

Az Univerzum szerkezete

Frei Zsolt (Eötvös E.)

Atomoktól a csillagokig
2005 december 15.

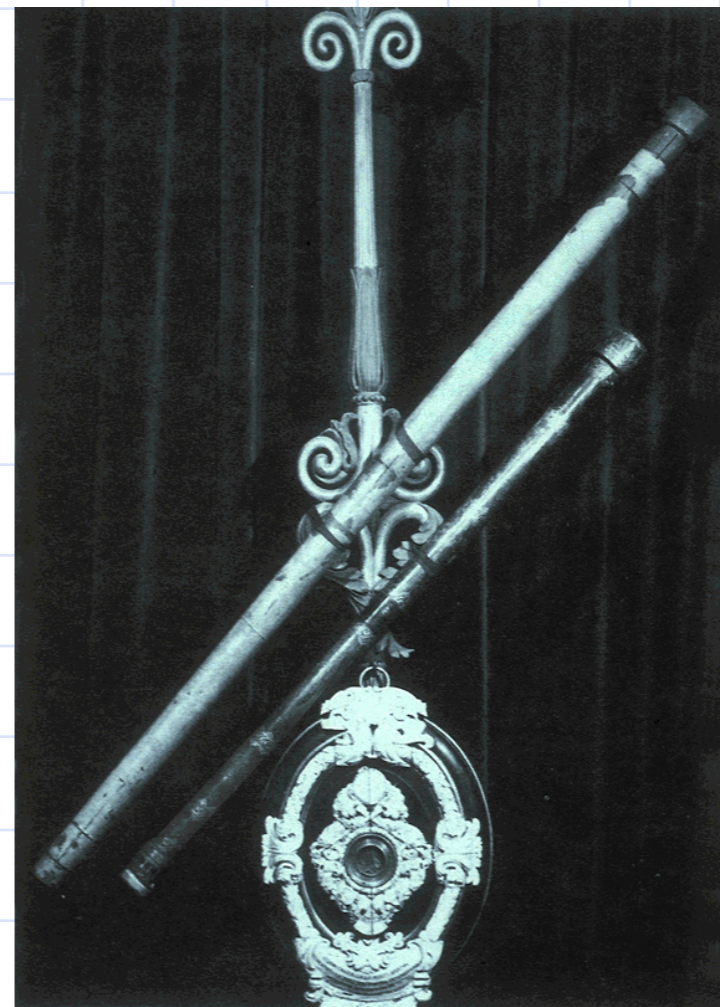
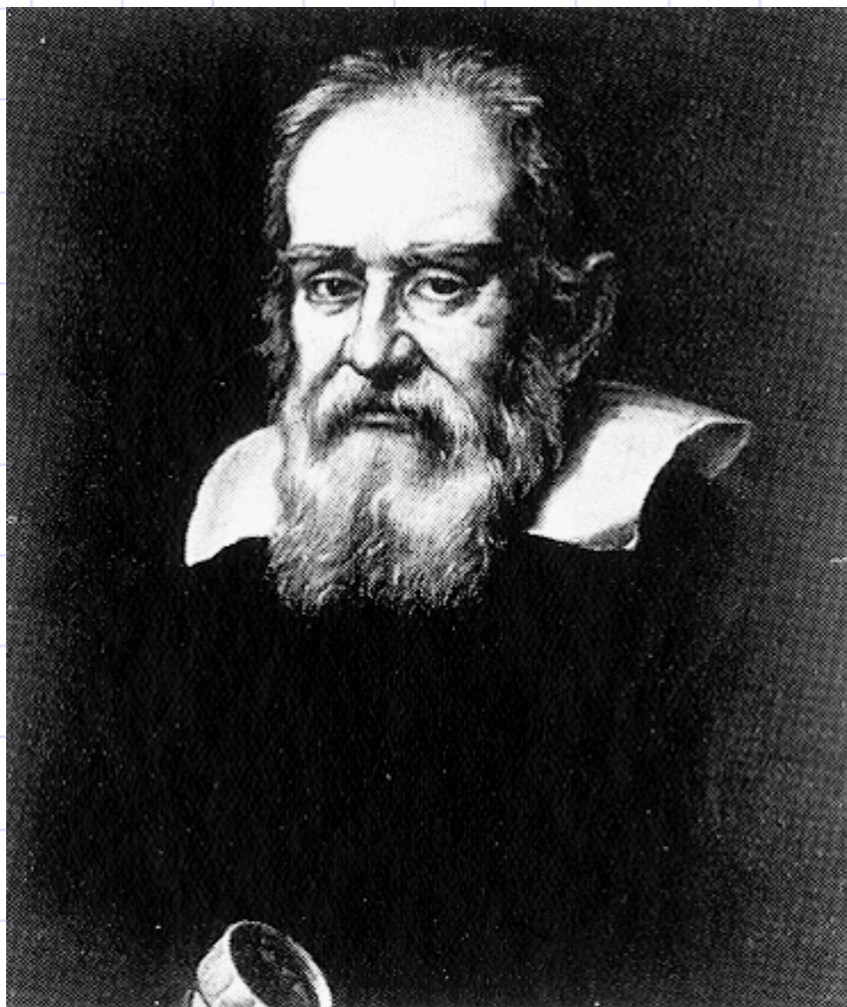


Vázlat:

- ◆ Csillagászat (nagyon rövid) története
- ◆ Galaxisok felfedezése
- ◆ Morfológiai osztályozás
- ◆ Saját katalógusunk
- ◆ Fejlődés, Hubble Deep Field (HDF)
- ◆ Nagyskálás szerkezet feltárása
- ◆ Sloan Digital Sky Survey (SDSS)

Történeti áttekintő:

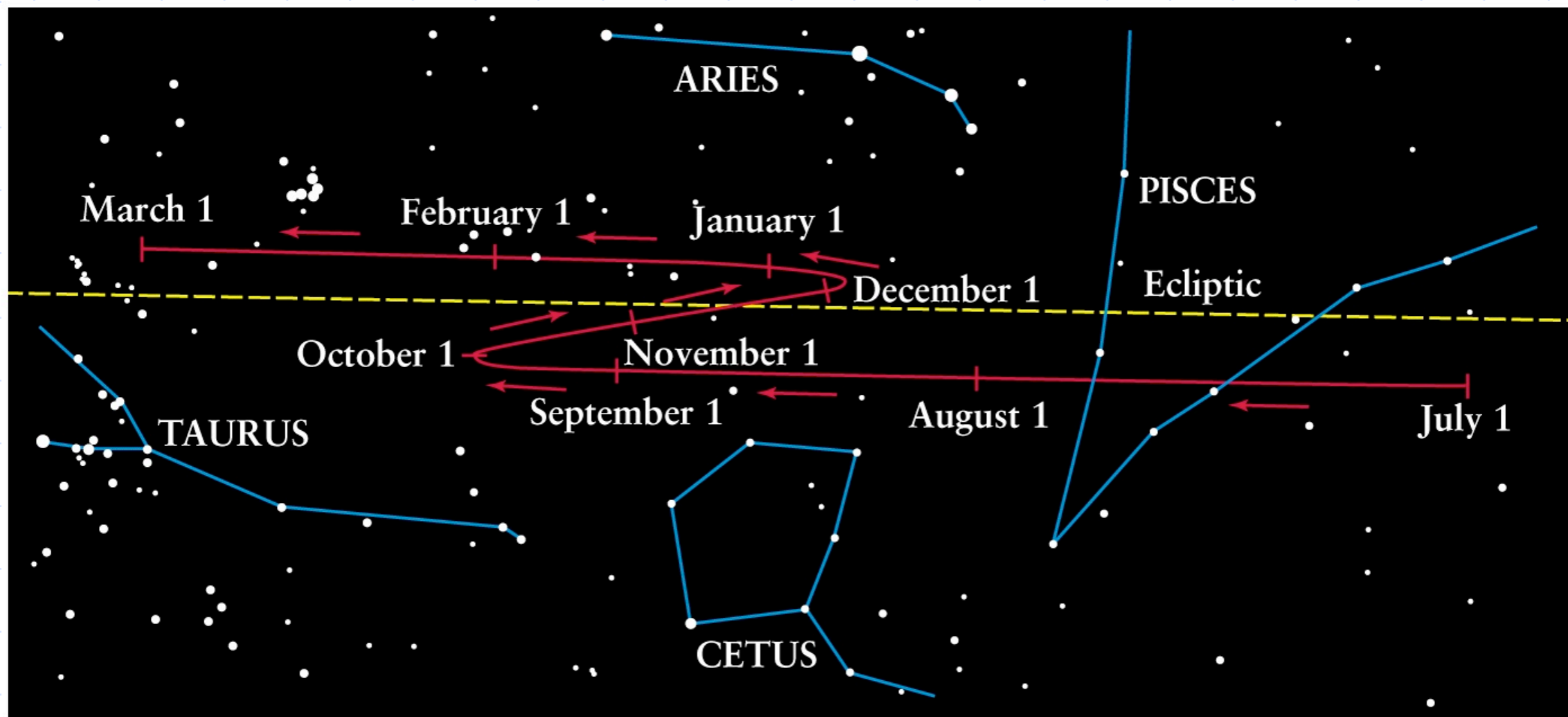
XVII.-XVIII. századra: Naprendszer szerkezete nagyjából ismert volt



