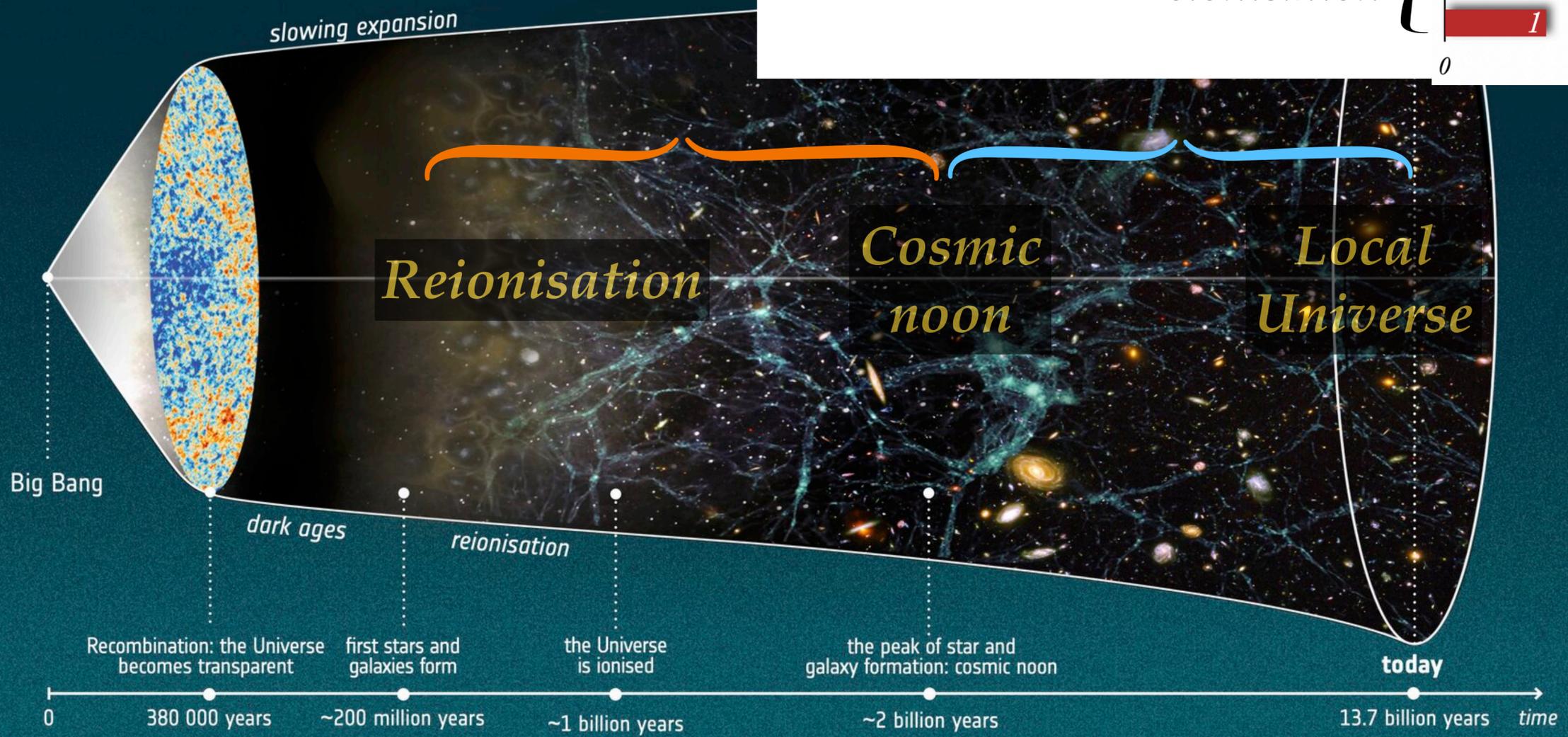
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INAF 2022-2024

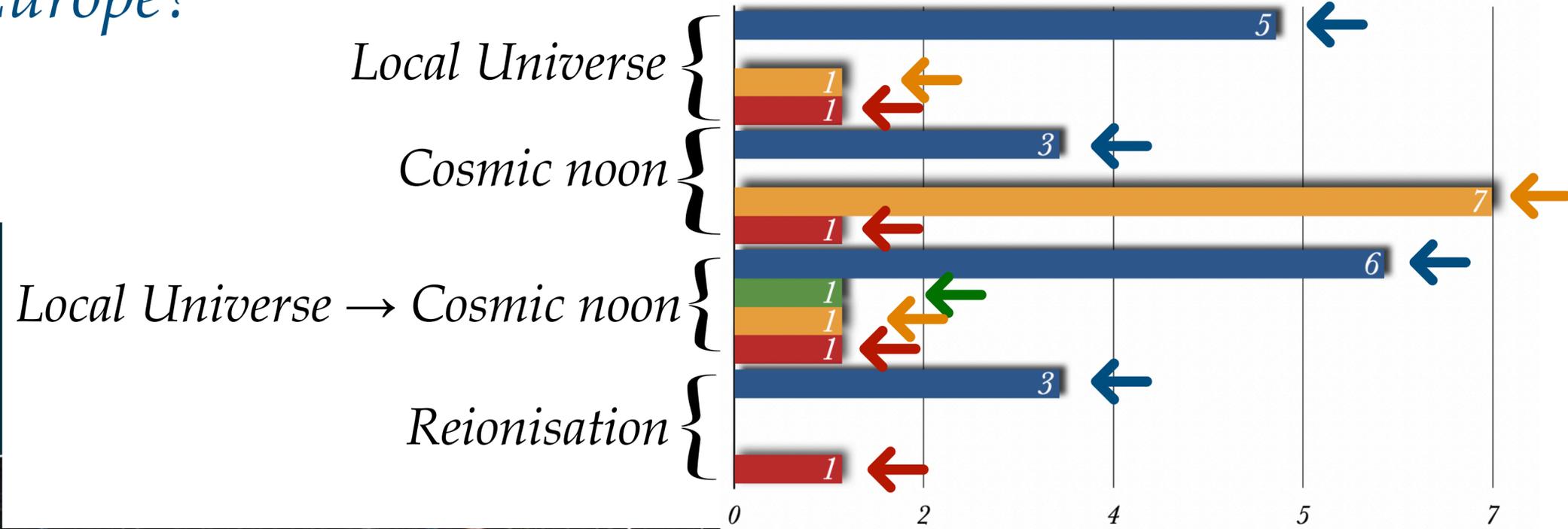
PRORIS 2025

PRIN MUR  
2020 & 2022

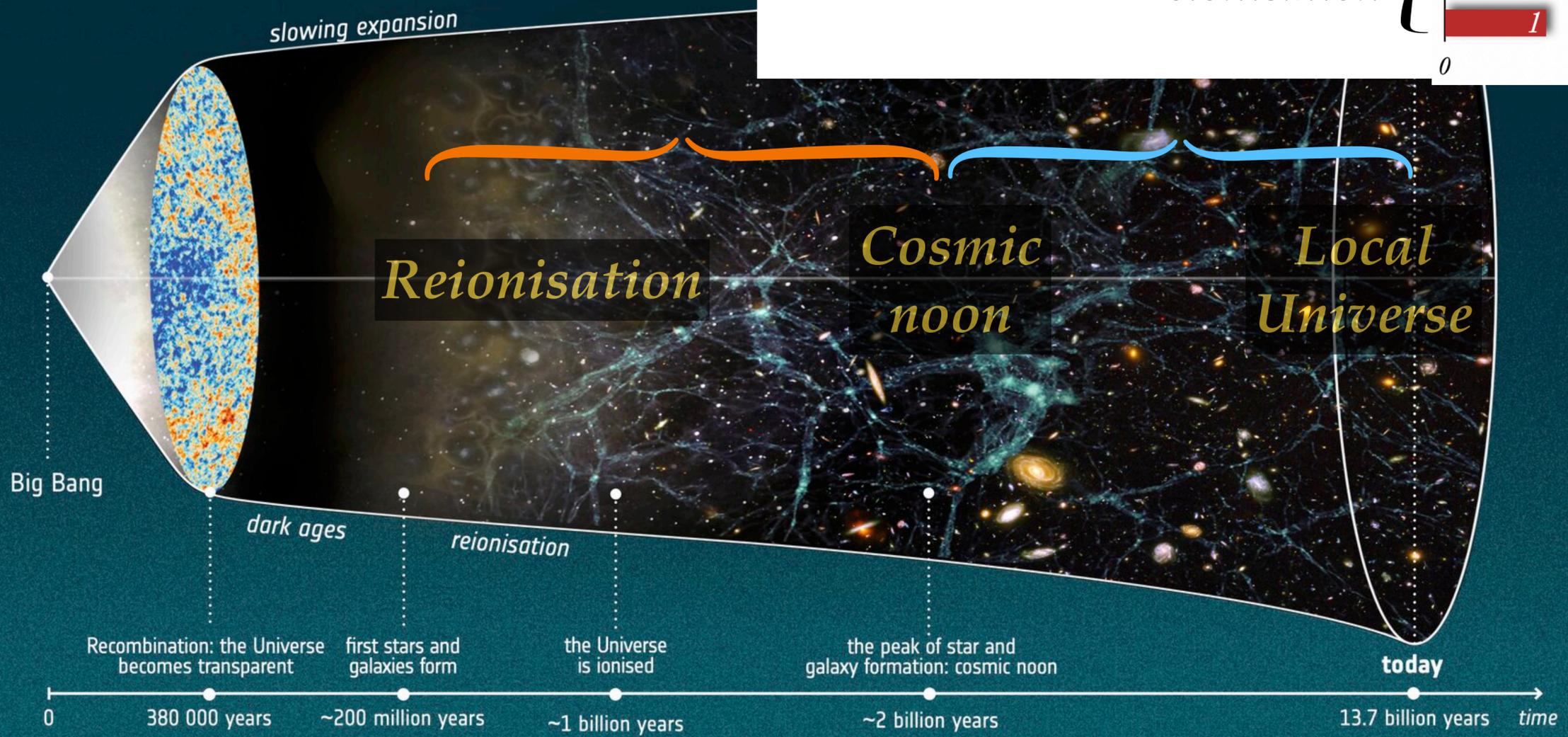
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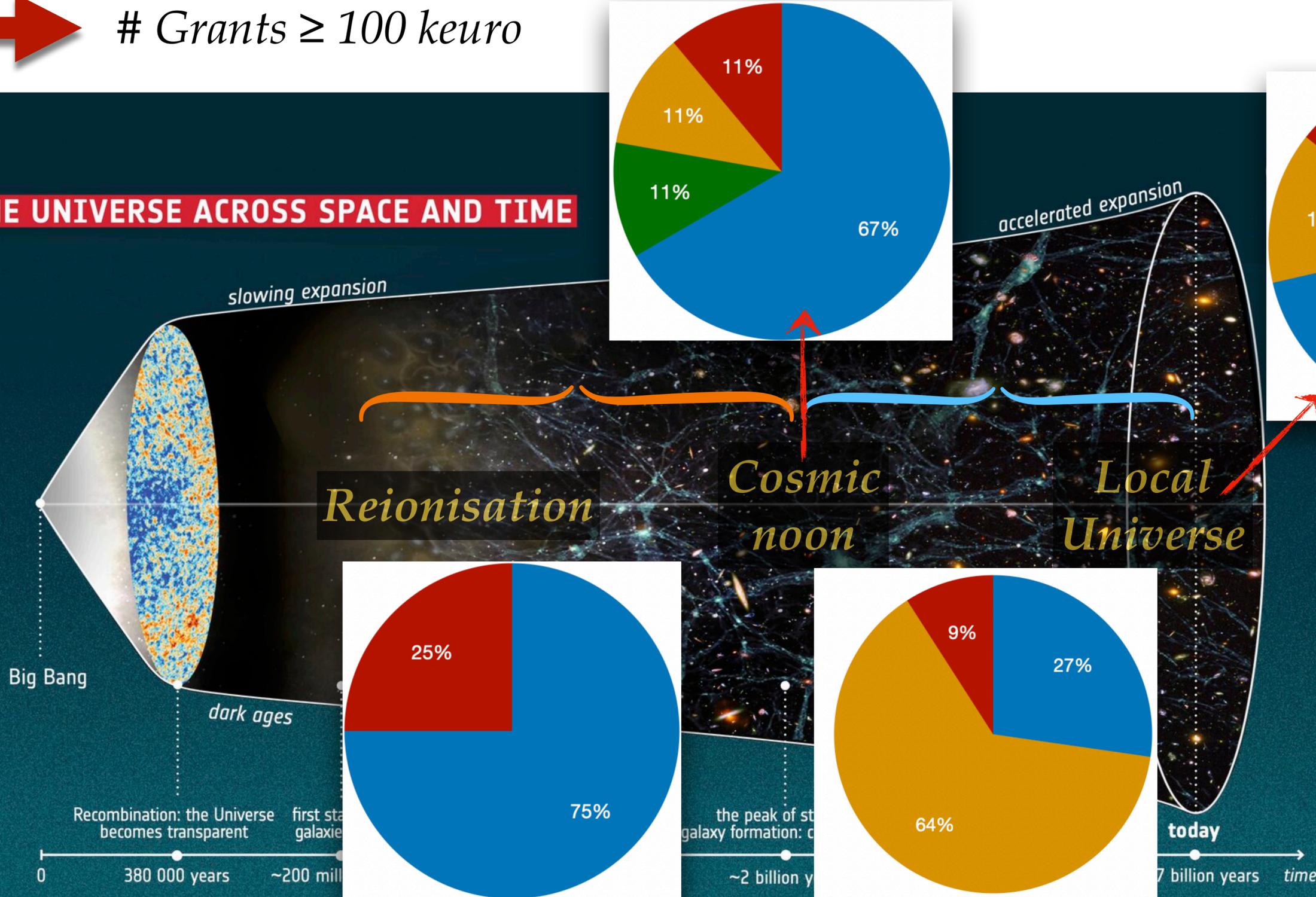
**ERC  
2019 - 2024**

