

Taller de Astronomía



La Vía Láctea
en el visible

La Vía Láctea
en IR cercano

4. La Vía-Láctea y la Estructura a Gran Escala del Universo

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UA = unidad astronómica
distancia Tierra-Sol = $1,5 \times 10^8$ km
(149.600.000 km)

a.l. = año-luz
distancia que la luz viaja en 1 año = $9,5 \times 10^{12}$ km
(9,5 billones de km)

pc = parsec = *paralaxe second* = $3,1 \times 10^{13}$ km
distancia en la cual 1 UA es vista bajo un ángulo de 1''
(31 billones de km)

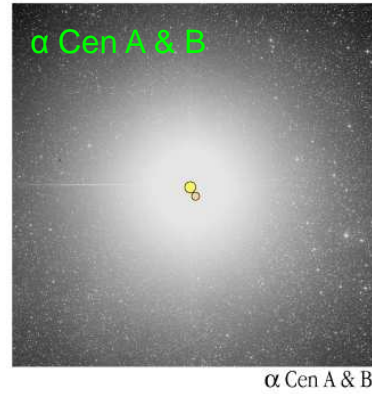
kpc = kiloparsec = 10^3 pc

Mpc = megaparsec = 10^6 pc

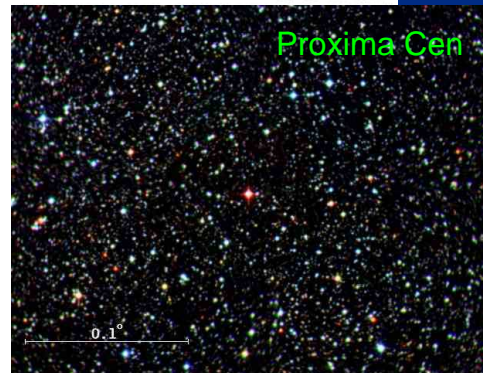
Gpc = gigaparsec = 10^9 pc

La(s) estrella(s) mas Cercanas (después del Sol) - el sistema α Centauri -

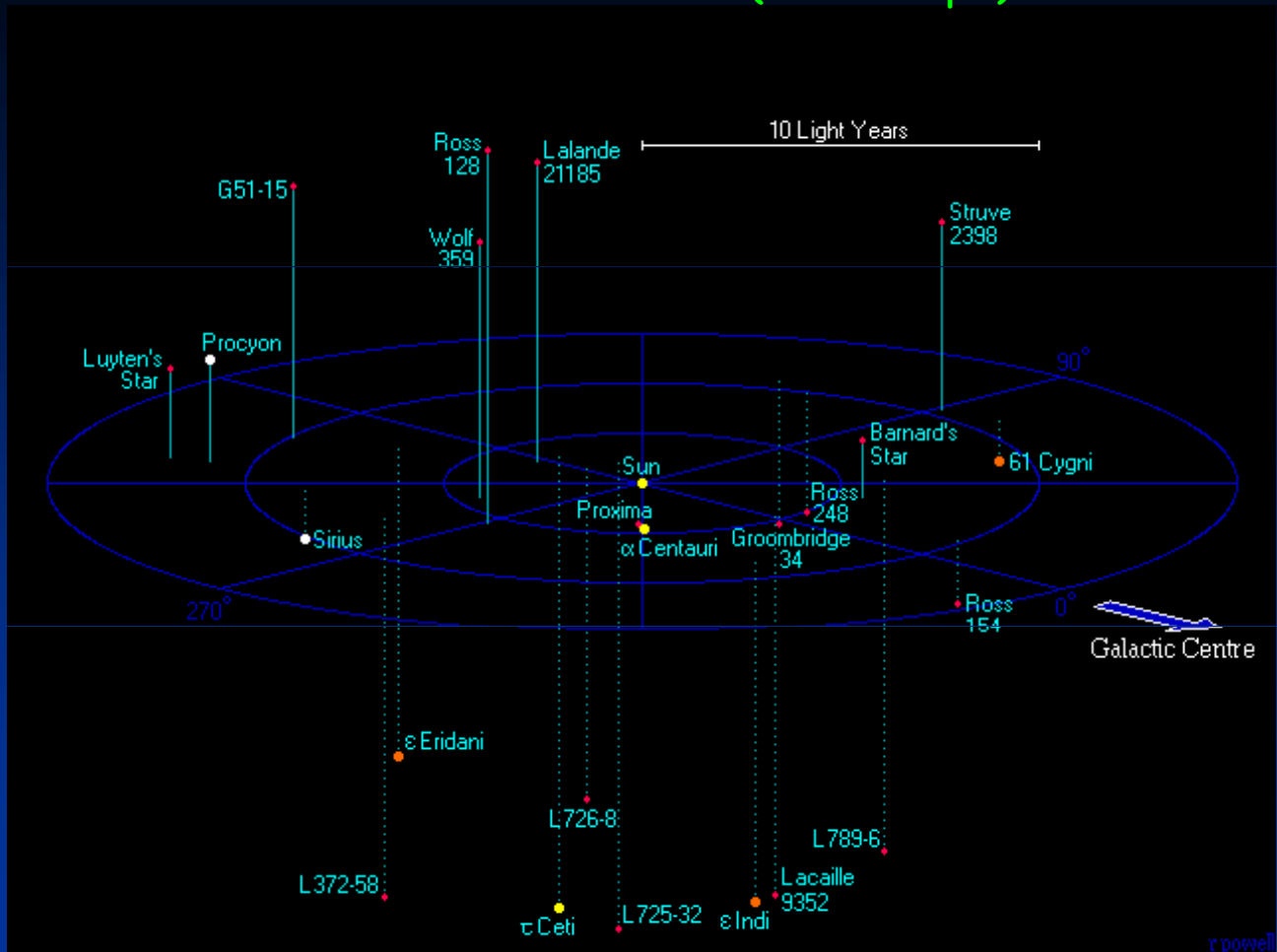
In true relative scale



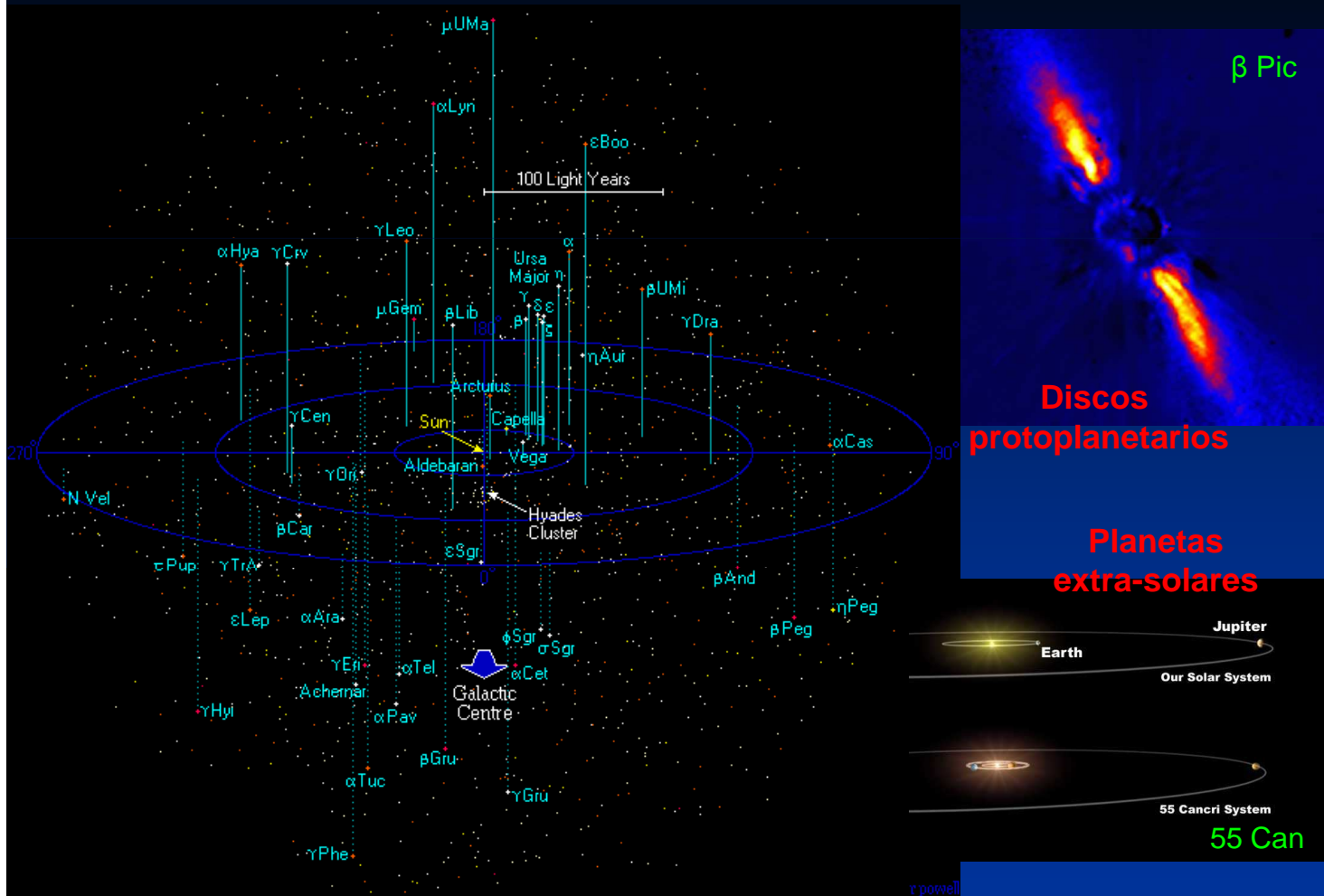
Distancia Sol - α Cen
 40 billones de km
 276,395 UA
 4.35 a.l.
 1.33 pc



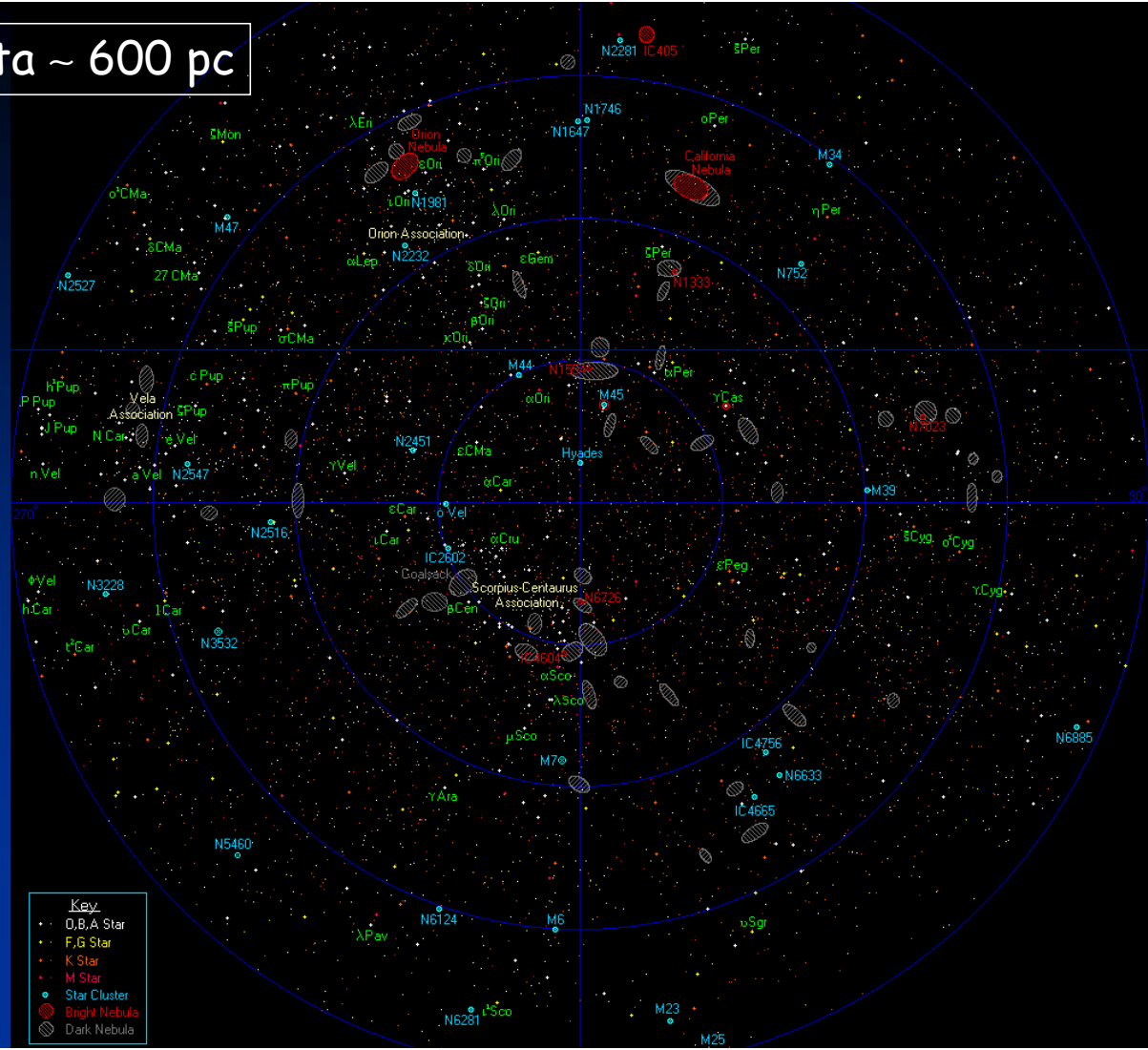
Nuestras vecinas (hasta 4 pc)



"La colonia" (hasta 75 pc)



hasta ~ 600 pc



Cúmulos de estrellas

Neb. Orion (M42)

Neb. California

Neb. Helix

Hyades

M45
(Pléiades)

Neb. Cas A

M44
(Presépio)