Brahe, Kopernikusz és Kepler:

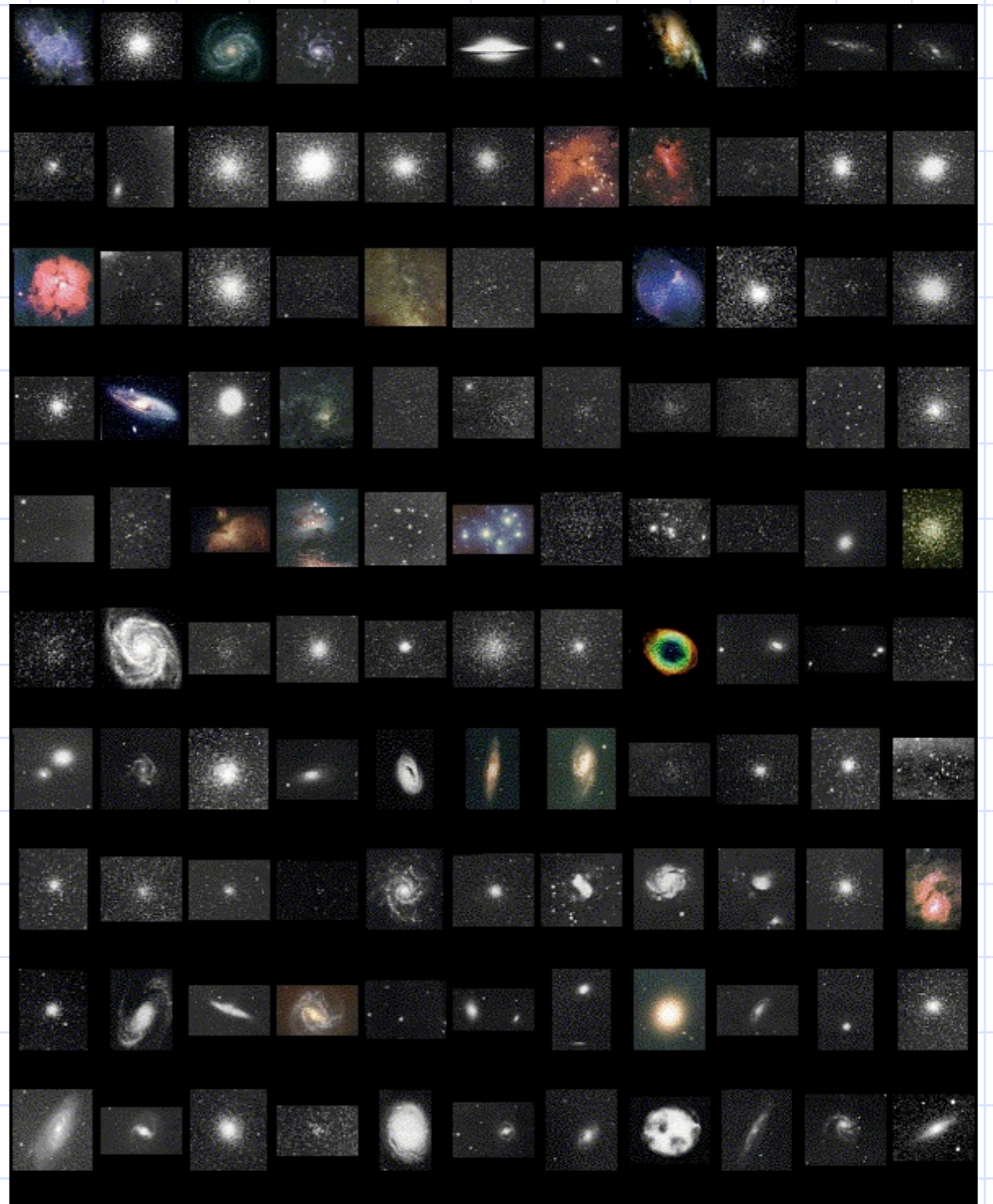


A Naprendszer és a csillagok:



Messier katalógusa:

- ◆ 1700-as évek végén, ~100 objektum
- ◆ Objektumok mibenléte 100 éven át vitatott
- ◆ Mai, szép képek (jobbra)

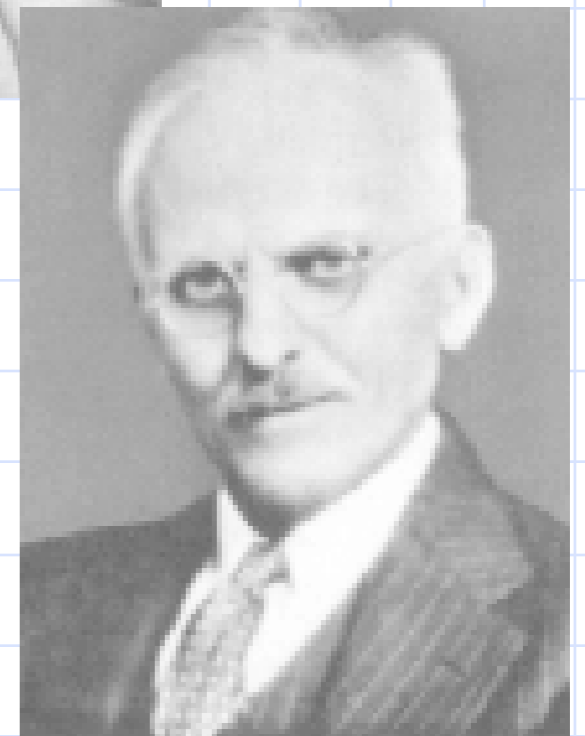


Shapley – Curtis vita:

◆ 1920, Smithsonian Intézet

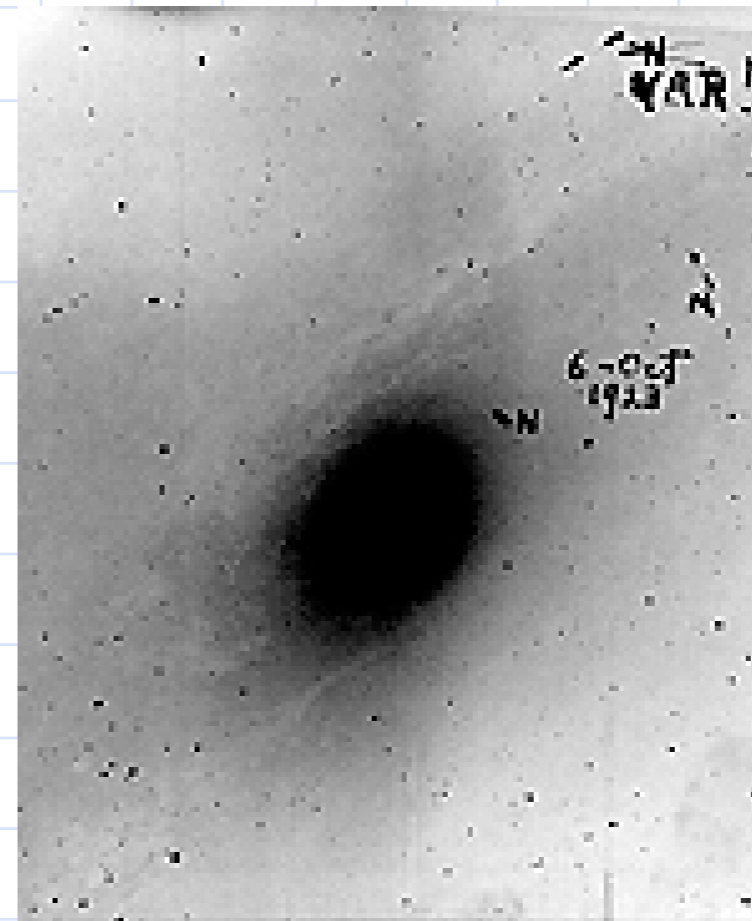
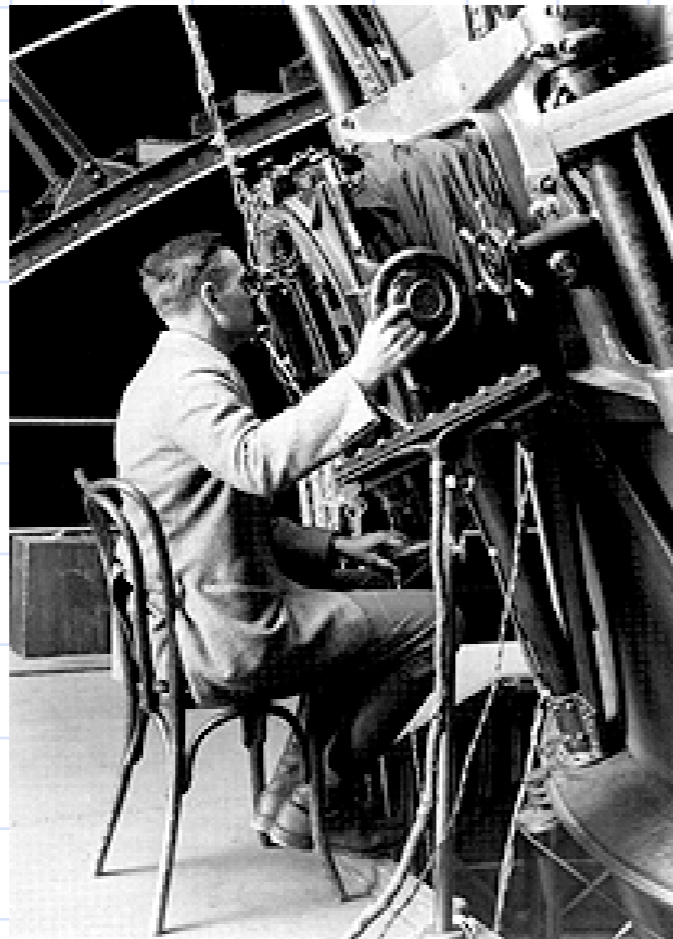
◆ 3 fő kérdés:

- távolság
- összetétel
- “elkerülési zóna”



Edwin Hubble megoldása:

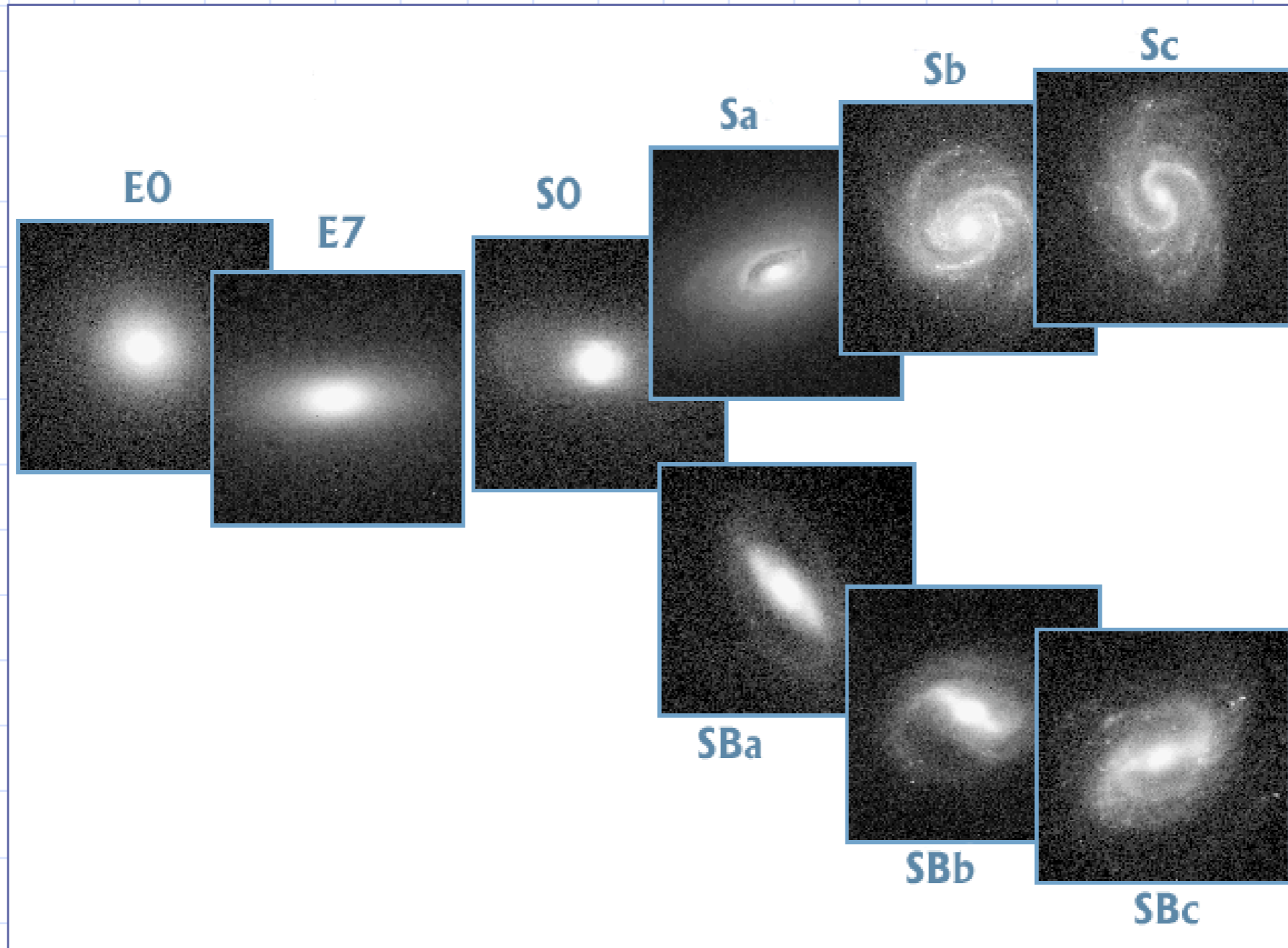
- ◆ Megmérte a cefeidák távolságát (Andromeda)
- ◆ 1924: Az objektumok **Univerzum-szigetek!**



Különböző galaxisok:



Hubble "hangvillája":



Különbségek a típusok között:

◆ Elliptikusok: E0-E7


◆ Spirálisok: Sa-Sc:

- mag/tányér arány változik
- karok nyílásszöge változik
- Karok súlya változik

Catalog of CCD images of ...

The Galaxy Catalog

This Galaxy Catalog is a collection of digital images of 113 nearby galaxies. Images taken in several passbands and a color composite image are included for each galaxy.



Introduction





Images of 31 galaxies were taken with the 1.5 meter telescope of the Palomar Observatory in 1991; images of the other 82 galaxies were taken with the 1.1 meter telescope of the Lowell Observatory in 1989. At Palomar we used a camera with an 800 by 800 TI CCD, at Lowell the camera had an RCA 512 by 320 CCD. Palomar images are available in 3 passband of the Thuan-Gunn system: *g*, *r* and *i*. Lowell images are in 2 passbands (*J* and *R*) of the filter system developed by Gullixson et al.

The first link below is to a detailed guide to the catalog. Please read this guide! You will learn about the graphics file formats we used, about freely available viewing software for many platforms, and about adjusting your monitor for optimal performance. A detailed description of the observations and subsequent image processing steps is also included. Another sections describes the algorithm we used to create the color-composite images.

The second link is to a scientific paper which reports about this catalog. The paper appeared in the *Astronomical Journal* in January, 1996. HTML, PDF and PostScript versions are available here. The third link is to a collection of small, thumbnail-size preview images of all 113 galaxies in the catalog, the last link is to a text-only list of the New Galaxy Catalog (NGC) numbers of all the galaxies. You can use the thumbnail-size images or the NGC numbers to select any of the galaxies you want to see.

The Catalog

You can click on these icons or titles to get to the pages described in the Introduction above. Please take a look at the **User Guide** first, as it will help you get the most out of the images.