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INAF 2022-2024

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*Part 2*

*How the extragalactic Astronomy will change with the arrival of new  
ground-based and space observing facilities?*

*Space  
Telescopes*

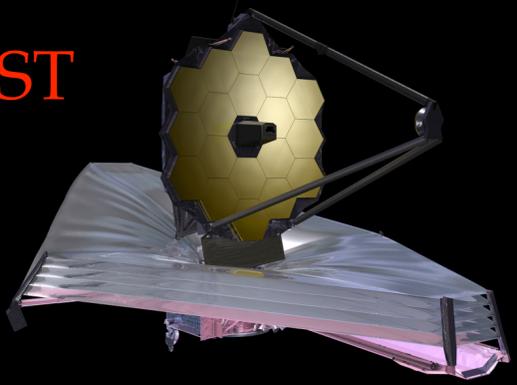
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*Space  
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2021

JWST



*ultra-deep, narrow-field imaging → physical properties of individual high-redshift galaxies*

Part 2

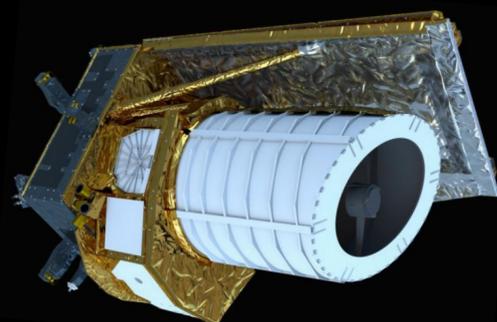
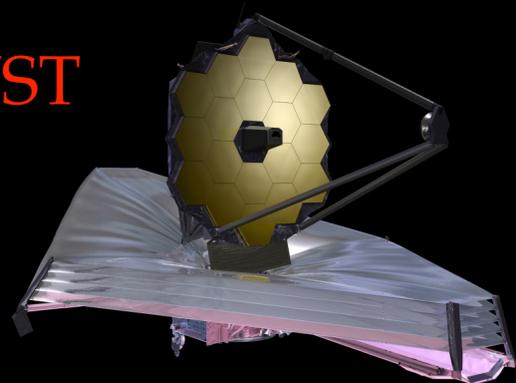
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Euclid

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**Part 2**

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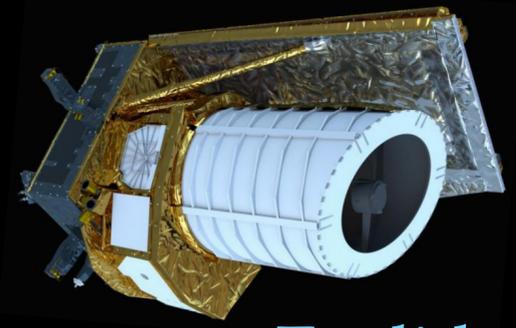
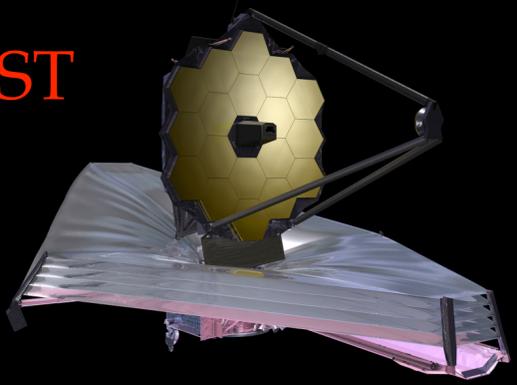


2021

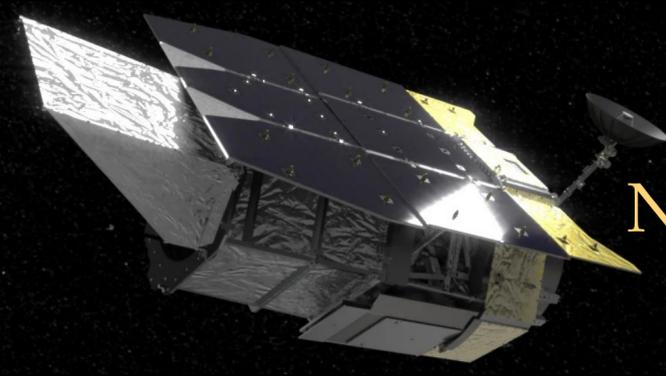
2023

2027

**JWST**



**Euclid**



**N. Roman**

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*wide-field (FOV~0.3 deg<sup>2</sup>) IR with Hubble-like resolution → surveys, complements Euclid in IR*

# How the extragalactic Astronomy will change with the arrival of new ground-based and space observing facilities?

Space  
Telescopes

Ground-based  
facilities

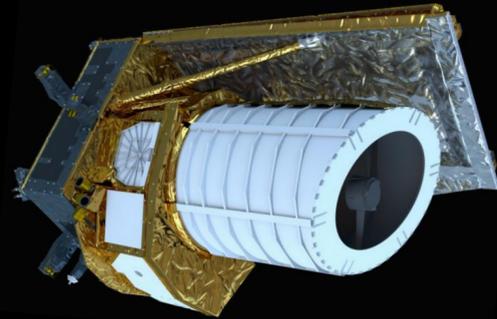
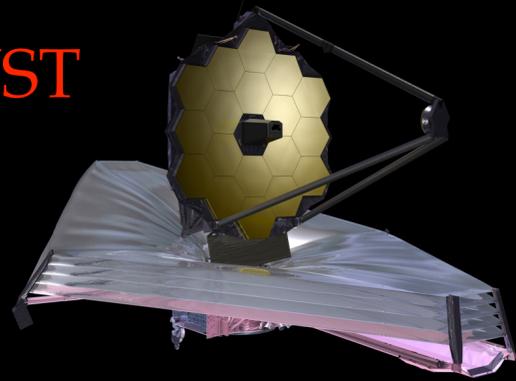
2021

2023

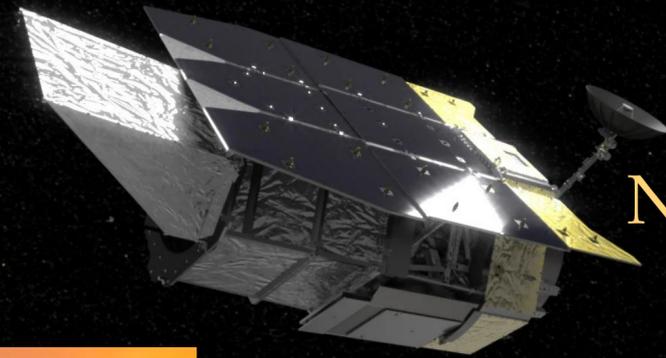
2026

2027

JWST



Euclid



N. Roman

Rubin -LSST



Large FoV & Collecting area

- variability studies of AGN
- transients in distant galaxies
- LSB structures

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Space Telescopes

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2021

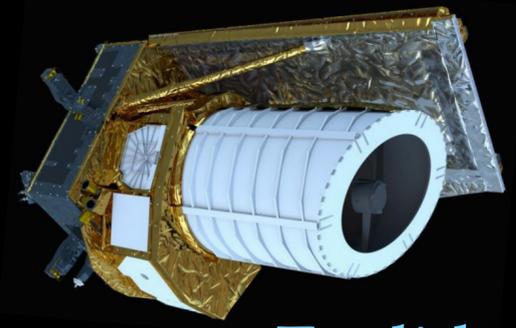
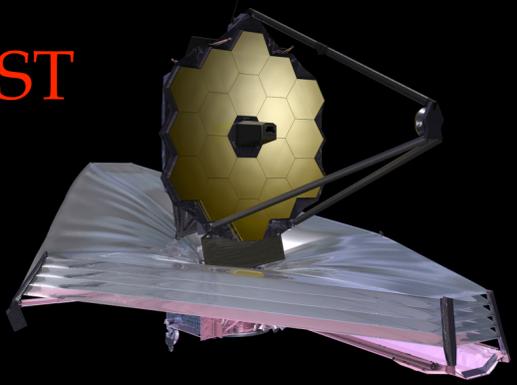
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2026

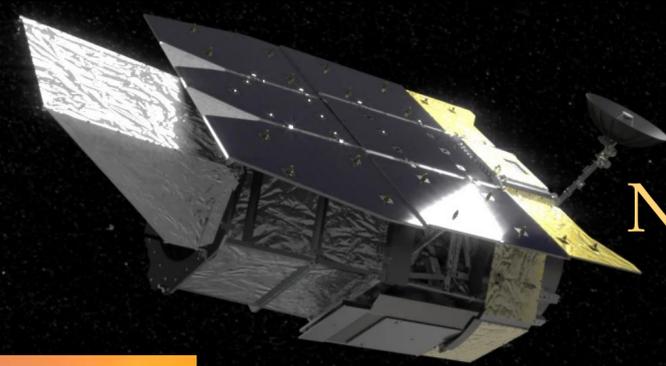
2027

2028 - 2030+

JWST



Euclid



N. Roman



Rubin -LSST

In 2030 ESO will be providing a large portfolio of facilities

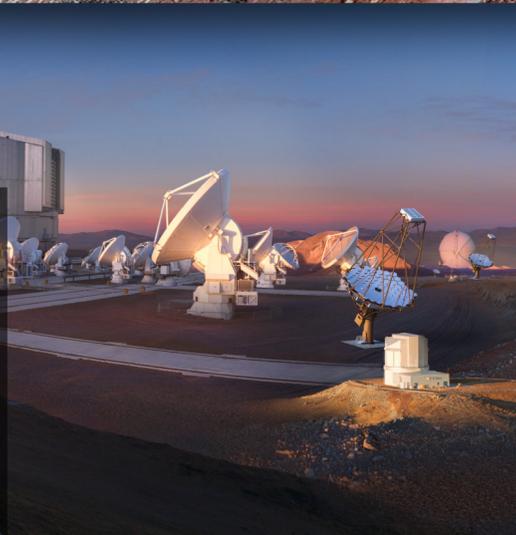
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- 4MOST@VISTA
- VLT: MOONS, CUBES, MAVIS, BlueMUSE
- ELT: MICADO & MORFEO; METIS, HARMONI & ANDES, MOSAIC

- Spectroscopic surveys high-z
- Early Universe
- Galaxy formation & Evolution



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Space Telescopes

Ground-based facilities

2021

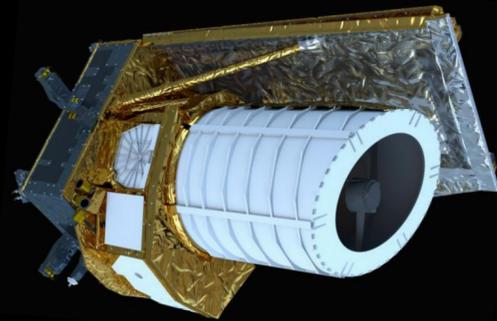
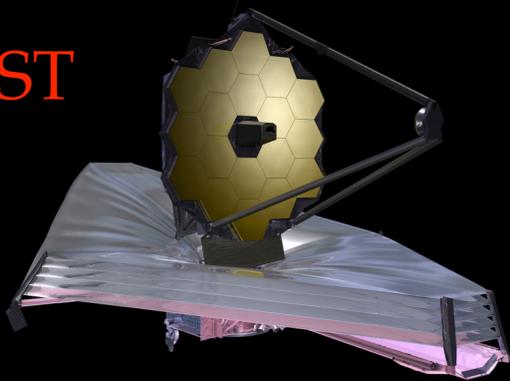
2023