Neb. Cabeza
de Caballo

47 Tucanae

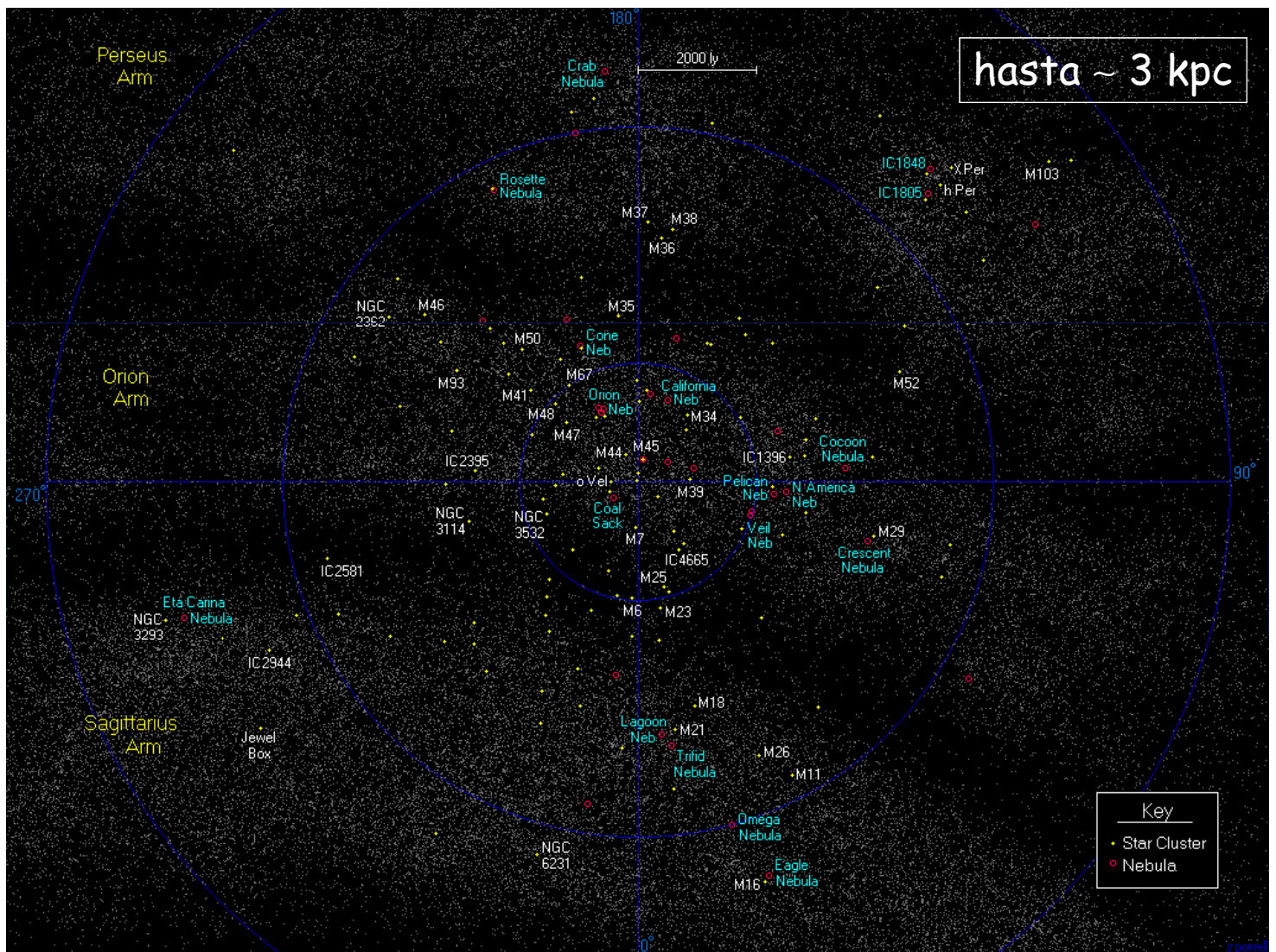
Antares

Neb.
Barnard 68

Nebulosas

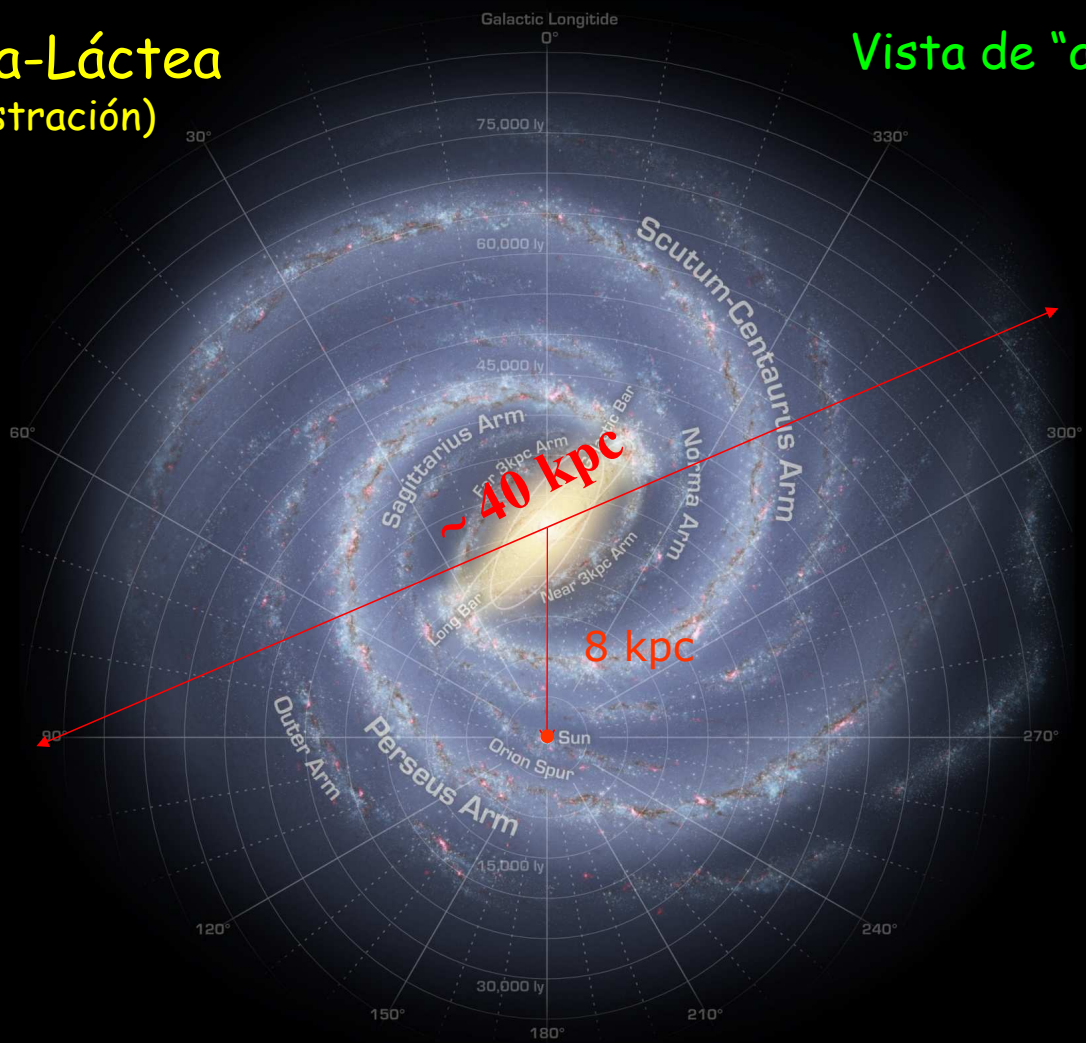
M78

ω Centauri

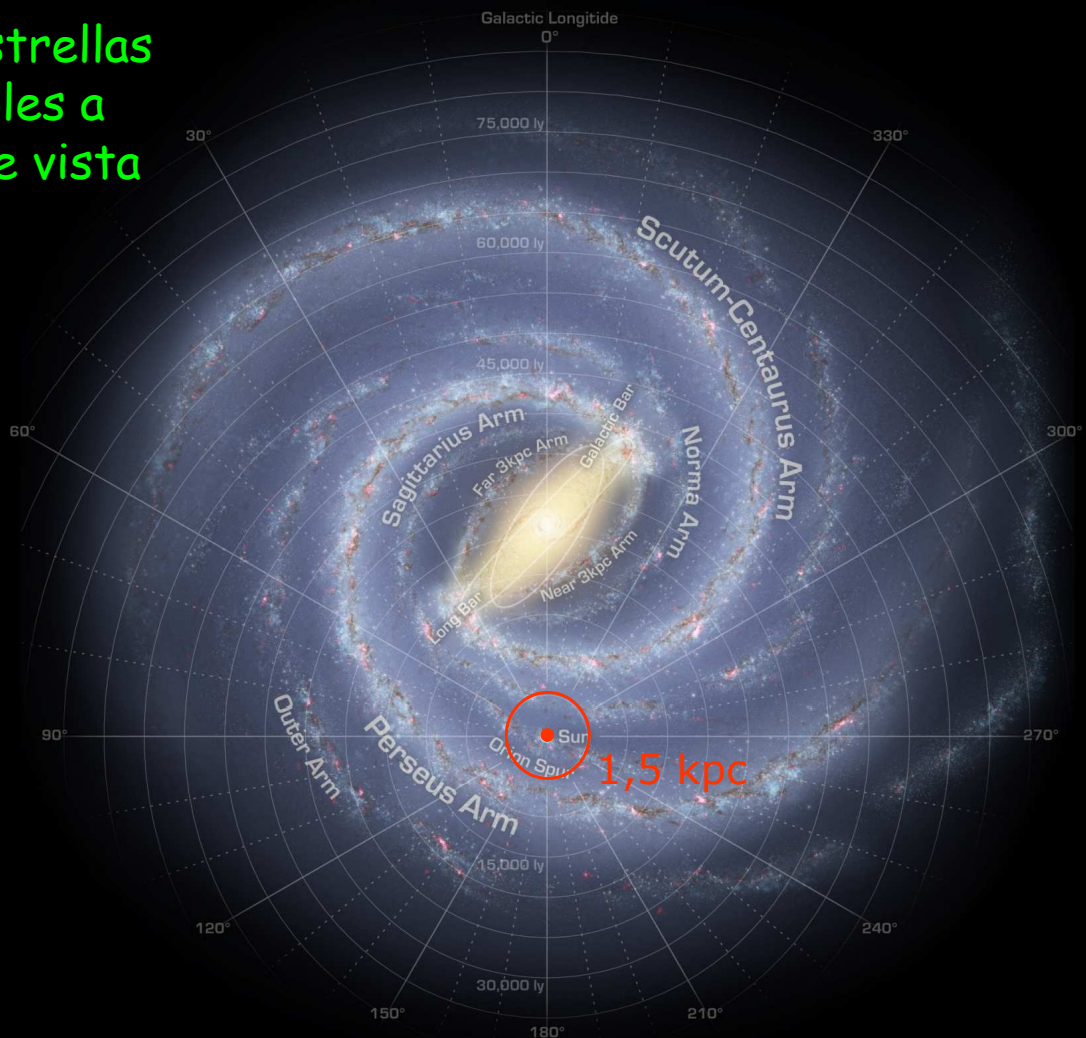