			
User Guide	AJ Paper	Images	NGC Index

The Galaxy Catalog - NGC 2715 - Netscape 6

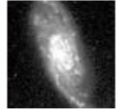
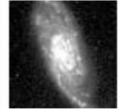
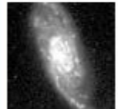
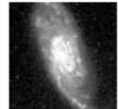


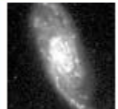
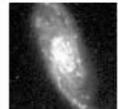

File Edit View Search Go Bookmarks Tasks Help

http://astro.princeton.edu/~frei/Gcat_html/Sub_sel/gal_2715.htm Search

Selection

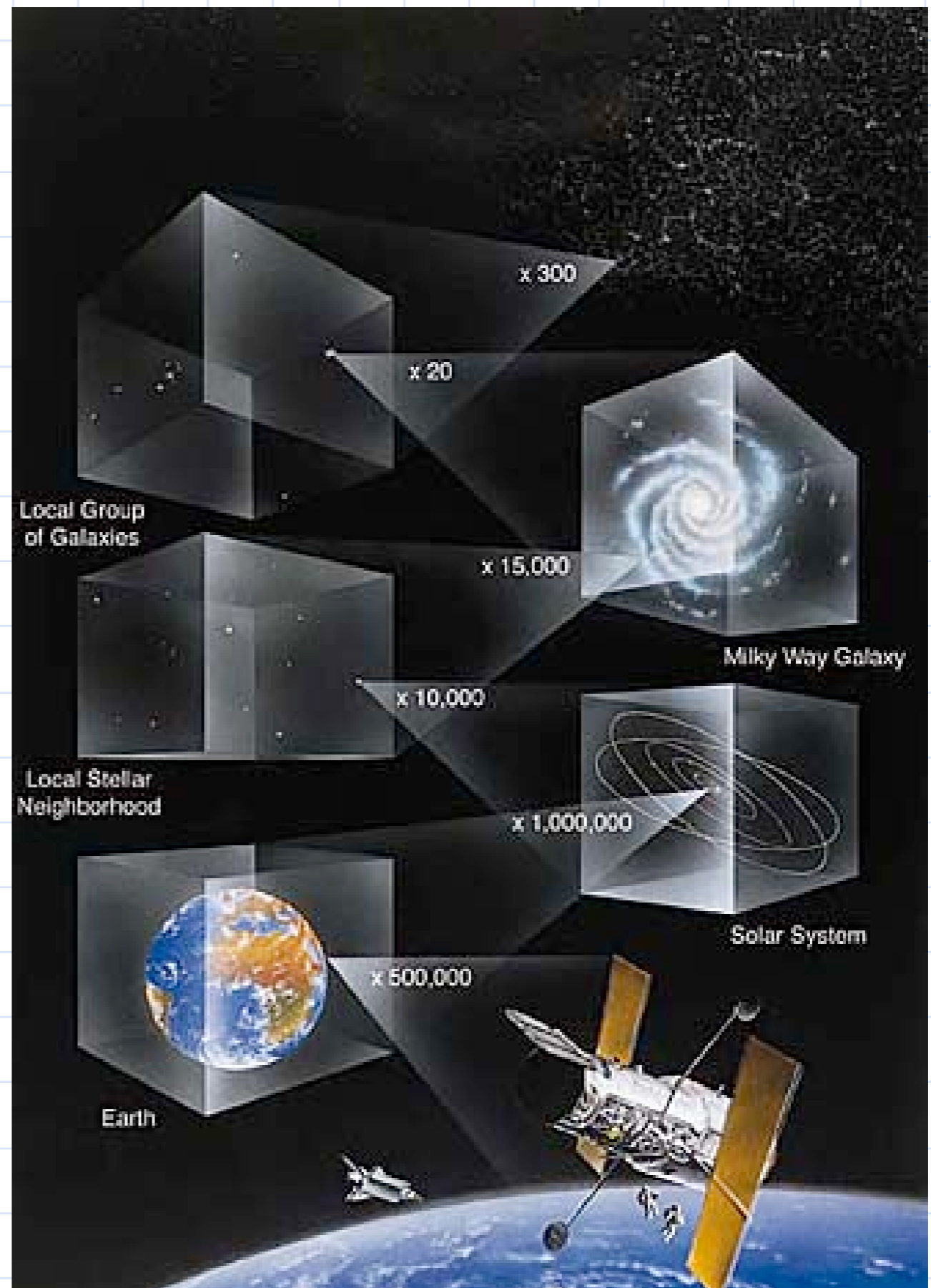
You have selected galaxy NGC 2715. Images of this galaxy were taken at the Lowell Observatory in two photometric bands of the Gullixson et al. system: *J* and *R*. Both images are available as FITS, JPEG, and GIF files. Separate header text files are provided since header information is not part of the JPEG or GIF file format. A color-composite image in JPEG format is also available.

In the table below each column corresponds to one of the filters (*J* or *R*), and each row corresponds to one of the file formats. Click on the cell in the intersection of the desired filter (column) and desired file format (row) to get the image (or text file) you want.

	J	R
JPEG		
GIF		
Header		
FITS		
Color JPEG		

Document: Done (5.167 secs)

Távoli objektumok:



A galaxisok fejlődése:

◆ Lokális galaxisok:

- ◆ 90 % a normál Hubble osztályokban

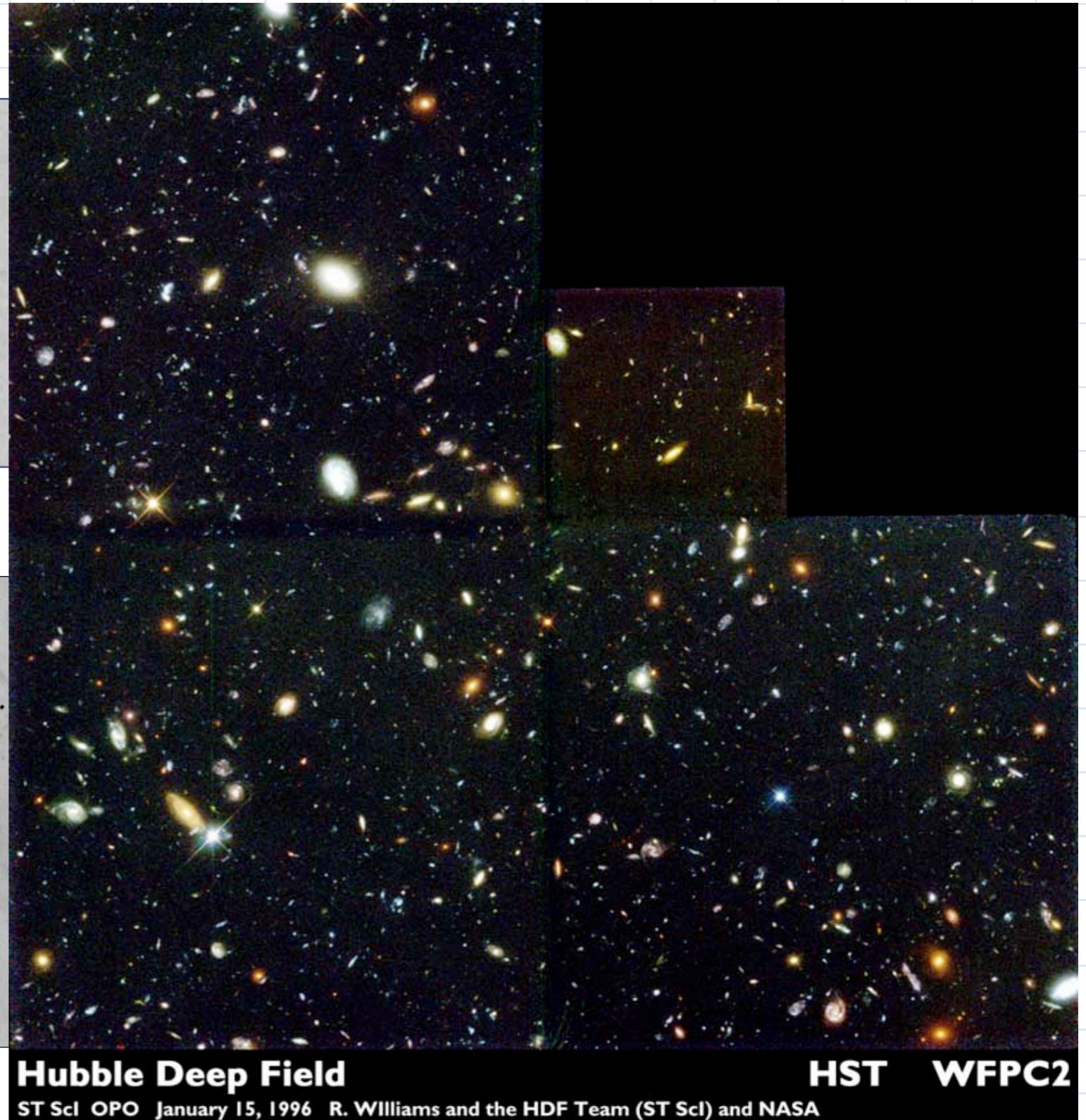
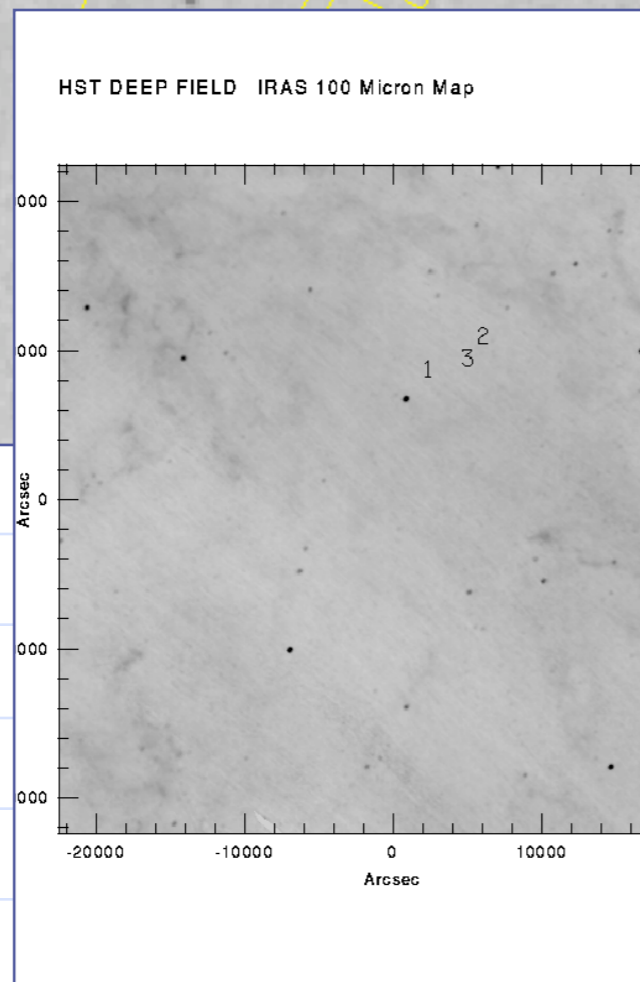
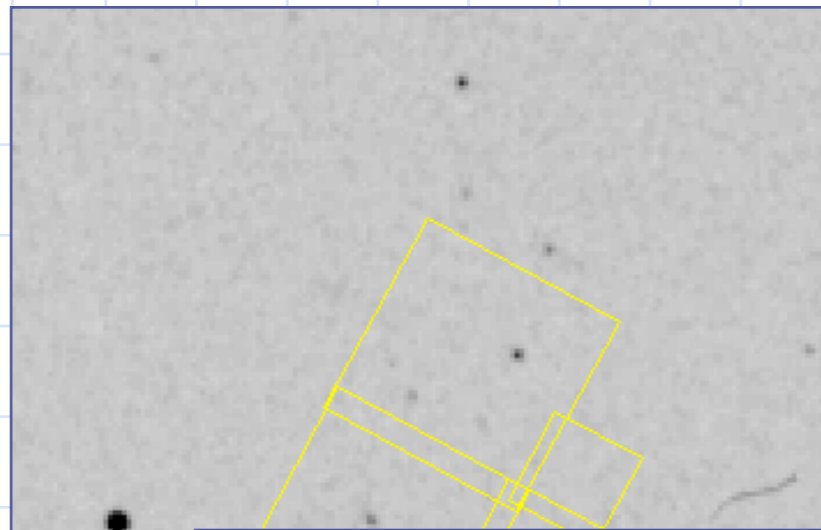
◆ Távoli galaxisok:

- 12 milliárd éves galaxisok a HDF képeken
 - ◆ 70% vissza az időben
 - ◆ 3000 galaxis mindkét HDF képen
 - ◆ 300 elég nagy a kiértékeléshez
 - ◆ 70 osztályozható
 - ◆ csak 50 % a normál Hubble osztályokban

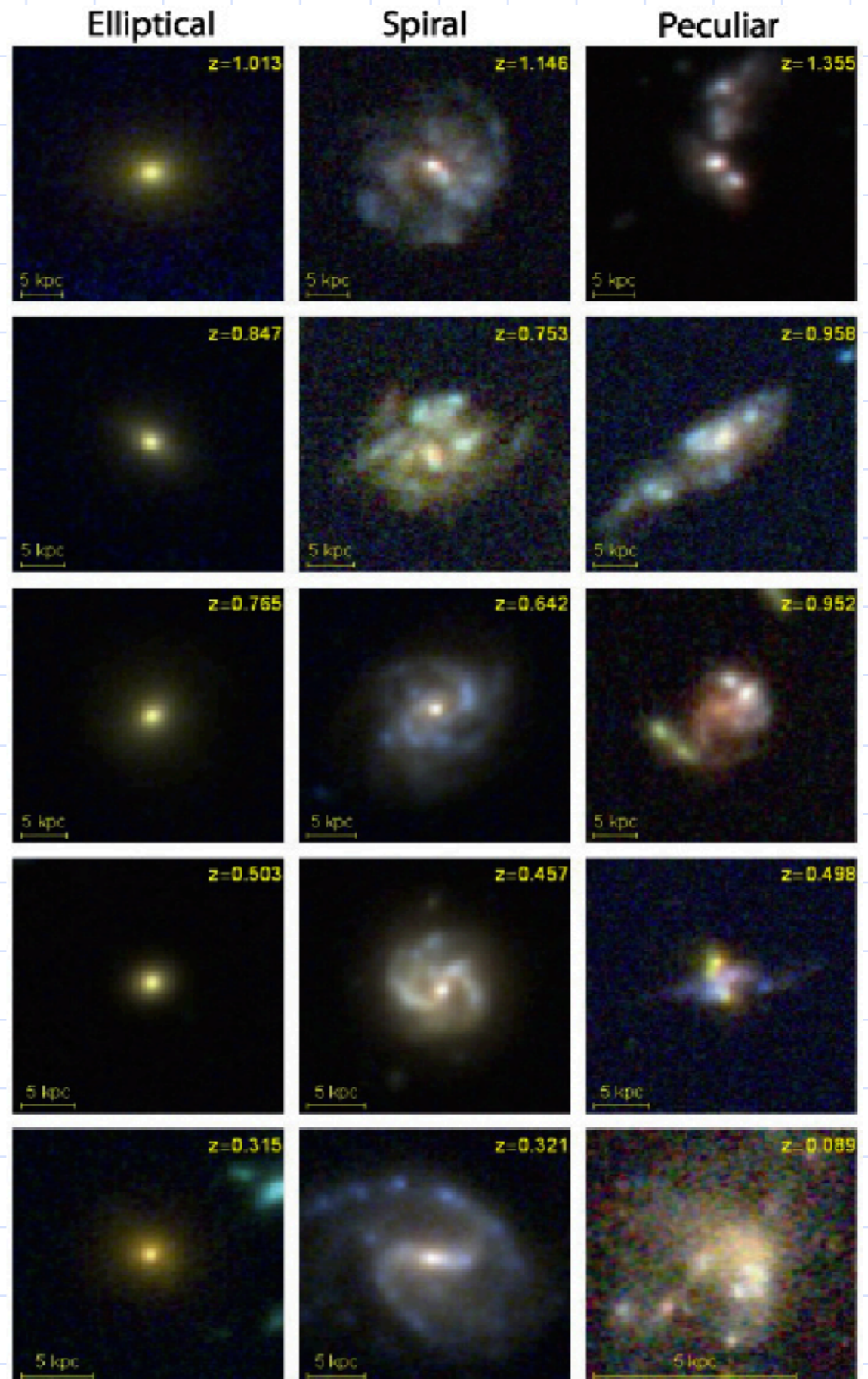
A Hubble Űrtávcszó:



A HDF:

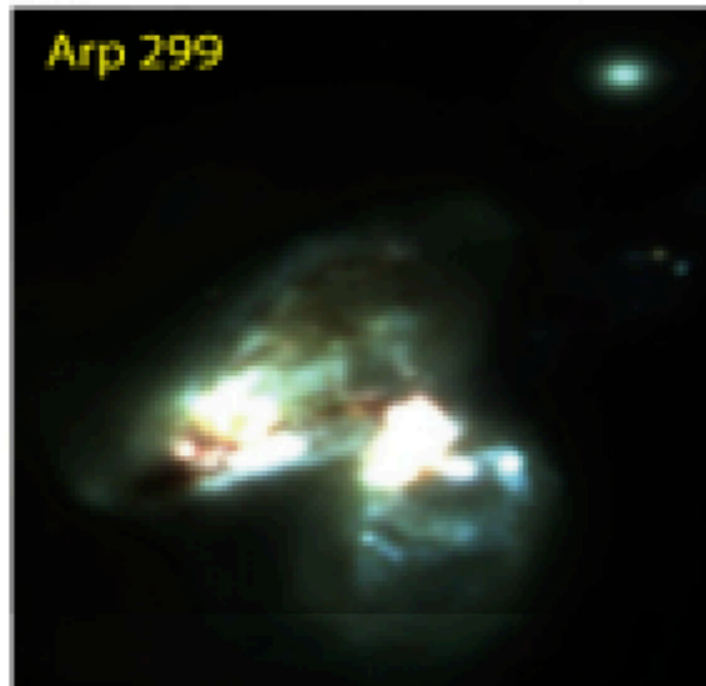


A HDF galaxisai:



Ütközéseket is lehet látni:

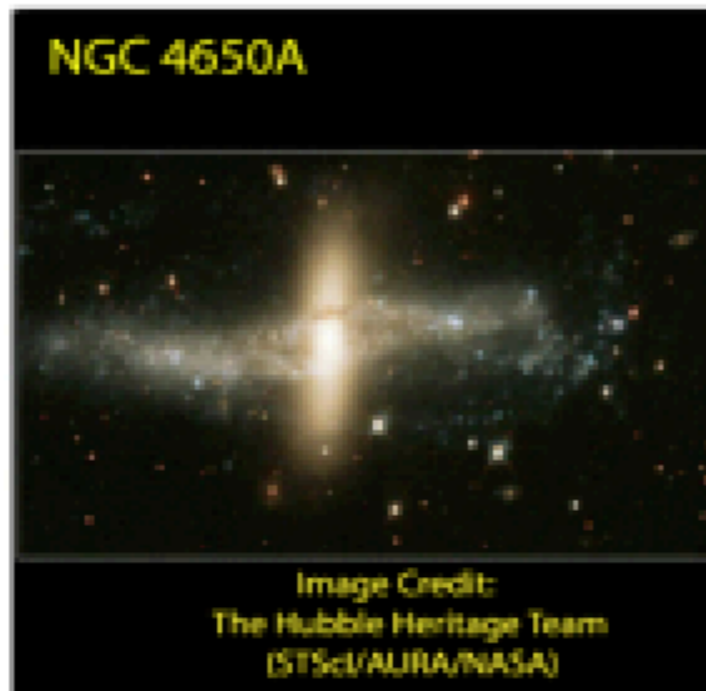
Local Object



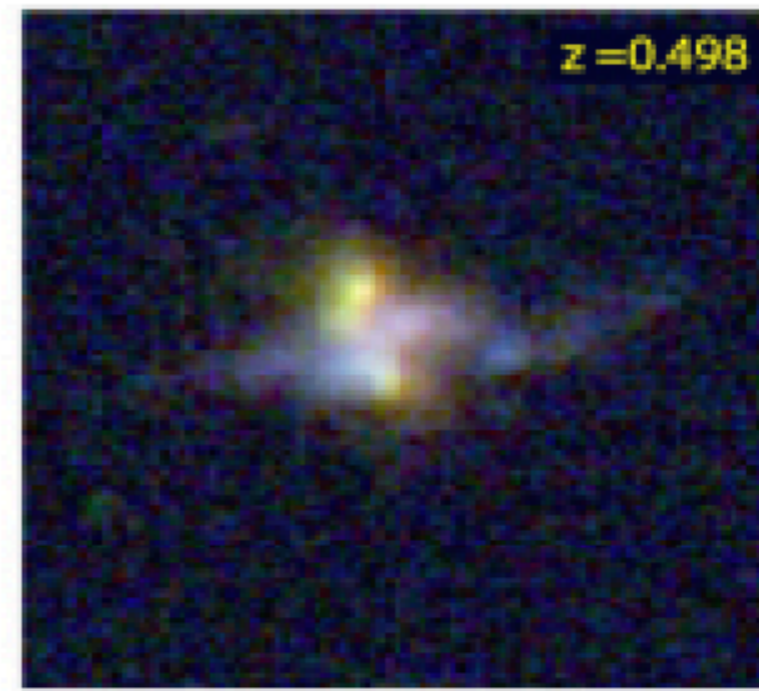
Distant Counterpart?



NGC 4650A

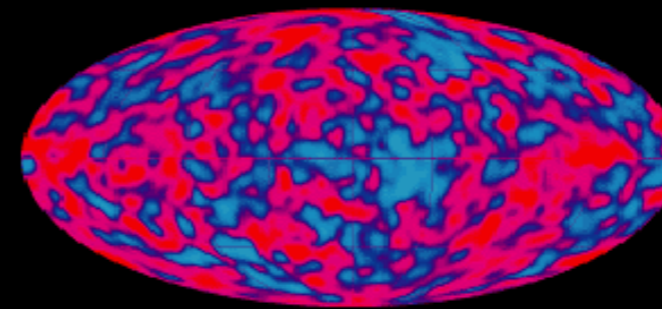


$z = 0.498$



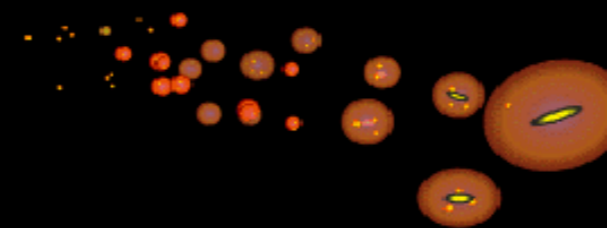
Modern felfogás:

HIERARCHICAL GALAXY FORMATION

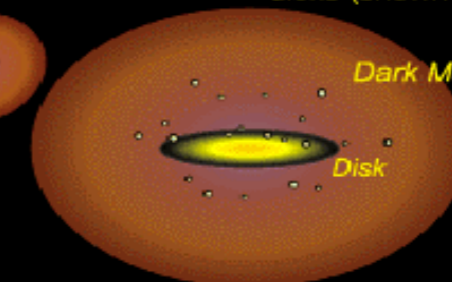


1. Small mass fluctuations (such as those revealed by the all-sky map, shown at left, obtained by the COBE satellite) are relics of the Big Bang. These are the "seeds" of galaxy formation.

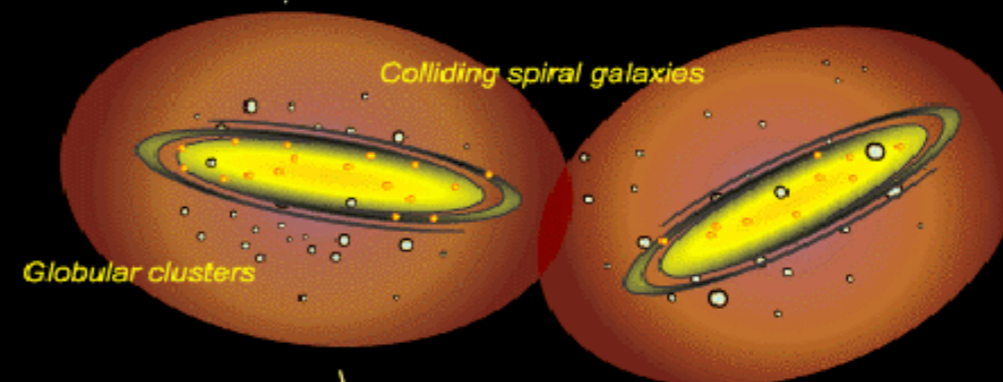
2. Invisible dark matter halos (shown in orange below) collapse from the ambient background, tracing the initial mass fluctuations.



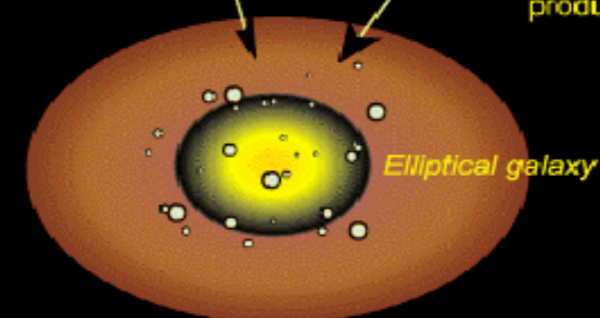
3. Primordial gas condenses within the dark matter halos. Some stars form during the collapse, and collect into globular clusters. Most of the gas collects into disks (shown in yellow).