2026

2027

2028 - 2030+

JWST

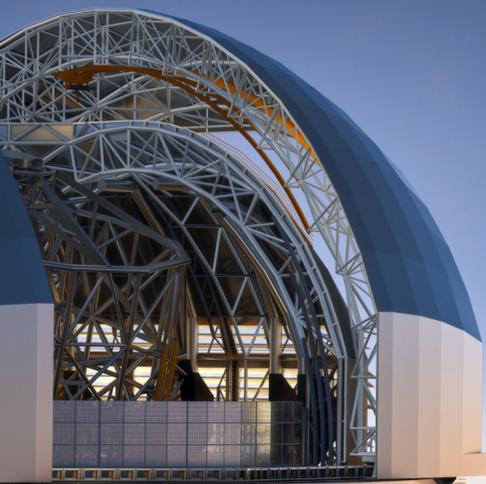


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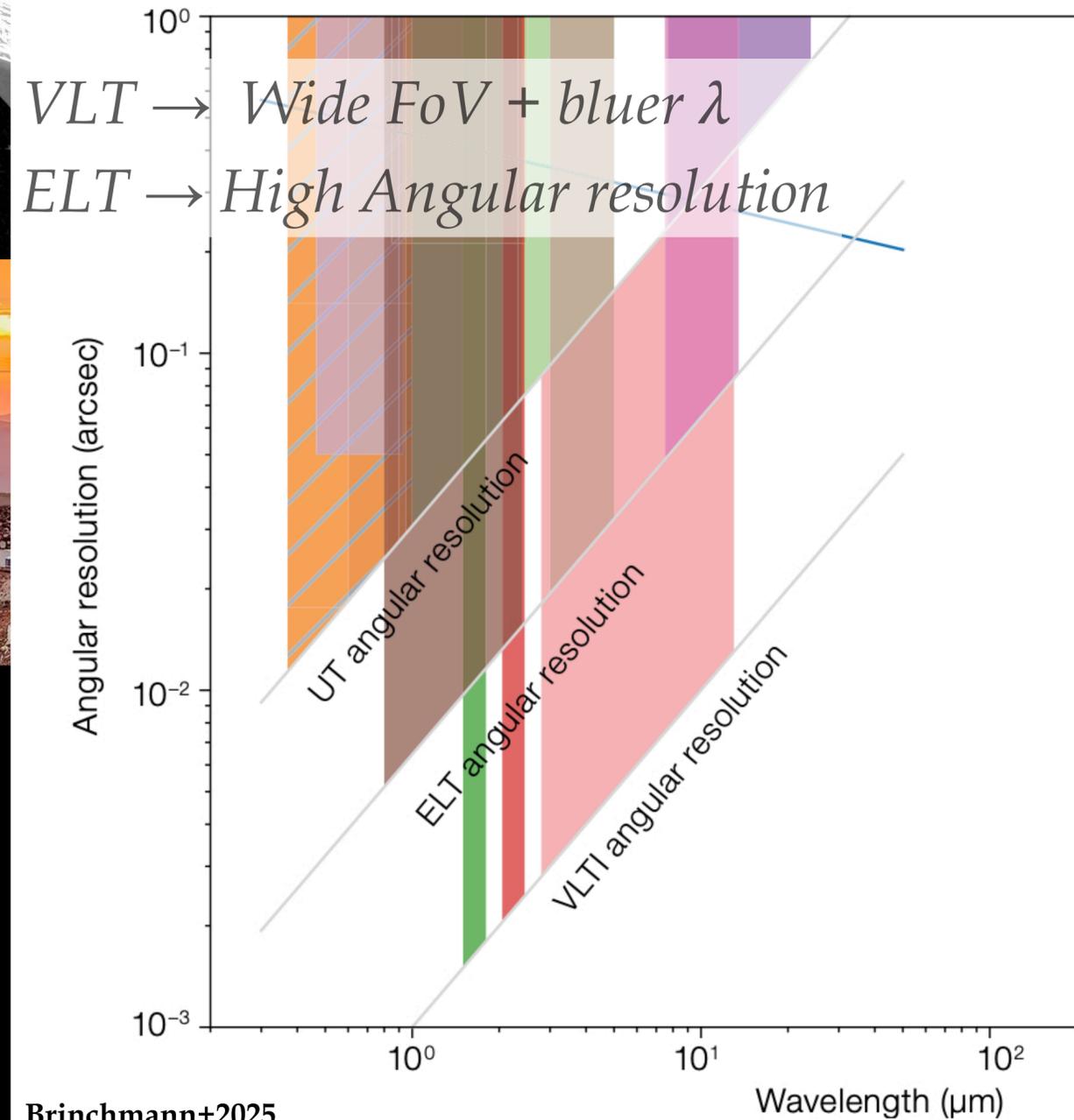
Rubin -LSST



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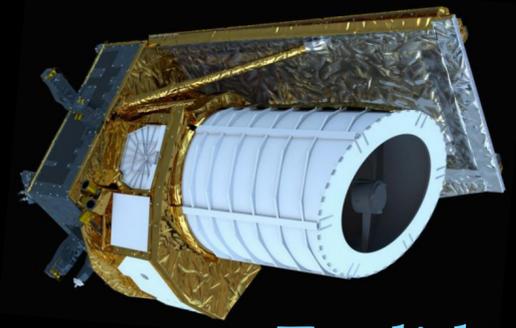
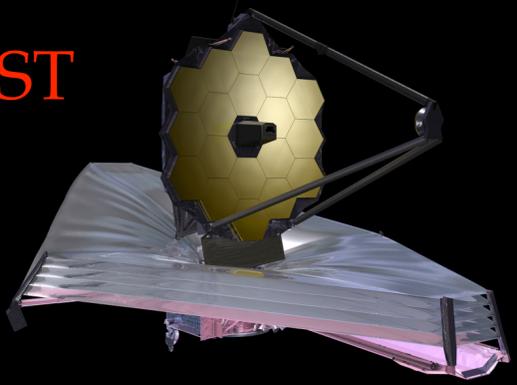
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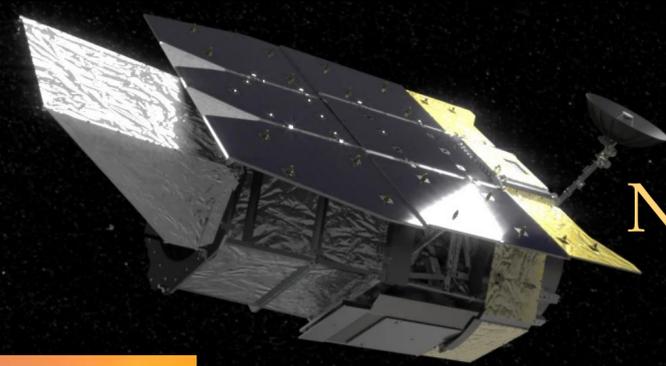
2027

2028 - 2030+

JWST



Euclid



N. Roman



Rubin -LSST

In 2030 ESO will be providing a large portfolio of facilities

Synergies between ESO facilities

ALMA  
leading millimetre/submillimetre observatory

CTA  
a window to very high-energy astrophysics

- ▶ 4MOST@VISTA
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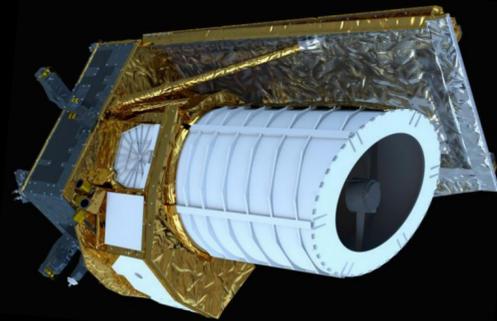
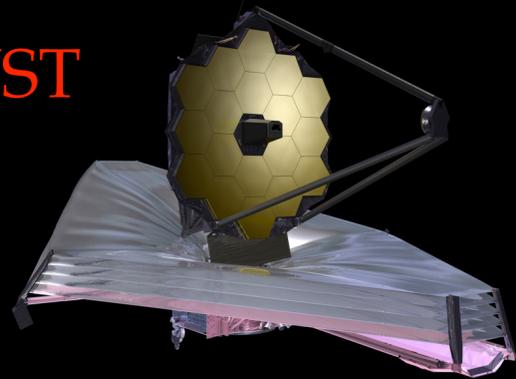
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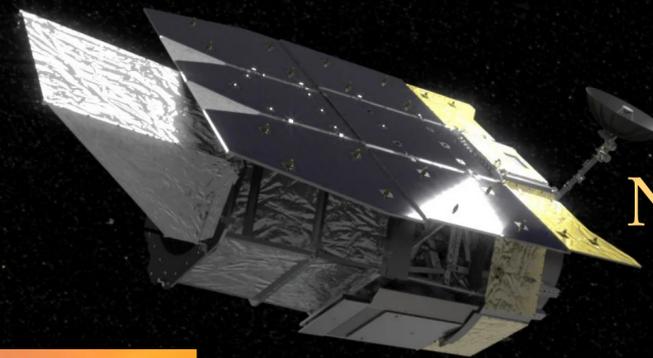
2027

2028 - 2030+

JWST



Euclid



N. Roman

Rubin -LSST



In 2030 ESO will be providing a large portfolio of facilities

- LSS at high  $z$
- HI emission in galaxies  $z > 1$
- SFH & AGN

SKA



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*We are entering a transformative phase for extragalactic astronomy!*

*The next decade will NOT simply deliver better data, but a fundamentally different way of doing science:  
deep & wide surveys + high angular resolution + time domain + multi-messenger*

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*turn the mass assembly process in the Universe from a static picture into a dynamic process over the cosmic time*

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**From “typical galaxies” to the full cosmic ecosystem:**

*Stop focusing on “average” systems and start mapping the entire galaxy-environment-cosmic web connection*



*LSS: Euclid + Rubin + Roman  
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*High-z galaxies will move from “SED-based guesses” to physics-driven measurements*



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Relativistic processes: CTA  
Counterpart: EM facilities*

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## From parameter fitting to model-breaking precision cosmology:

Cosmology shifts from “measuring parameters” to *testing gravity, dark matter properties, and dark energy models*



weak lensing & clustering & BAO:  
 Euclid, Rubin & Roman

# How the extragalactic Astronomy will change with the arrival of new ground-based and space observing facilities?

We are entering a transformative phase for extragalactic astronomy!