La Vía-Láctea (ilustración)

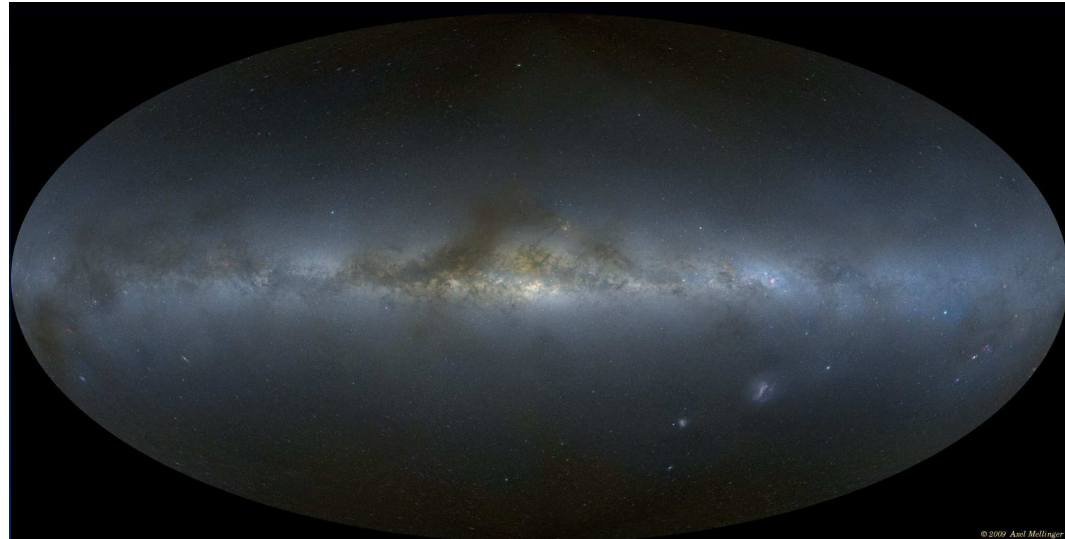
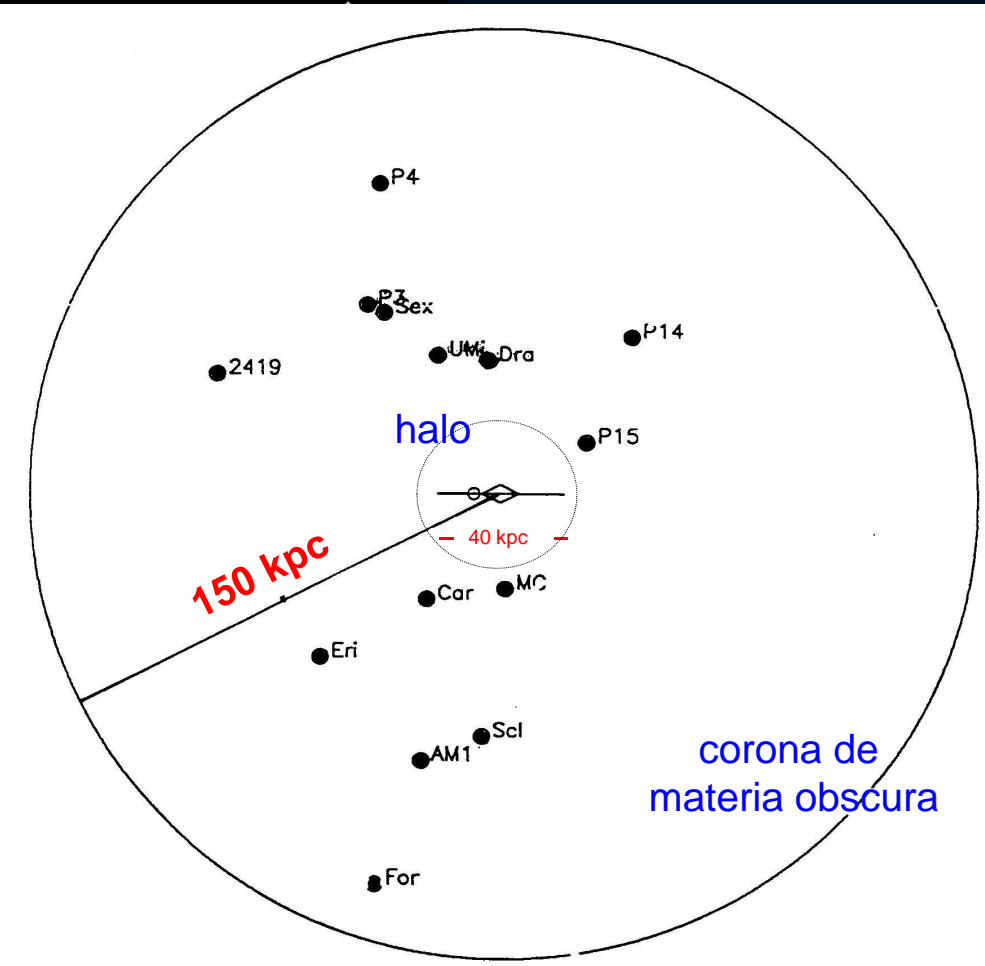
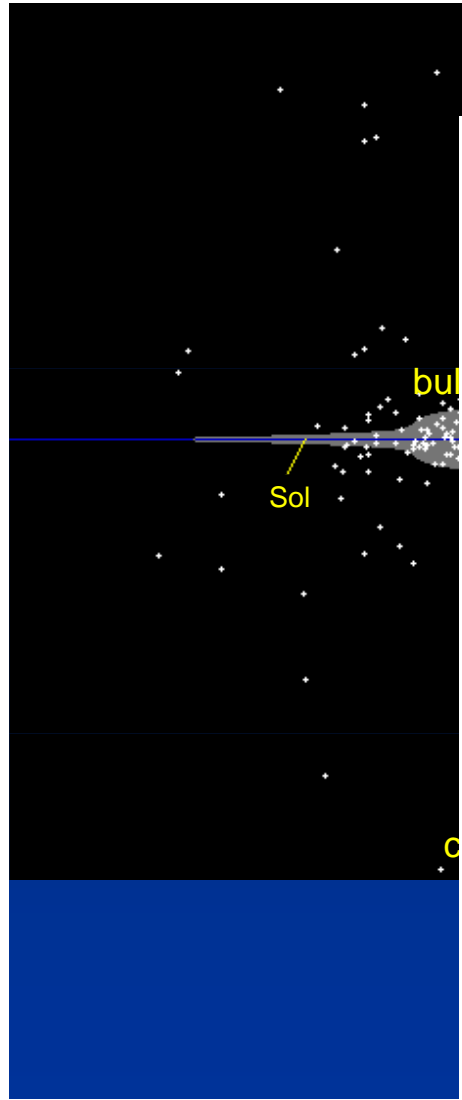
Vista de "arriba"