4. Stars form in the disk, gradually building up a spiral galaxy.

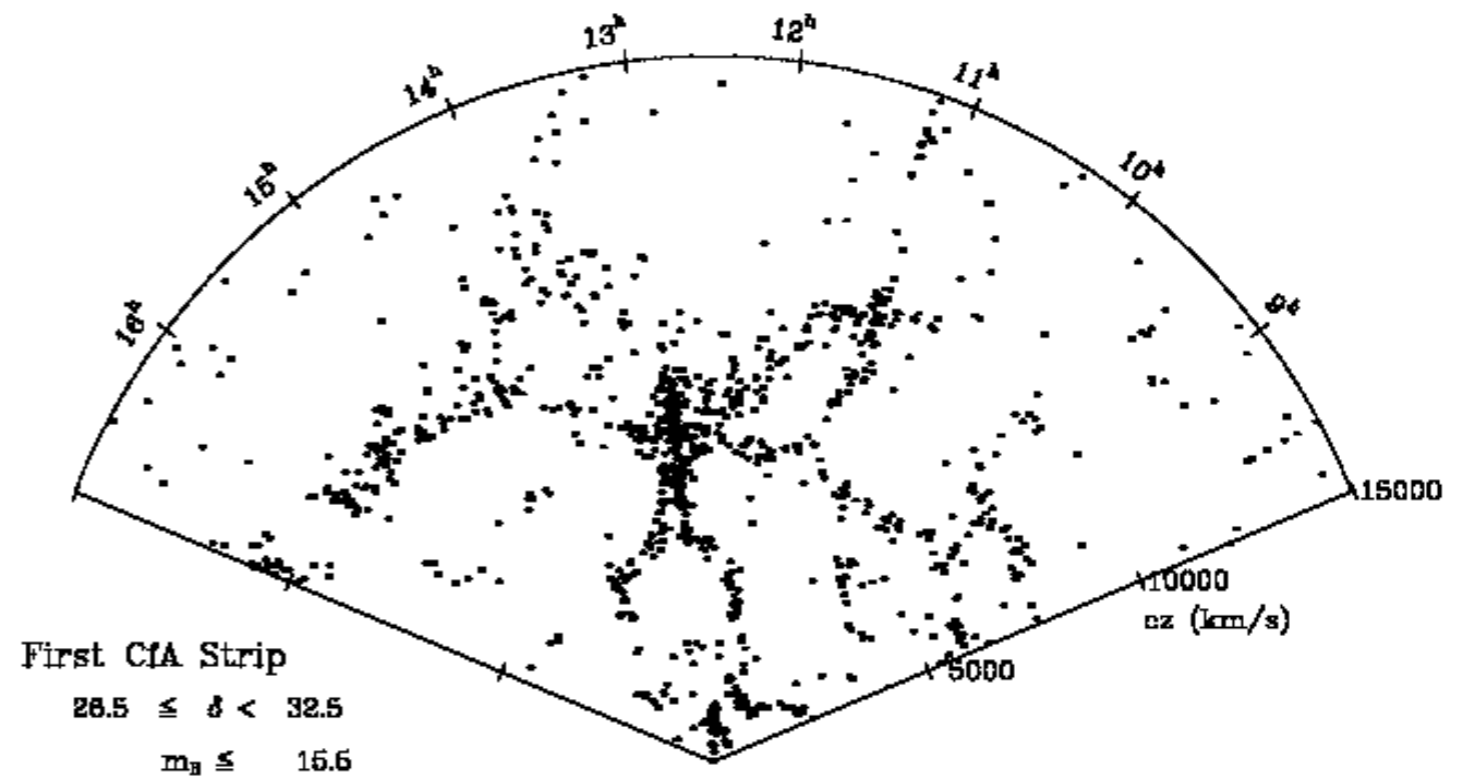


5. Mergers and collisions of disks produce elliptical galaxies

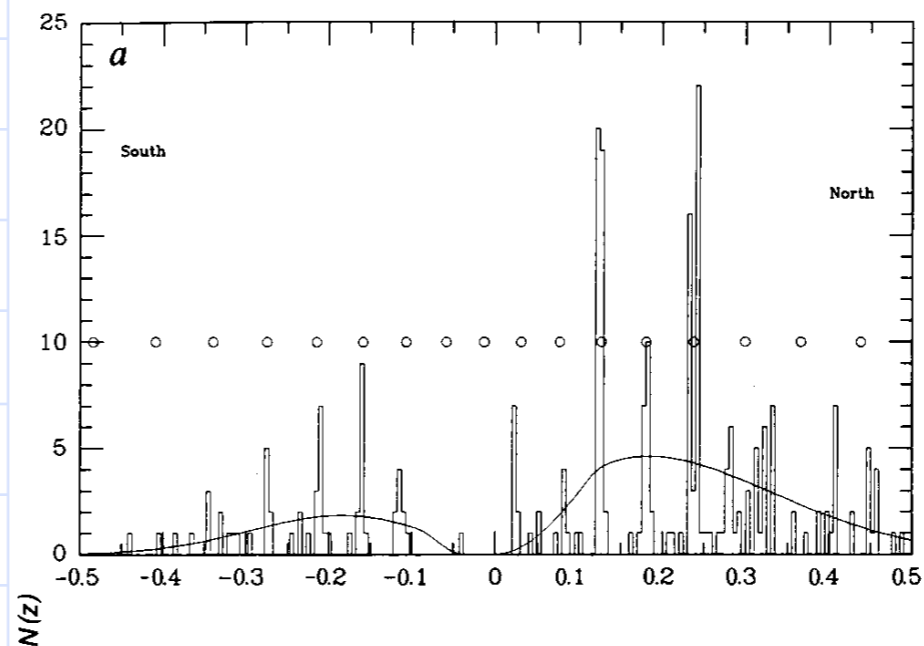


Elmúlt 25 évben:

◆ CfA slice (1980)
(dinnyeszelet):



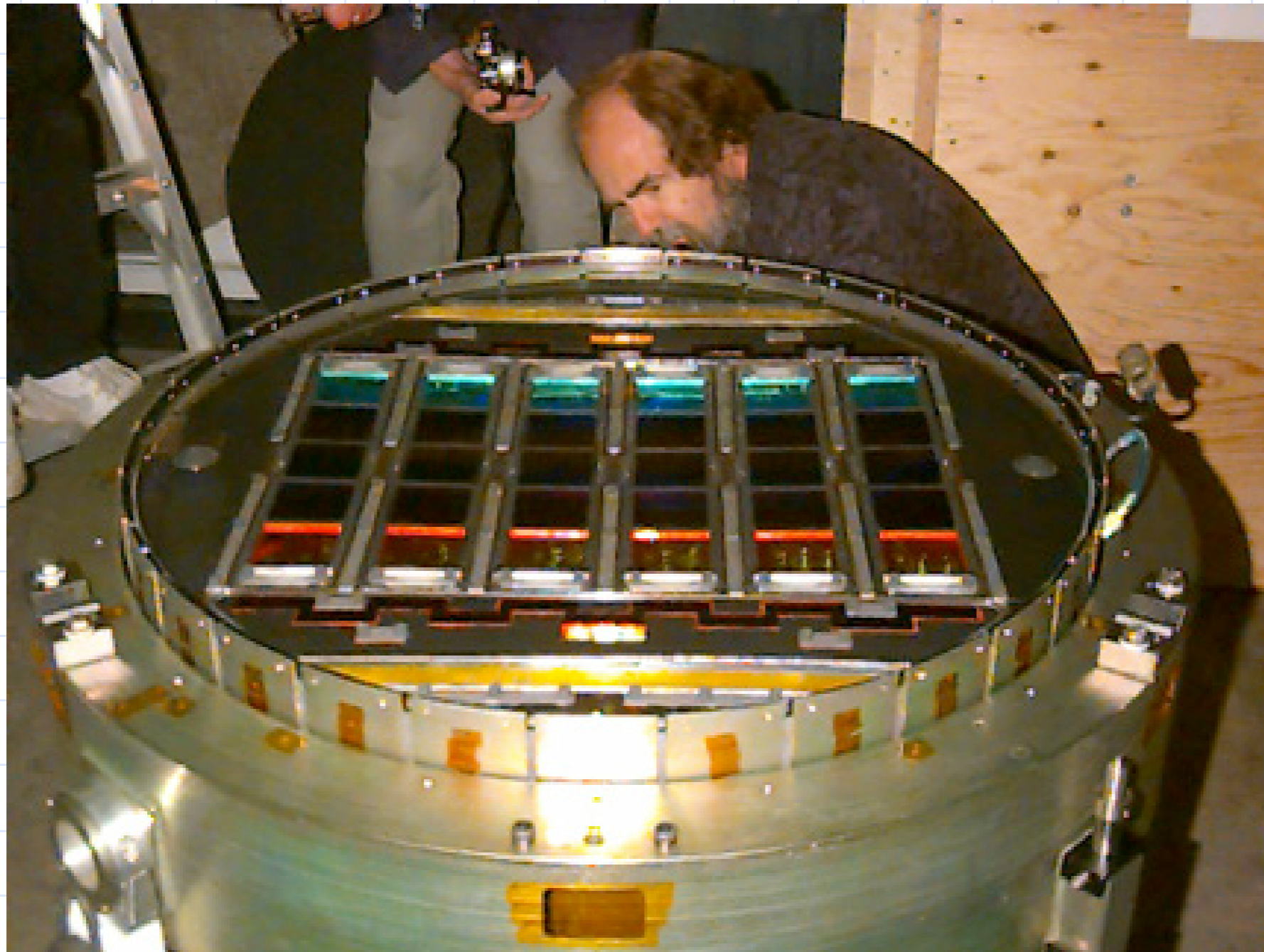
◆ Pencil beam
(1990):