## The big picture shift



Physical scale:  
stellar mass

Observables:  
wavelength range

Cosmic time:  
redshift

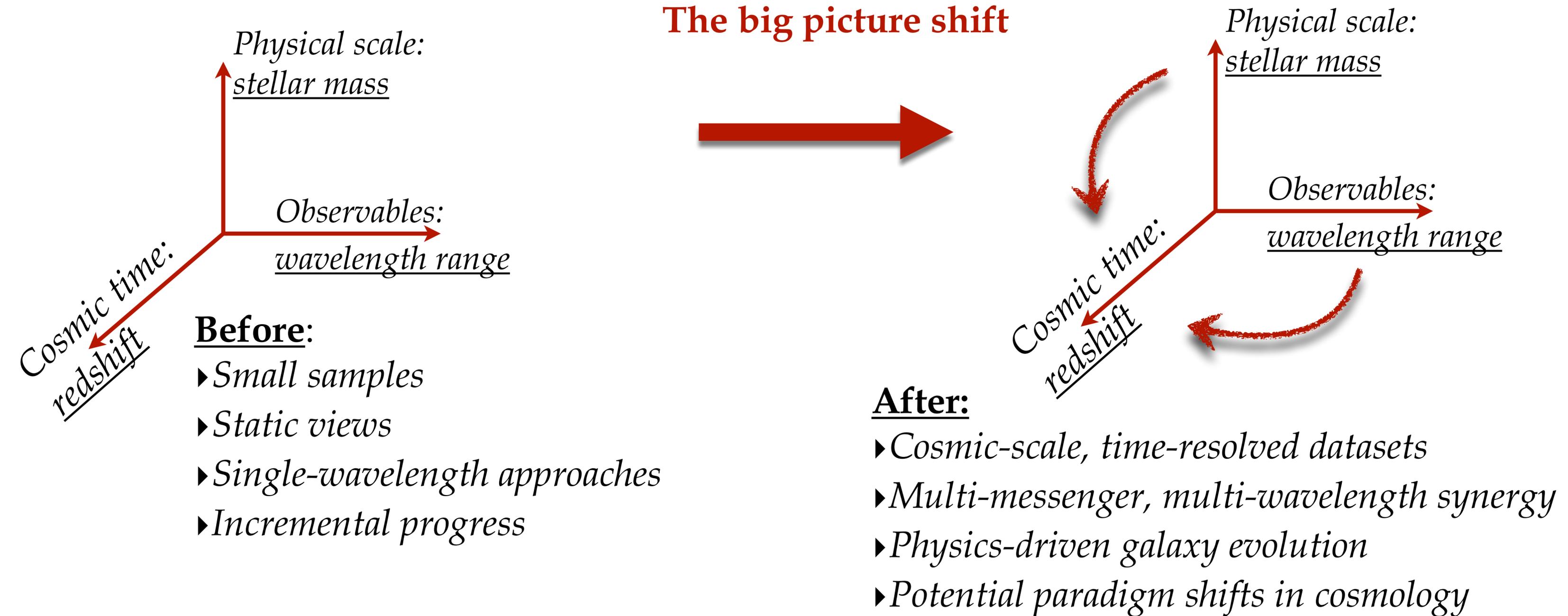
### Before:

- ▶ Small samples
- ▶ Static views
- ▶ Single-wavelength approaches
- ▶ Incremental progress

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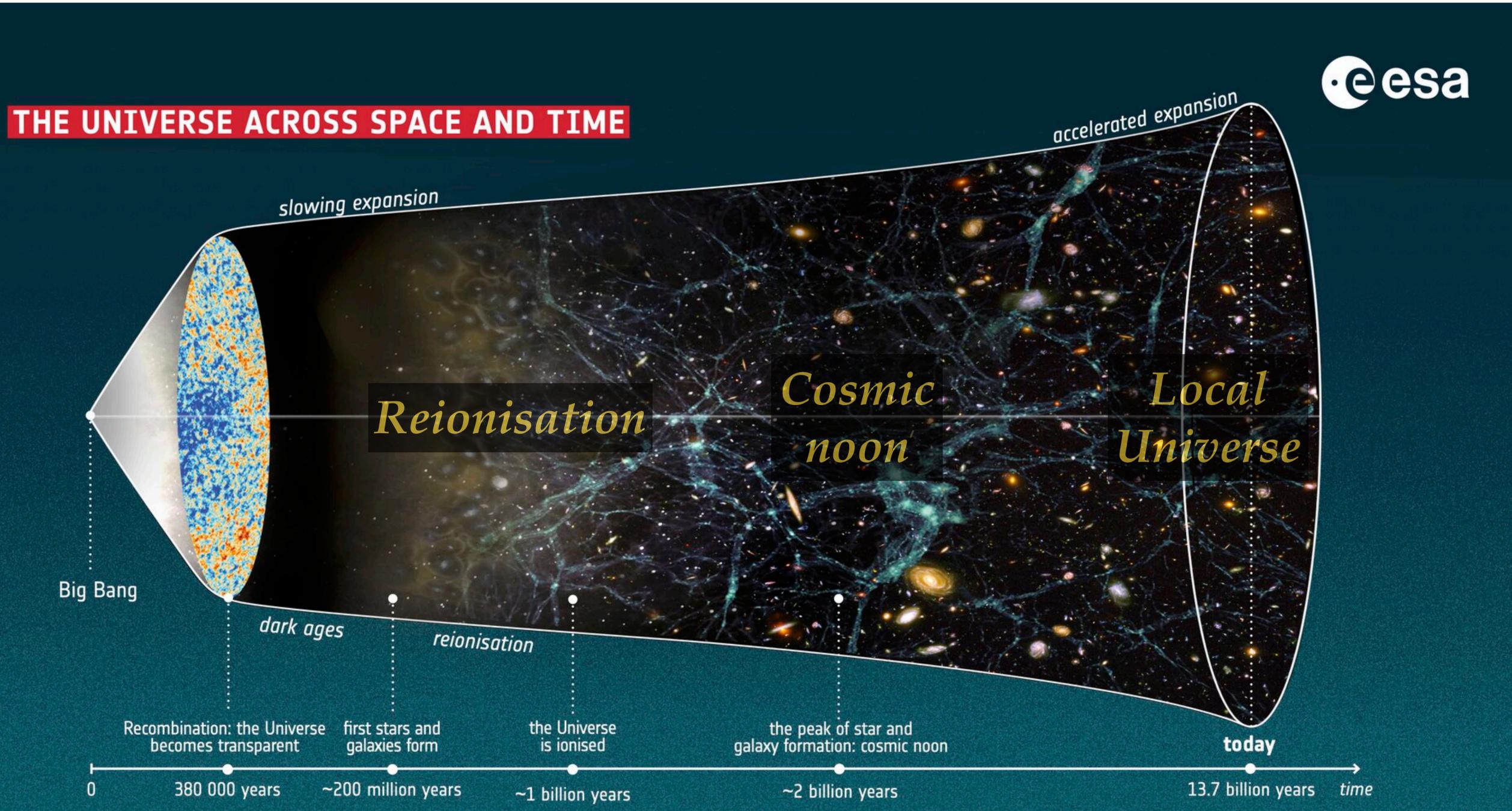
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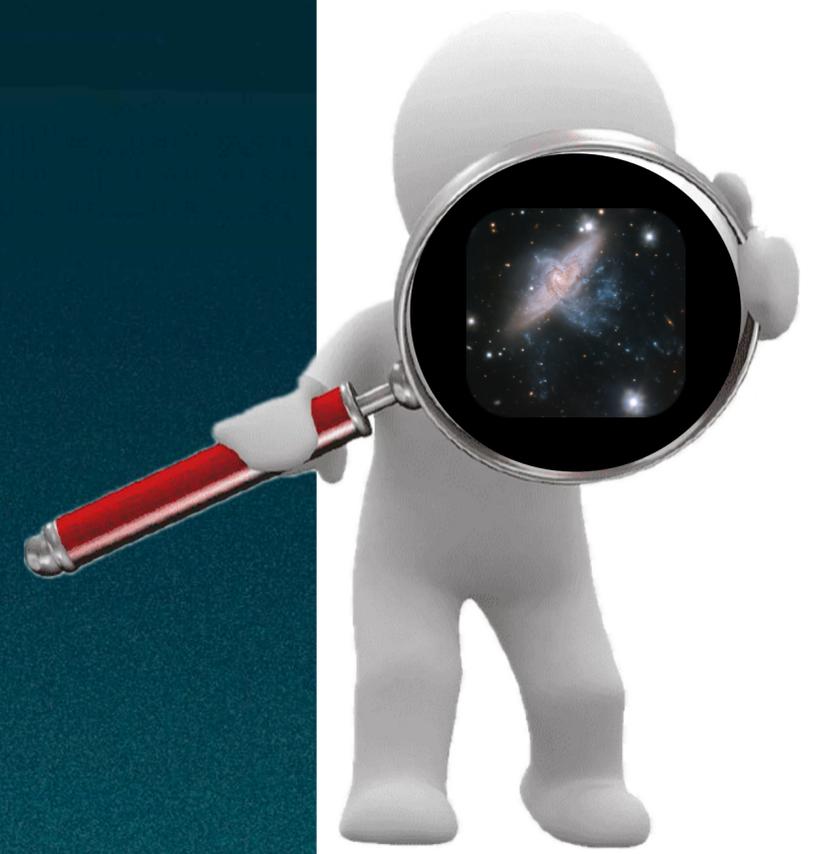
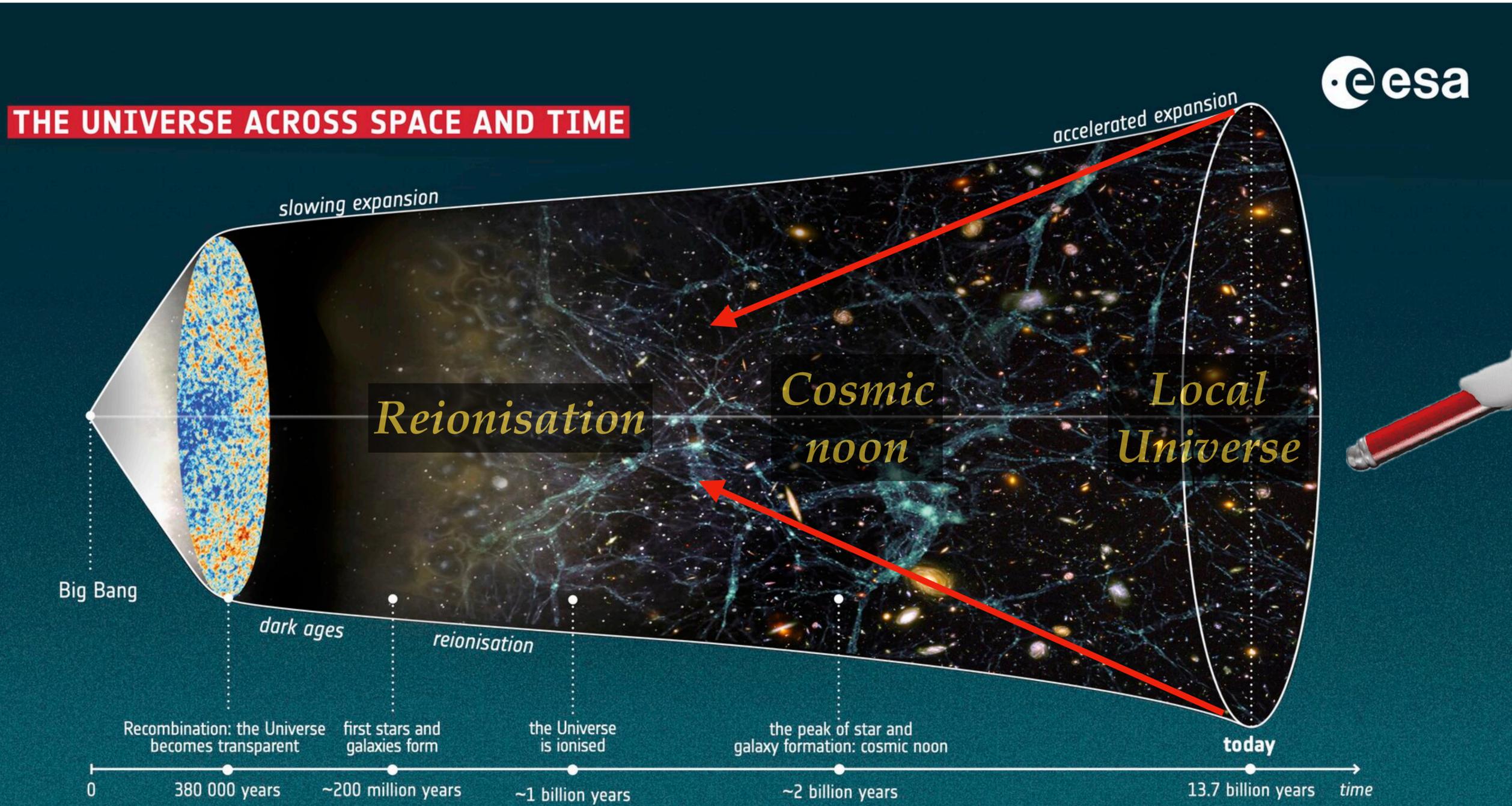
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### **The big picture shift**

- ▶ *Fragmented facilities*
- ▶ *PI-driven science*
- ▶ *Limited European critical mass*



- ▶ *Long-term, coordinated infrastructures*
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### **Which is the INAF's role?**

- ▶ *Leadership in survey science, follow-up, and multi-wavelength analysis*
- ▶ *Instrumentation and science leadership in ESO, ESA, SKA*
- ▶ *Theory, simulations, and data science as enabling pillars*

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### **Which is the step forward?**



*connecting them into a coherent scientific strategy*

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**How we can manage this shift?**



### **Synergies:**

*science (observations & theory), methodologies, technology challenges*

Part 2

*How the extragalactic Astronomy will change with the arrival of new ground-based and space observing facilities?*