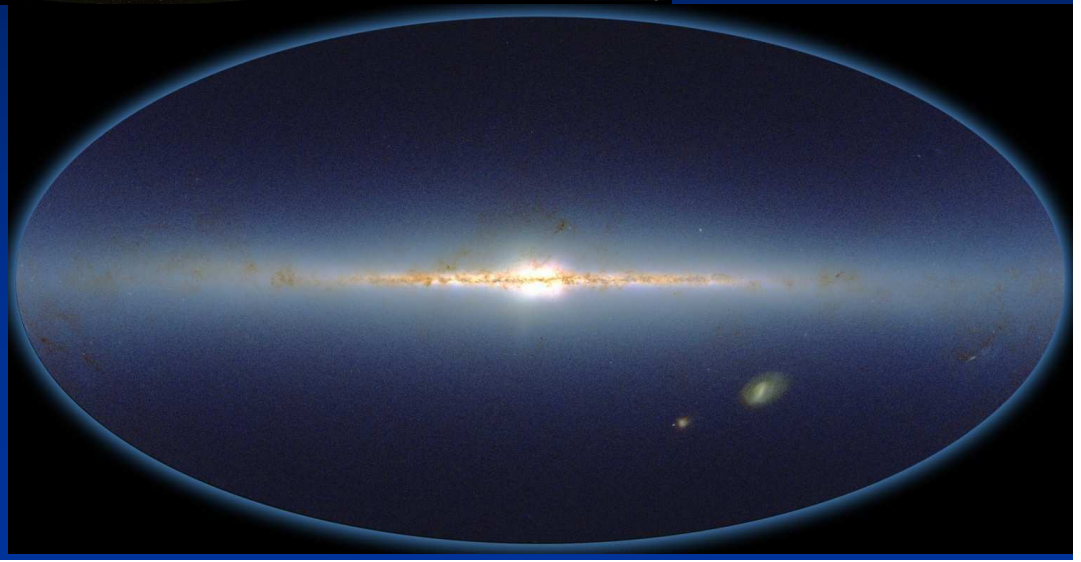
Las estrellas visibles a simple vista



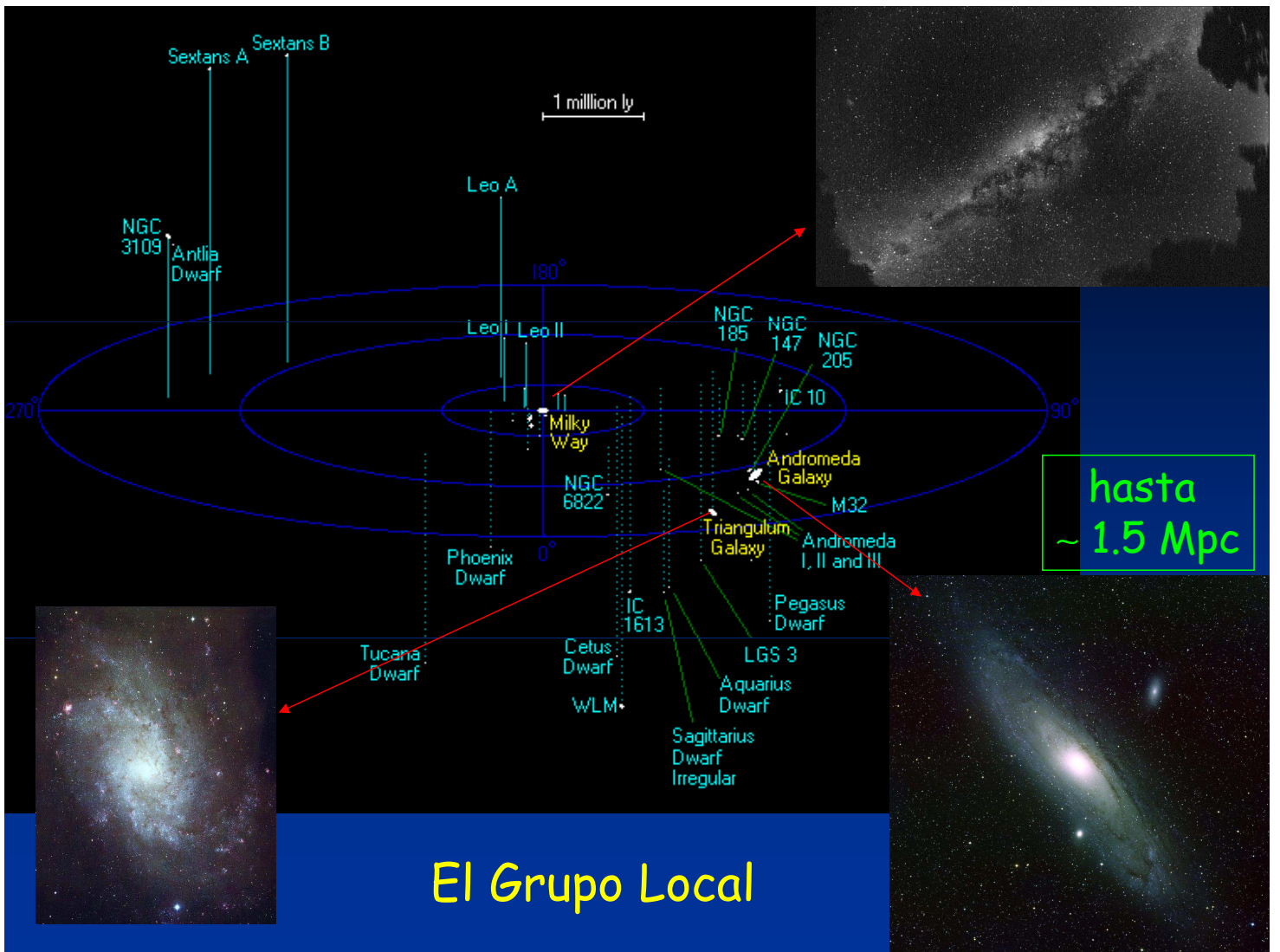
Vista de "perfil"