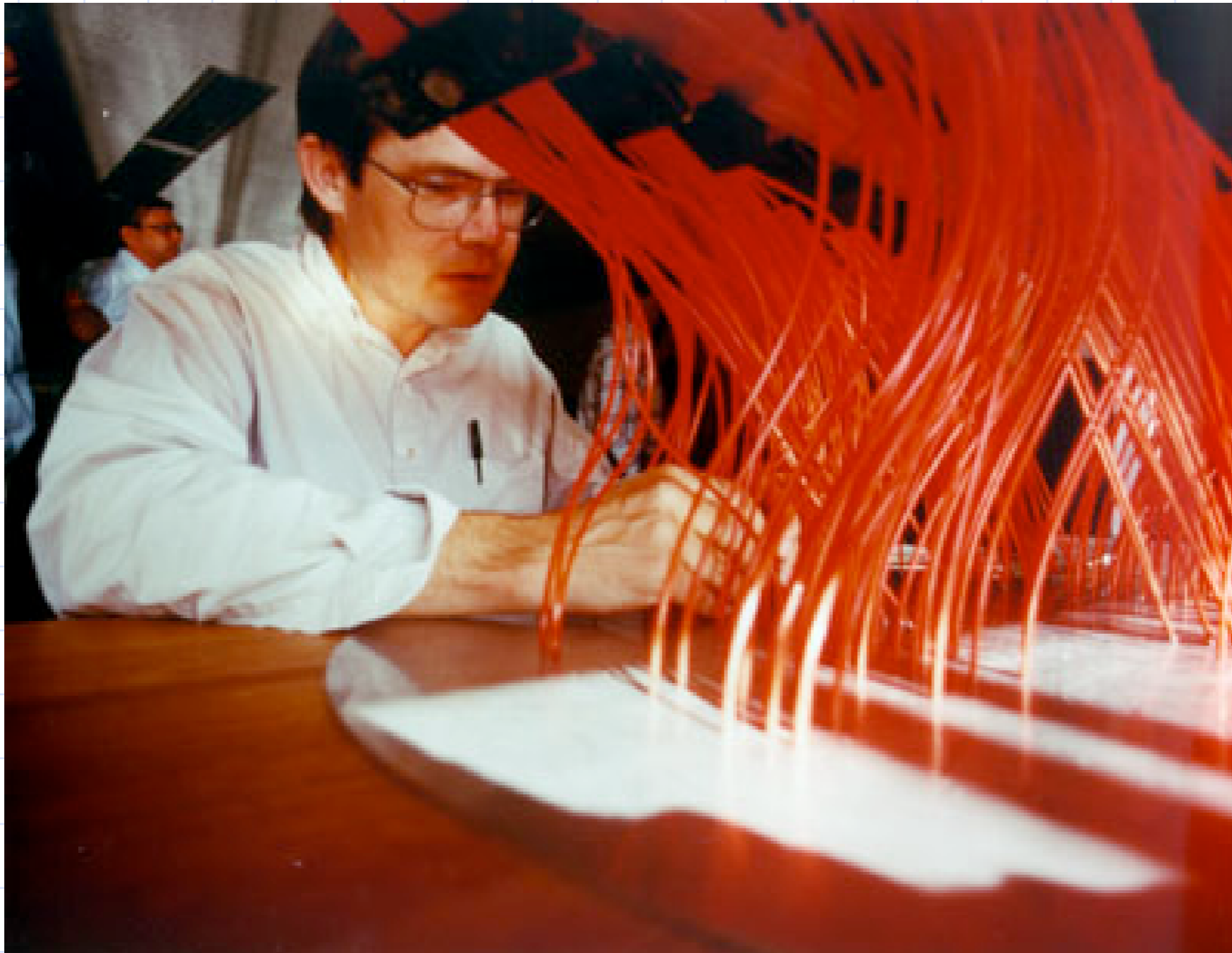
SDSS (2000-2005):



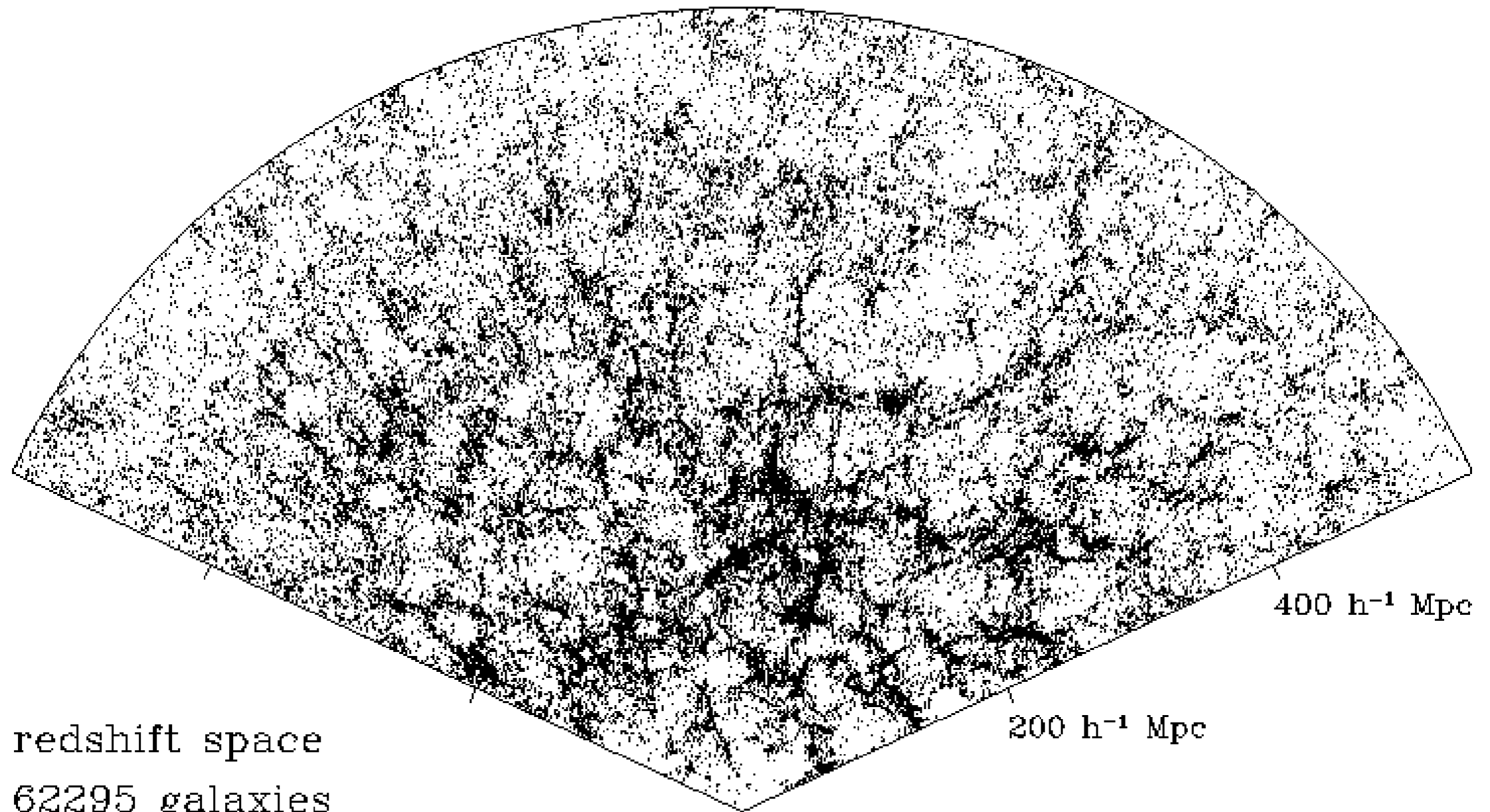
CCD mozaik kamera:



Spektroszkóp:



Jó térkép:



skyserver.elte.hu

Sloan Digital Sky Survey / SkyServer

SDSS

Főoldal | Eszközök | Szakkör | Csillagászat | SDSS | SkyServer | Alkotók | Letöltés | Segítség

Üdvözlünk!

Ez a portál a Sloan Digital Sky Survey adatait teszi közzé. Az SDSS a világegyetem térképét készíti el. Szeretnénk bemutatni, hogy milyen csodálatos az univerzum, és megosztani azt az izgalmas élményt, amit az emberi történet legnagyobb térképének megalkotása jelent.

Hírek
Ez a portál az SDSS Data Release 1 (DR1) adatait tartalmazza.
Tovább...

Csillagászoknak
Hivatásos kutatóknak szóló oldalak. (angol)
Tovább...

Az SDSS támogatói:

SkyServer eszközök
Érdekességek
Képek
Gördülő égbolt
Megjelenítő eszközök
Áttekintő
Kereső
Feltöltő

Szakkör
Kezdőknek
Haladóknak
Kihívások
Kicsiknek
Játékok és vetélkedők
Tanároknak
Kapcsolódó projektek

Információk
Csillagászati bevezető
Az SDSS
A SkyServer
A régi SkyServer
SDSS Data Release 1
SDSS központ
SkyQuery

Segítség
Bevezetés
GY.I.K.
Útmutatók
Szójegyzék
Adatstruktúra
SQL bevezető
Részletes leírás (angol)

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