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*Integrated light*

**The big picture shift**

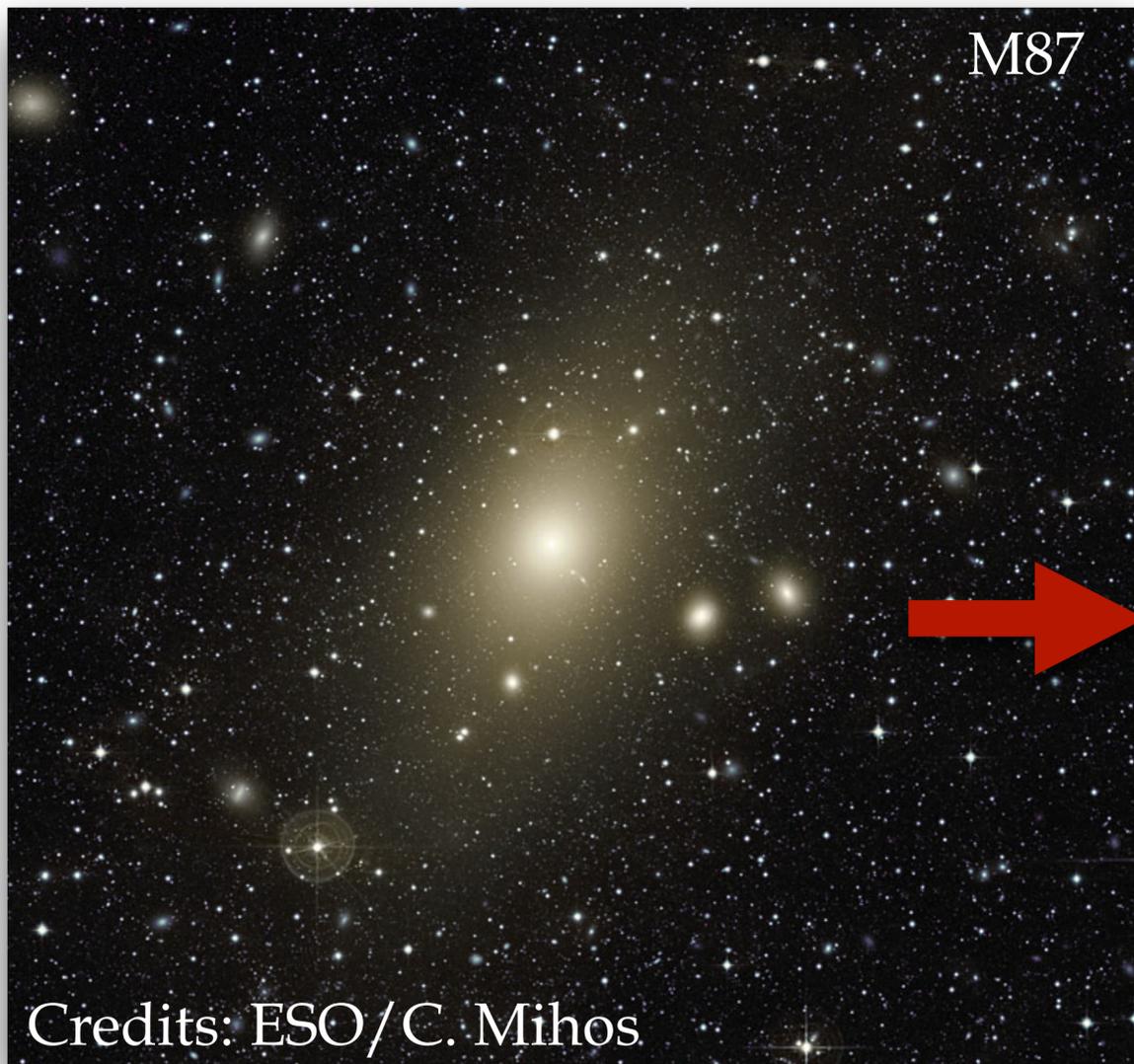


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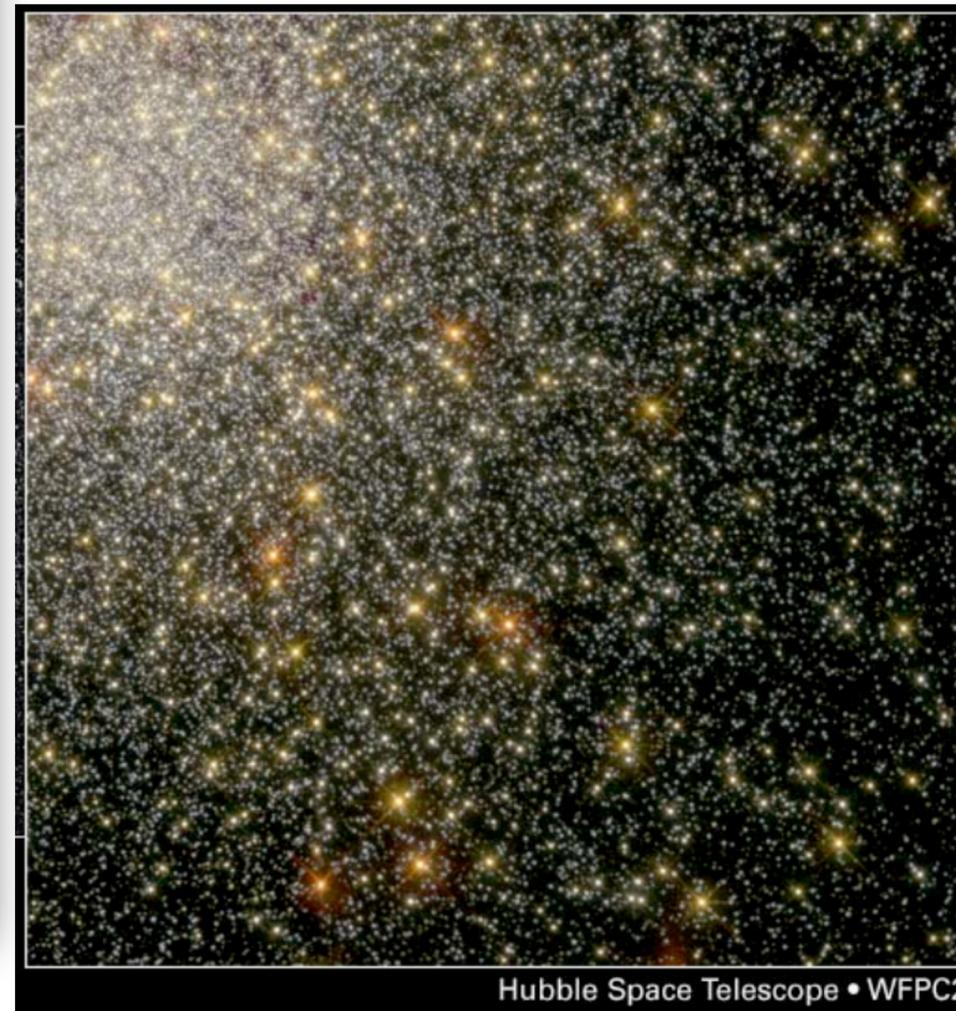
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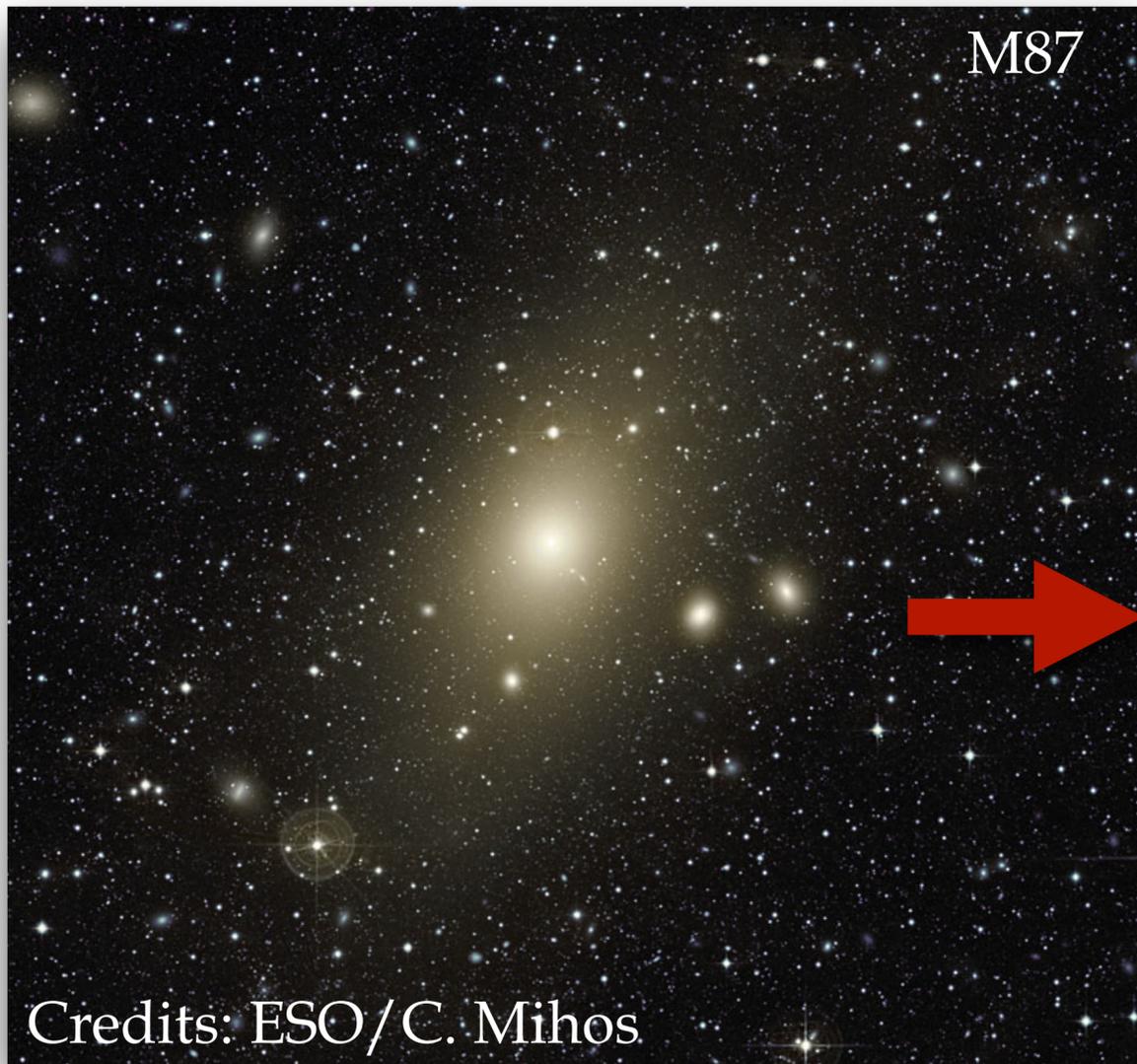
with ELT