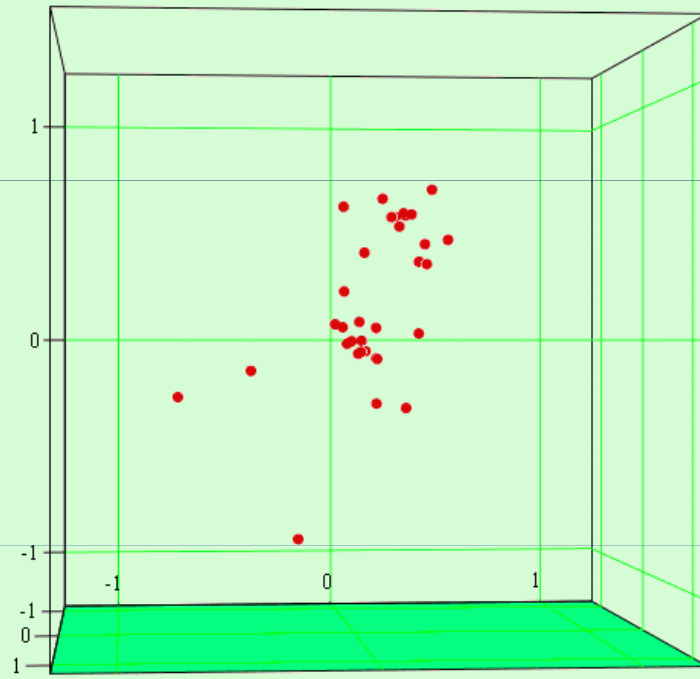


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¿Y que hay allá fuera?