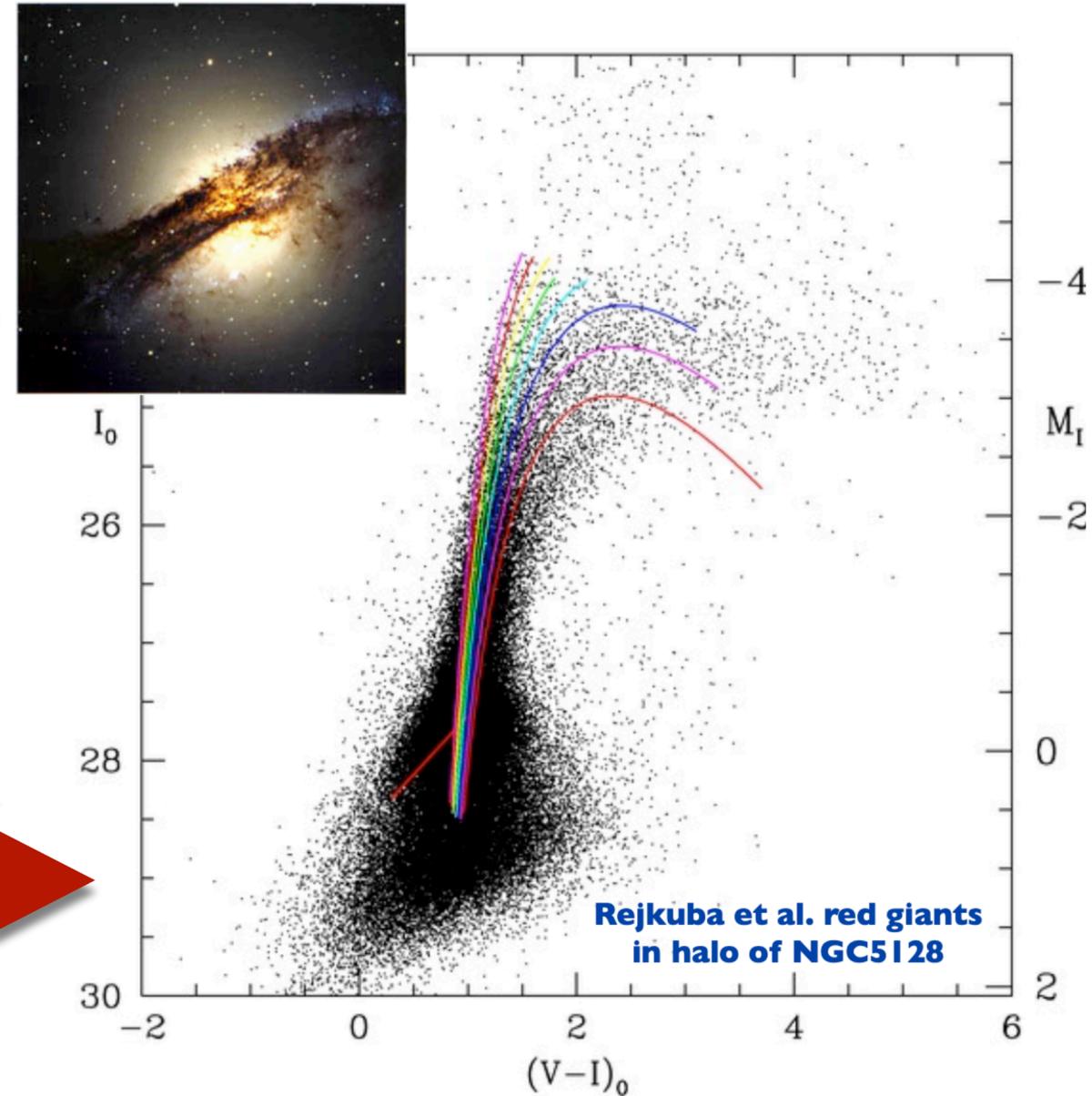
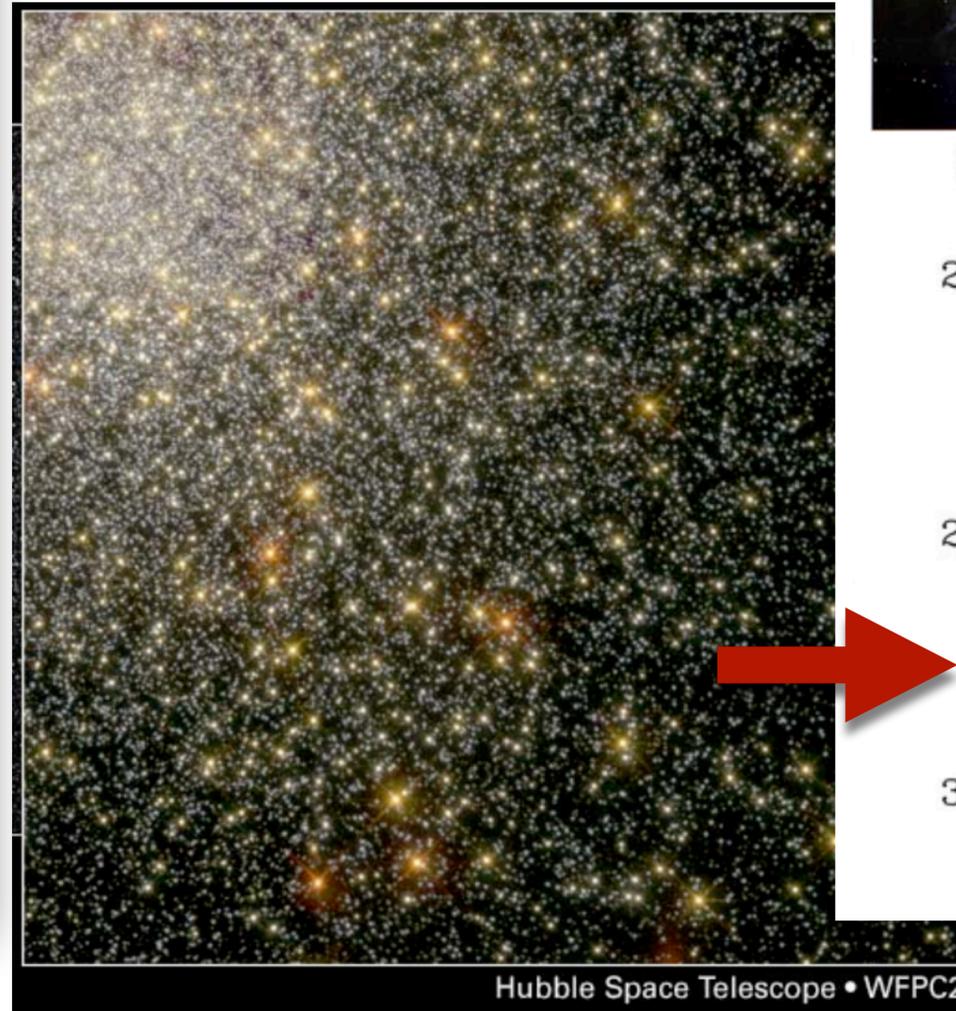
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Integrated light



The big picture shi  
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resolved stellar population

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**INAF Leadership in extragalactic astronomy will be defined by its ability to address a small number of flagship questions:**

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**Part 2**

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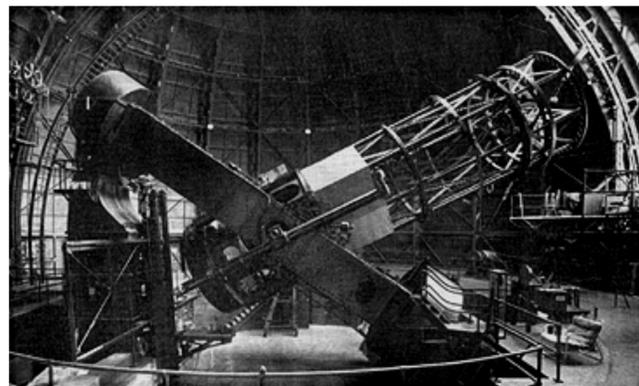
*Short-term contracts and fragmented career paths affect continuity and leadership!*

# Conclusive Remarks: extragalactic science today & tomorrow

We started from here (1923):  
*validating the Island Universe theory*



Edwin Hubble



The Mt. Wilson 100-inch

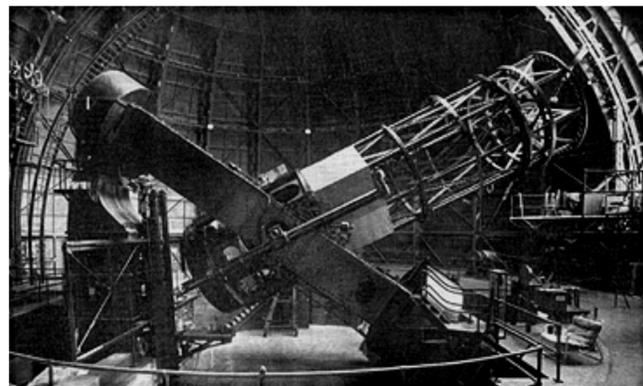
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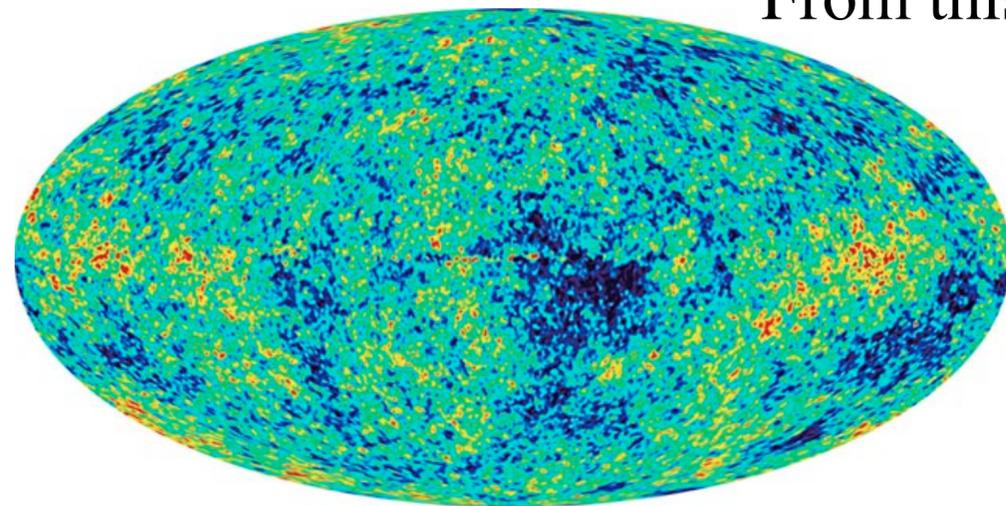
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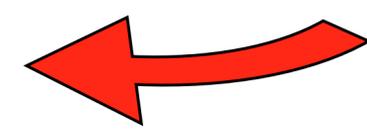
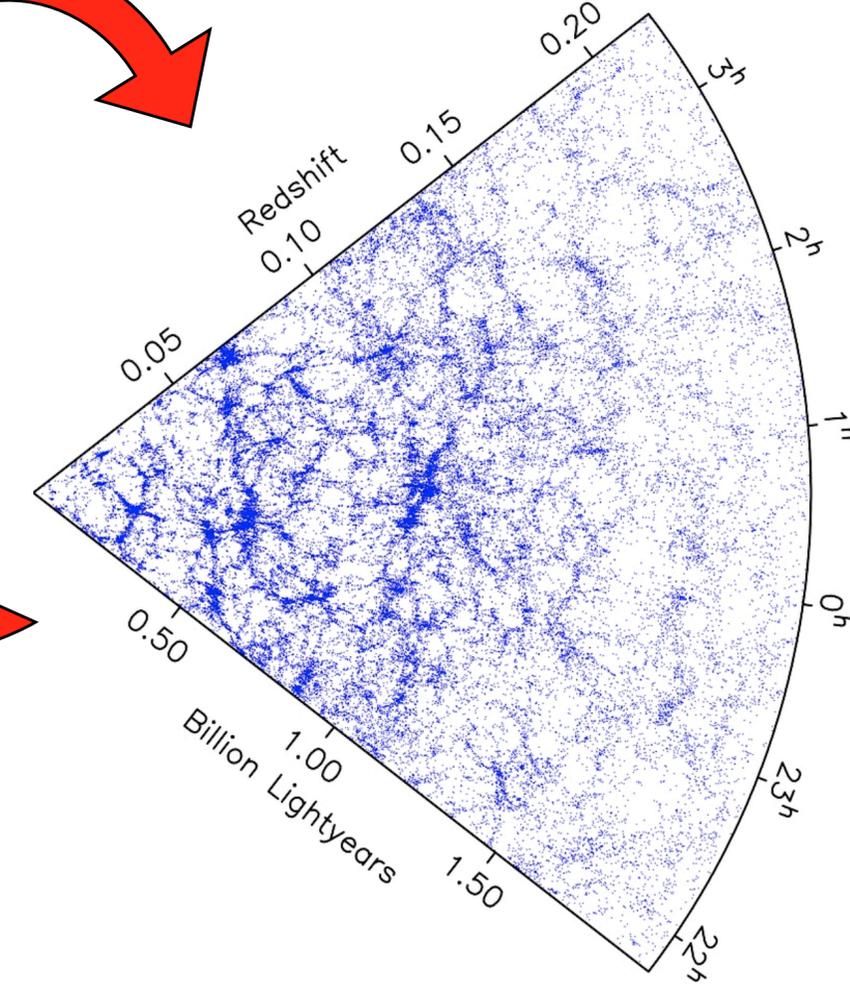
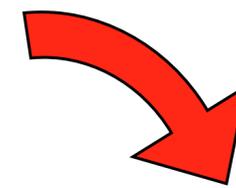


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From this ( $\Delta\rho/\rho \sim 10^{-6}$ )

to this  
( $\Delta\rho/\rho \sim 10^{+2}$ )