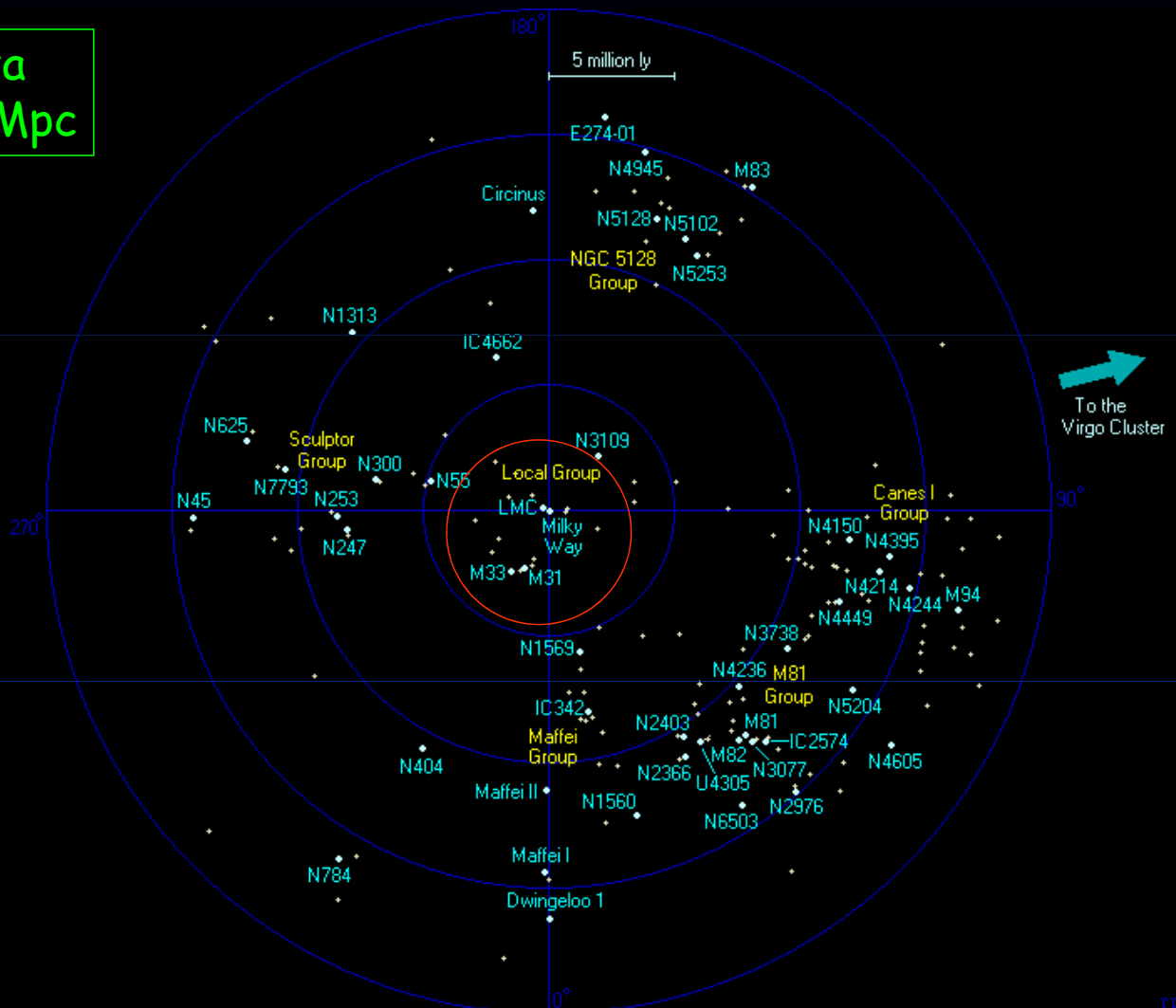


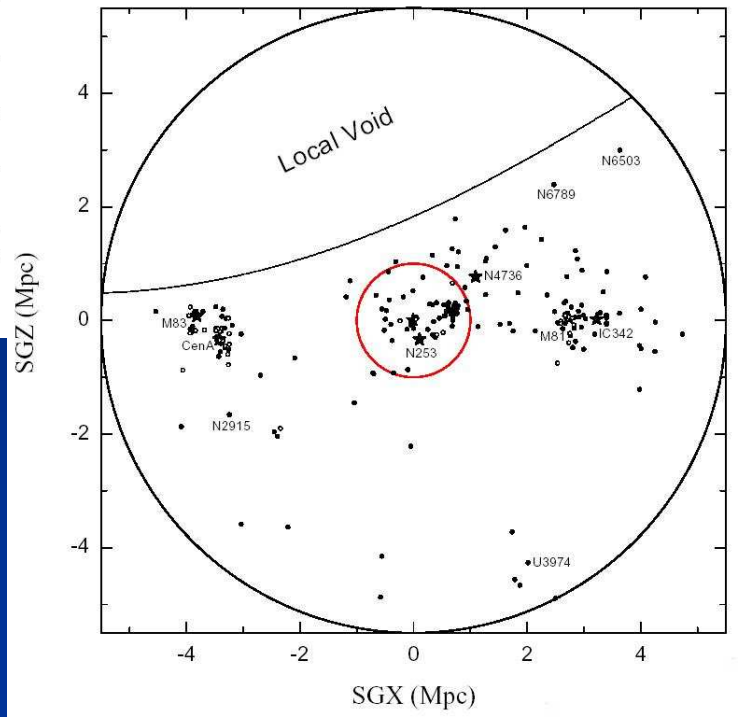
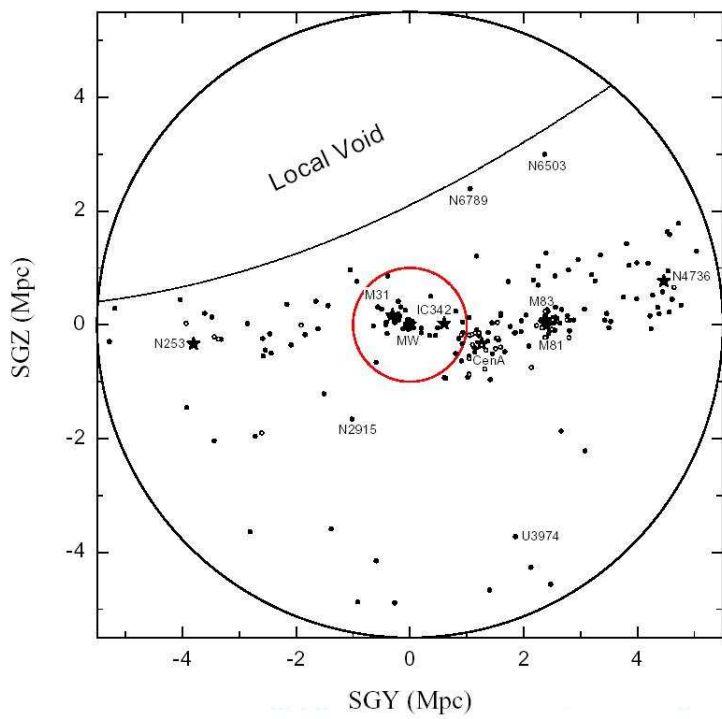
Local Galaxy Group Positions (X-Y = Earth equatorial plane, Z=polar axis)

Scale units = Megaparsecs Location 0,0 = Earth

(X2, Y2, Z2)