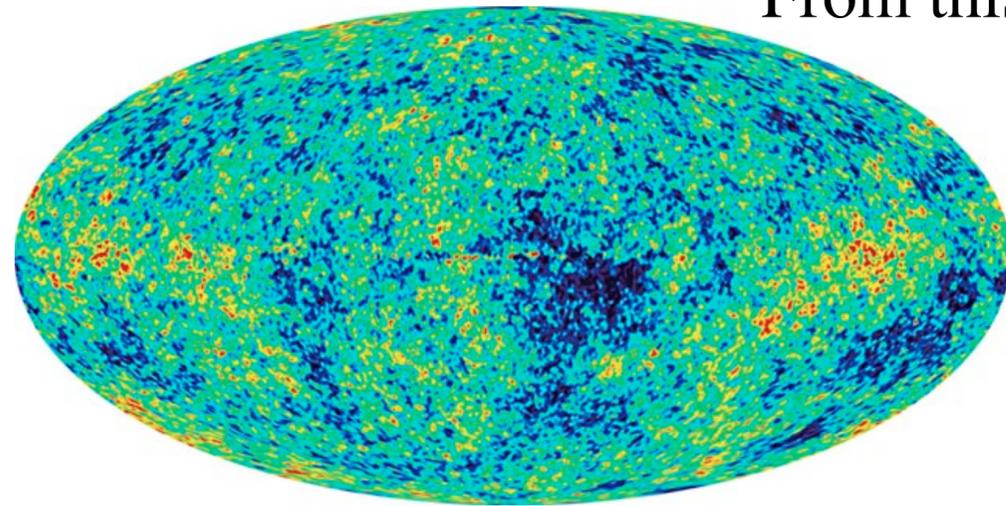
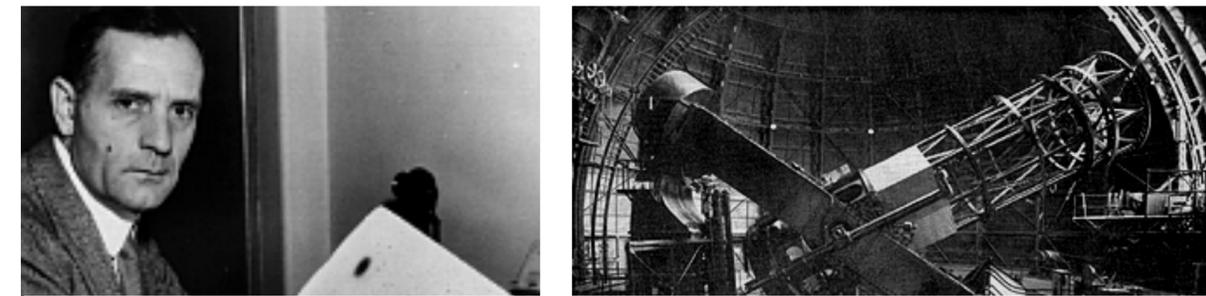
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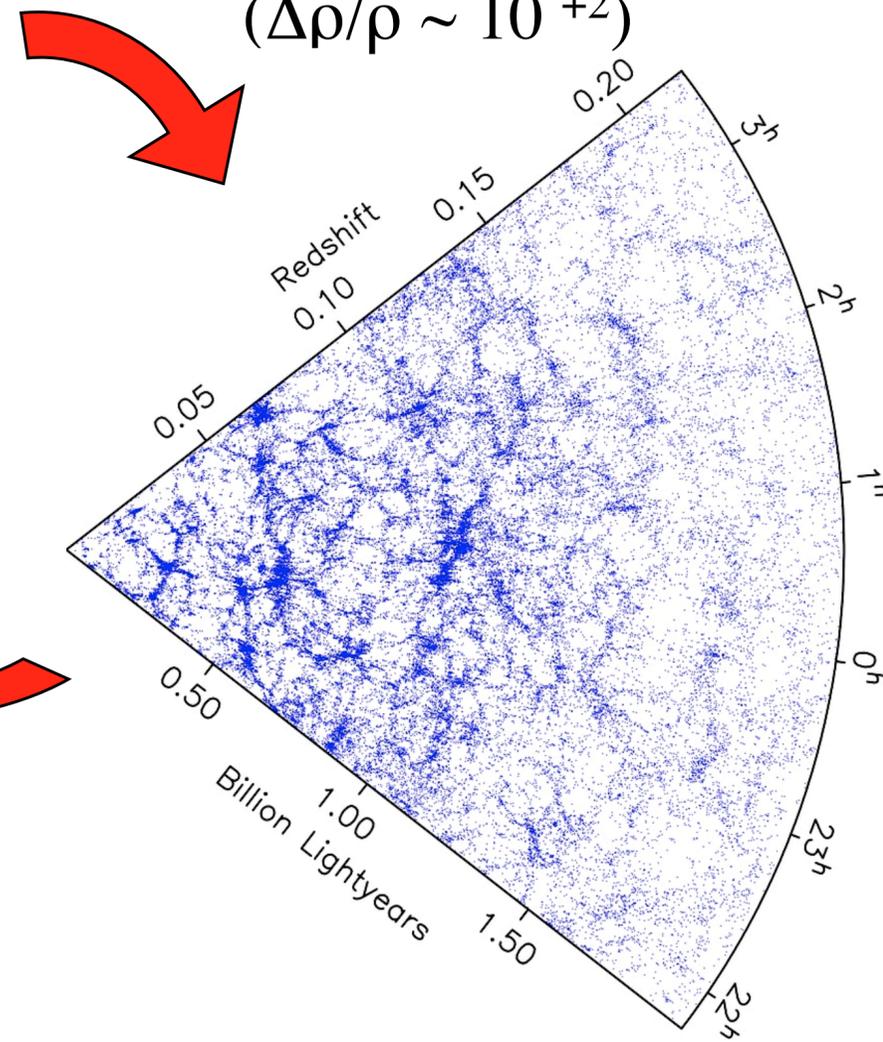
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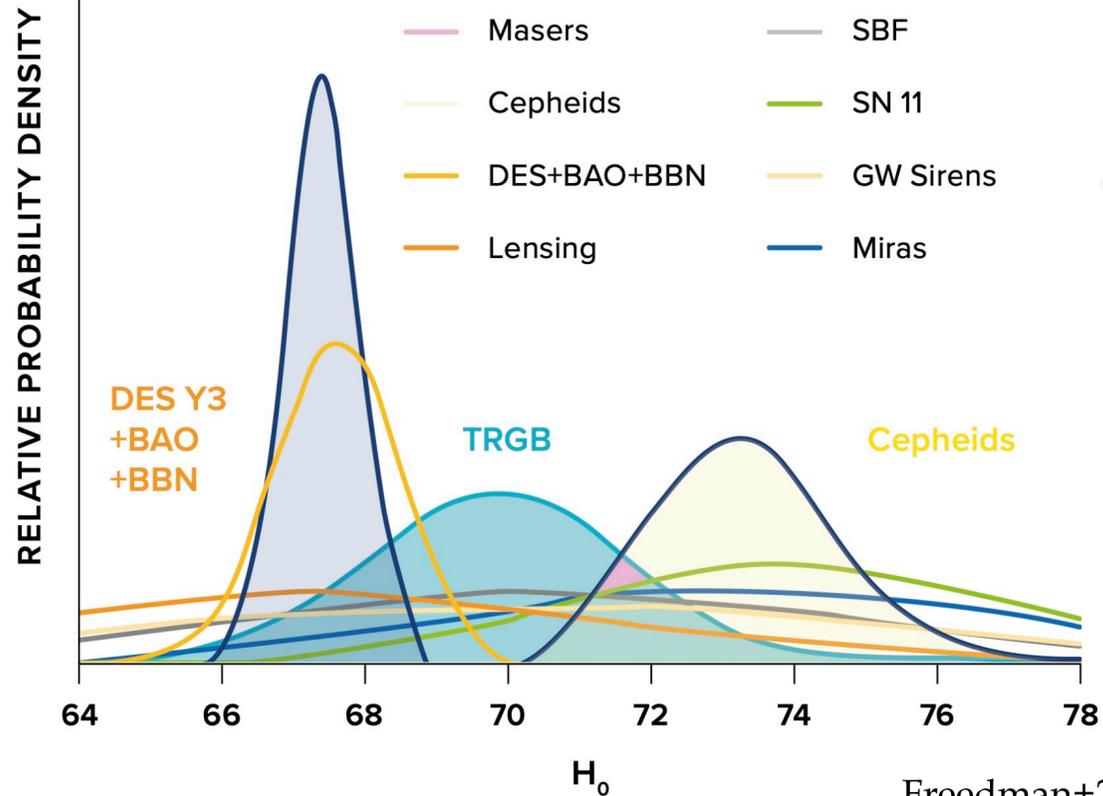
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RECENT PUBLISHED  $H_0$  VALUES

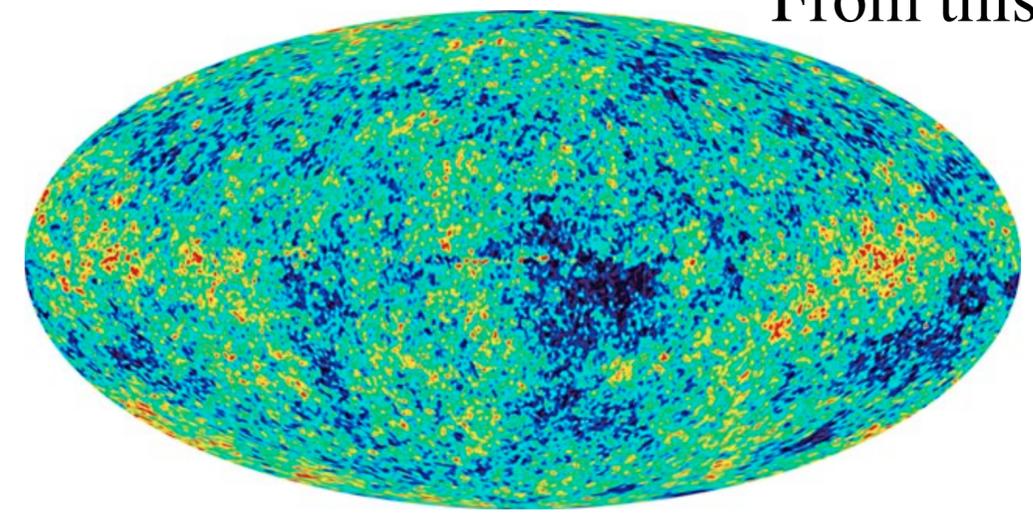
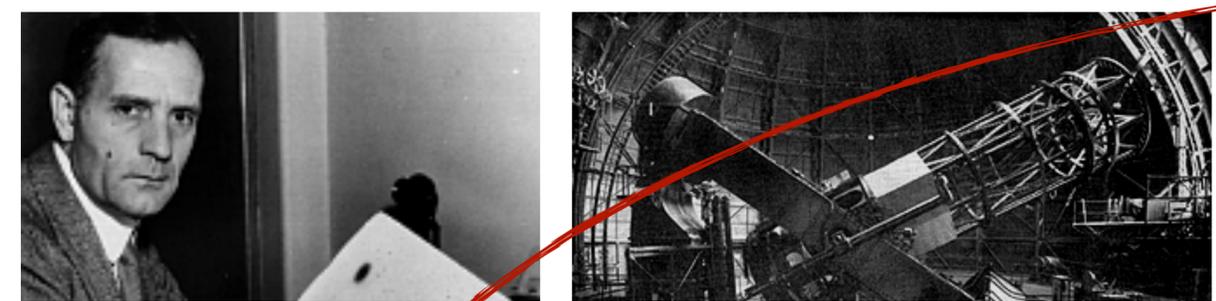
- Planck
- Masers
- Cepheids
- DES+BAO+BBN
- Lensing
- TRGB
- SBF
- SN 11
- GW Sirens
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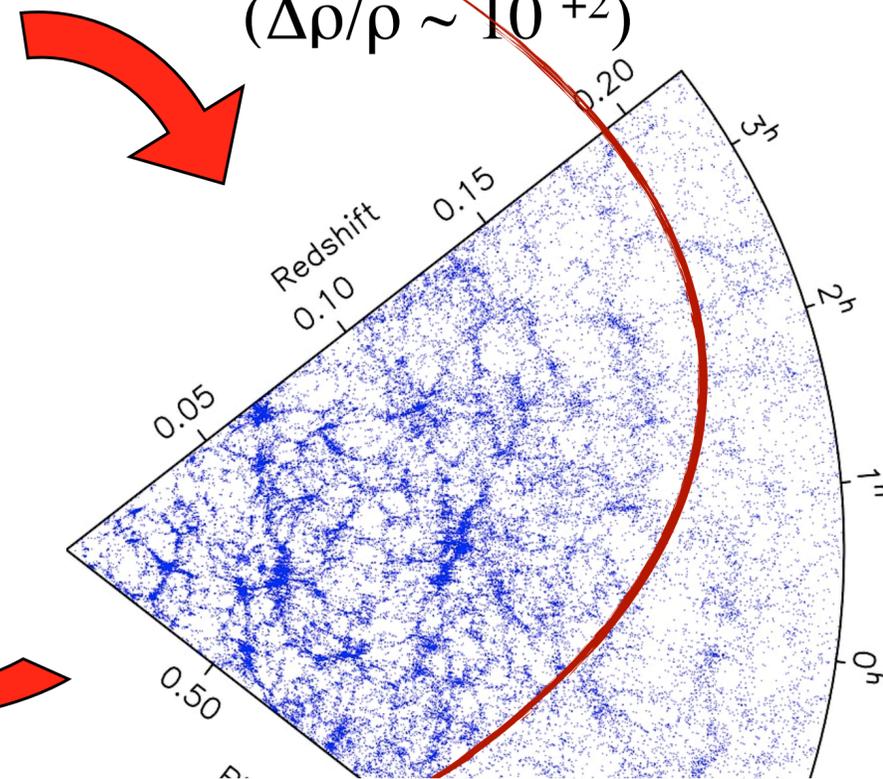
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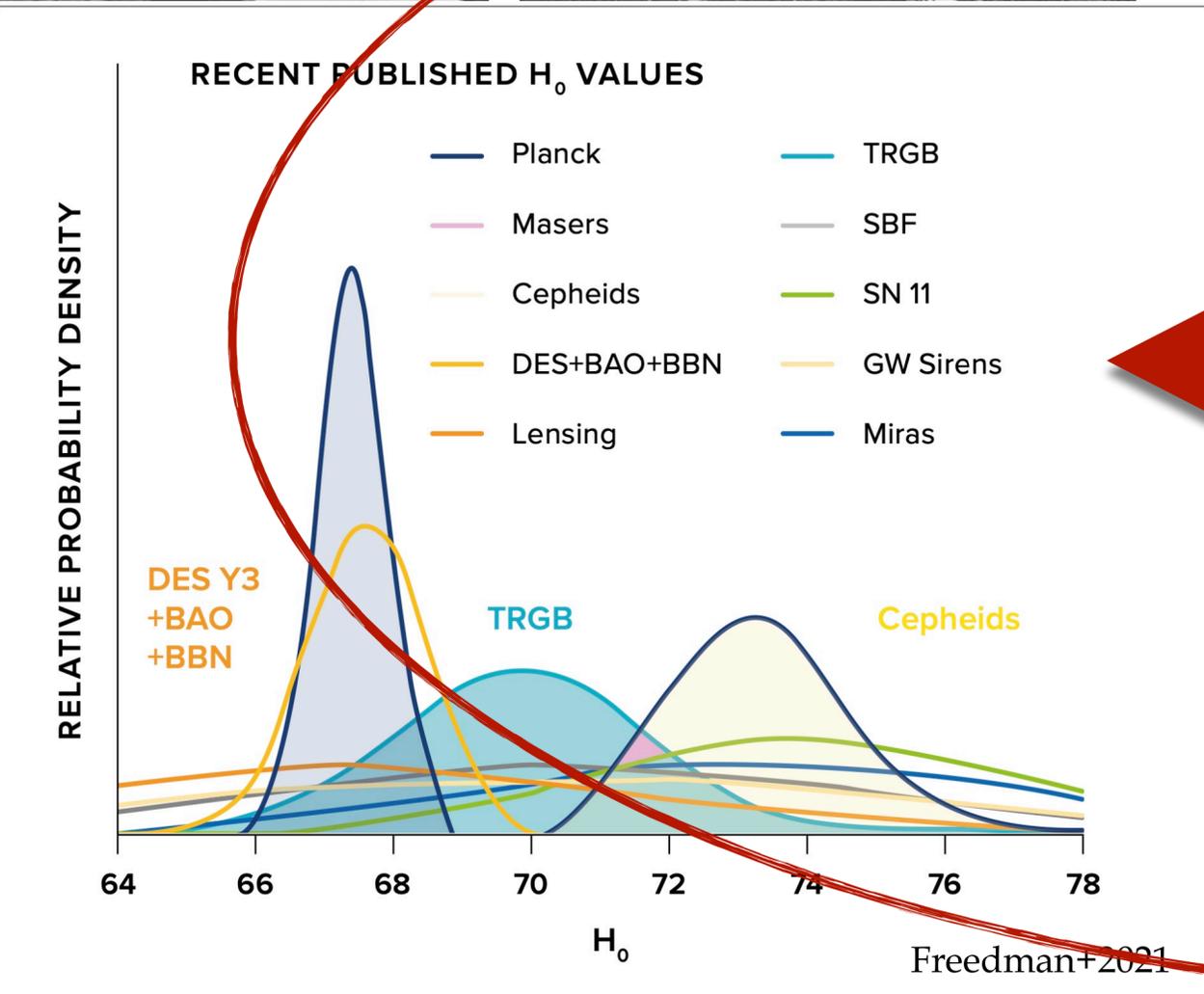
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*RSN1: "Galassie & Cosmologia"  
Still appropriate?*

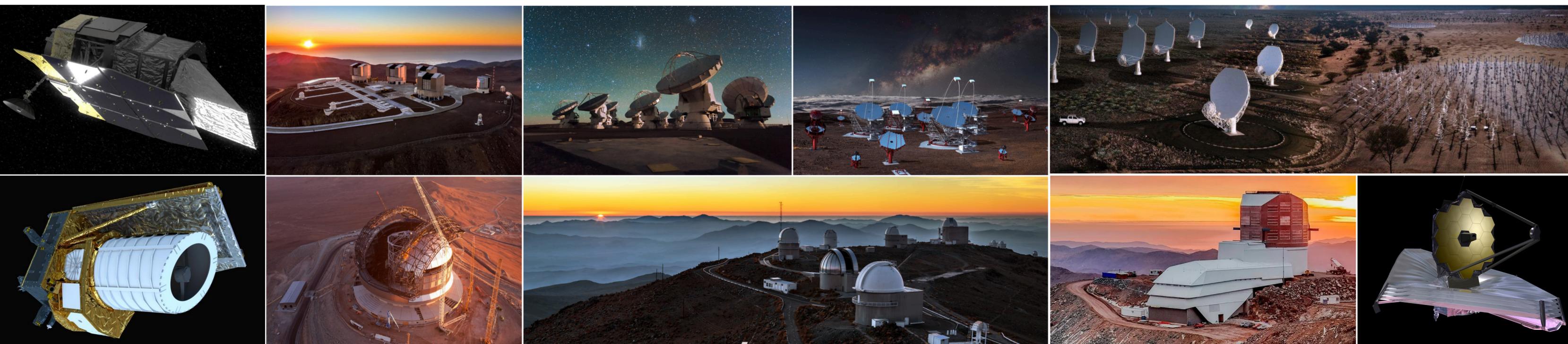


## Conclusive Remarks: extragalactic science today & tomorrow

*Goal: turning new infrastructures into scientific leadership*

*In the coming decade, extragalactic astronomy will be defined*

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*We have peered into a new world and have seen that it is more mysterious and more complex than we had imagined. Still more mysteries of the universe remain hidden.*

*Their discovery awaits the adventurous scientists of the future. I like it this way.*

Vera Rubin in *Bright Galaxies, Dark Matters*, preface, p. xiii



February 11, 2026:

*International day of women & girls in science*



– Call for Action 2026 –

*From Vision to Impact:  
Redefining STEM by Closing the Gender Gap*

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## *International day of women & girls in science*



– Call for Action 2026 –

*From Vision to Impact:  
Redefining STEM by Closing the Gender Gap*

**1**

Globally, young women are more likely than young men to enroll in higher education, with 46% of women and 40% of men enrolling in advanced studies within five years of completing their secondary education. But women account for 35% of science graduates.

**2**

Women form a persistently low share of scientific researchers. Just one in three researchers globally is a woman.

**3**

Women are moving towards equitable representation in the research workforce in academia and the public sector while men continue to dominate in the private sector, in the majority of countries.

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*“I live and work with three basic assumptions:*

- 1) There is no problem in science that can be solved by a man that cannot be solved by a woman.*
- 2) Worldwide, half of all brains are in women.*
- 3) We all need permission to do science, but, for reasons that are deeply ingrained in history, this permission is more often given to men than to women”*

V. Cooper Rubin “Opening the Doors,” 1990  
talk published in *Bright Galaxies, Dark Matter*, p. 174



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## – INAF Third Mission –

*Bridge between the frontier astrophysics research and society – > turning knowledge into shared public value*

- ▶ *Gender equality, diversity & inclusion*
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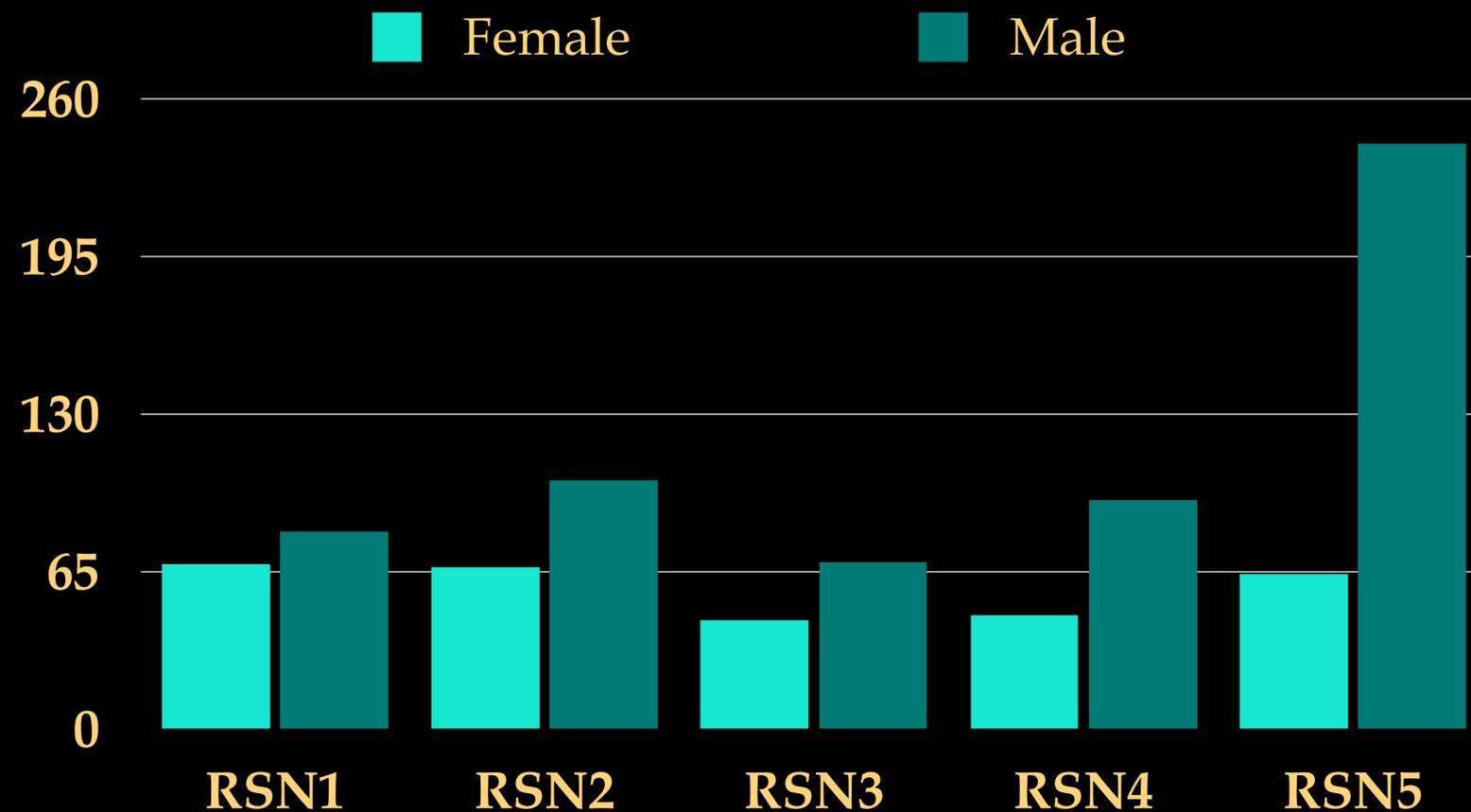
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