hasta
~ 6 Mpc

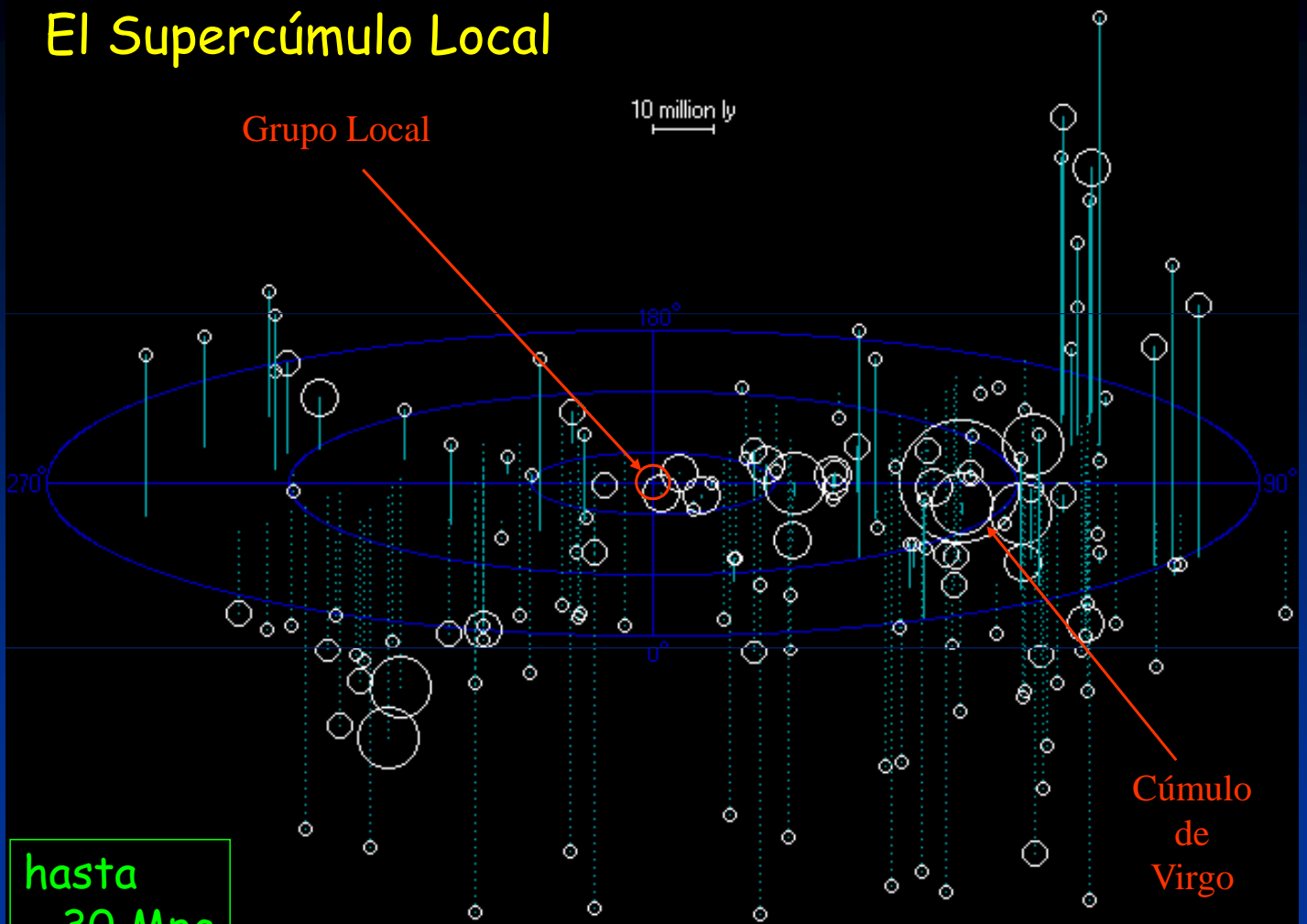




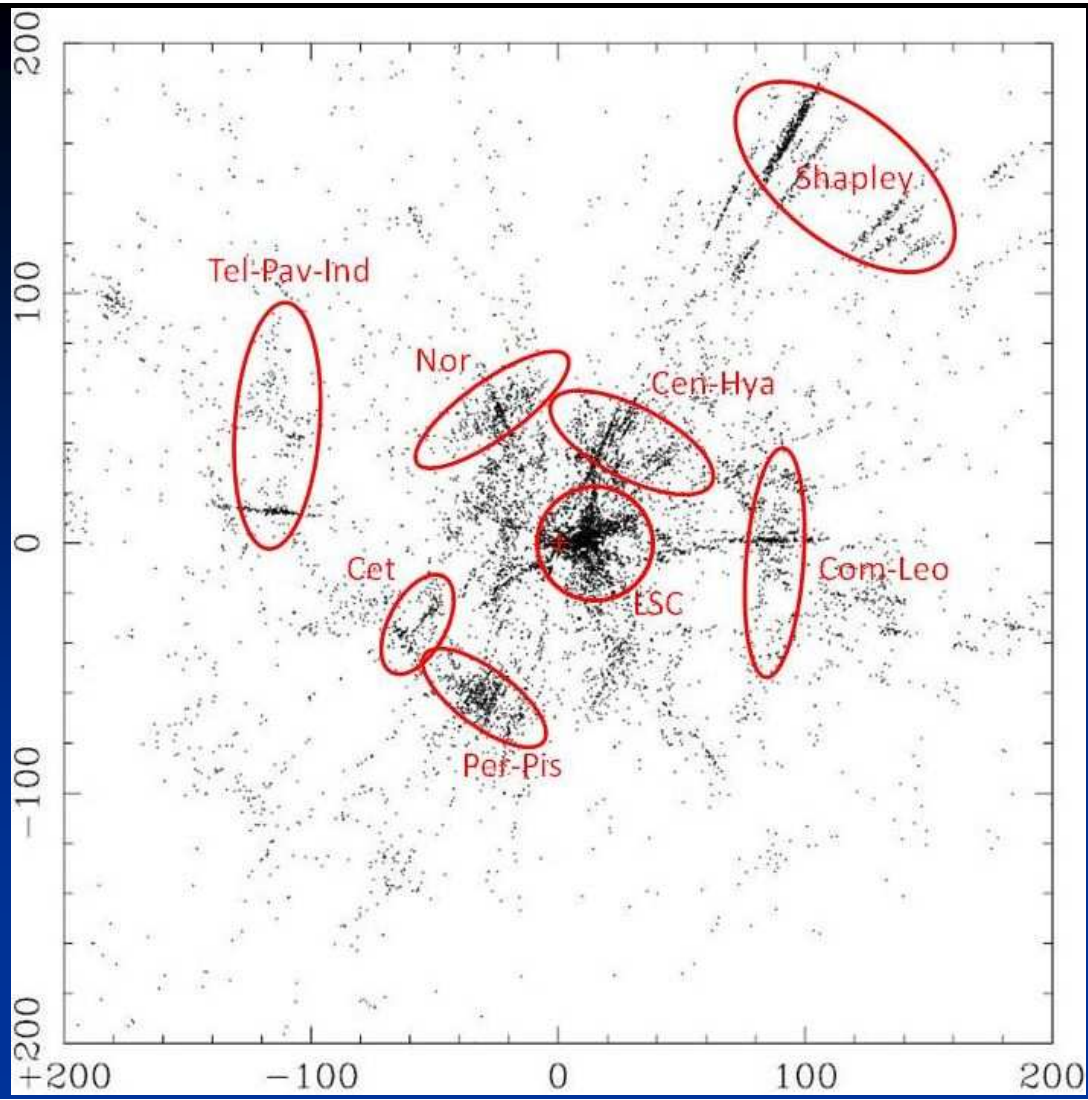
El Supercúmulo Local

Grupo Local

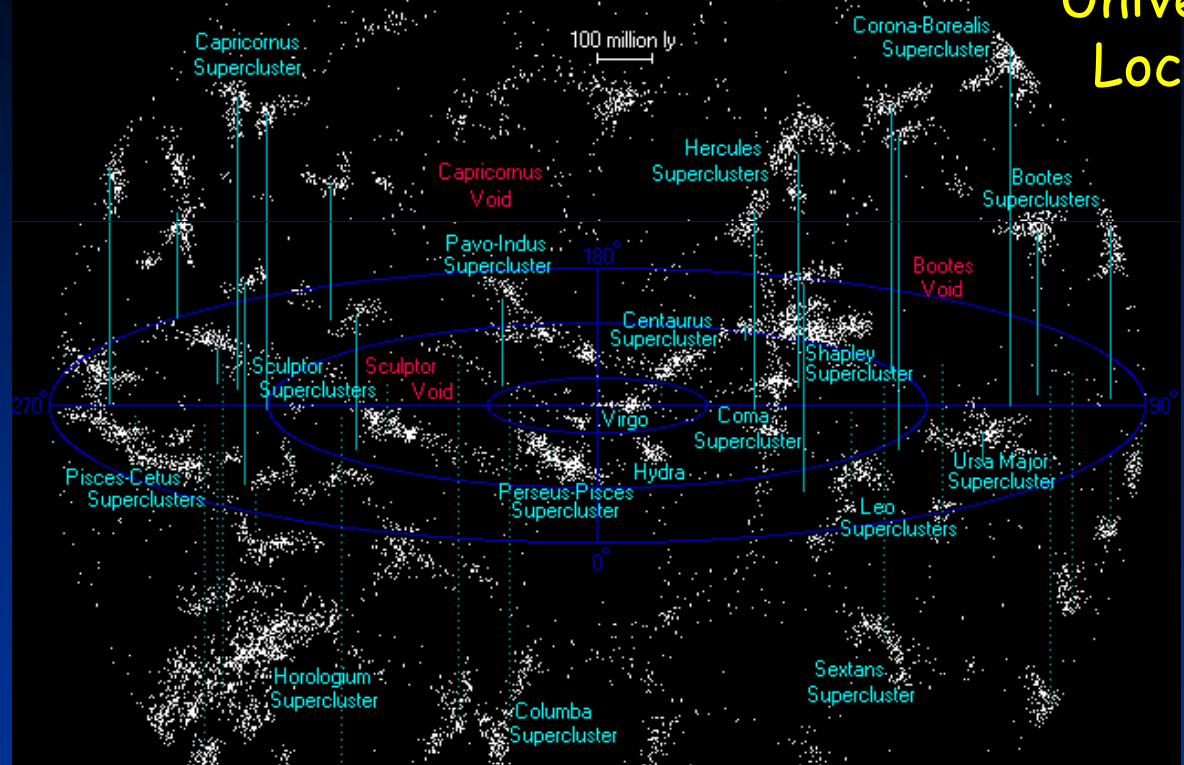
10 million ly



Los supercúmulos vecinos

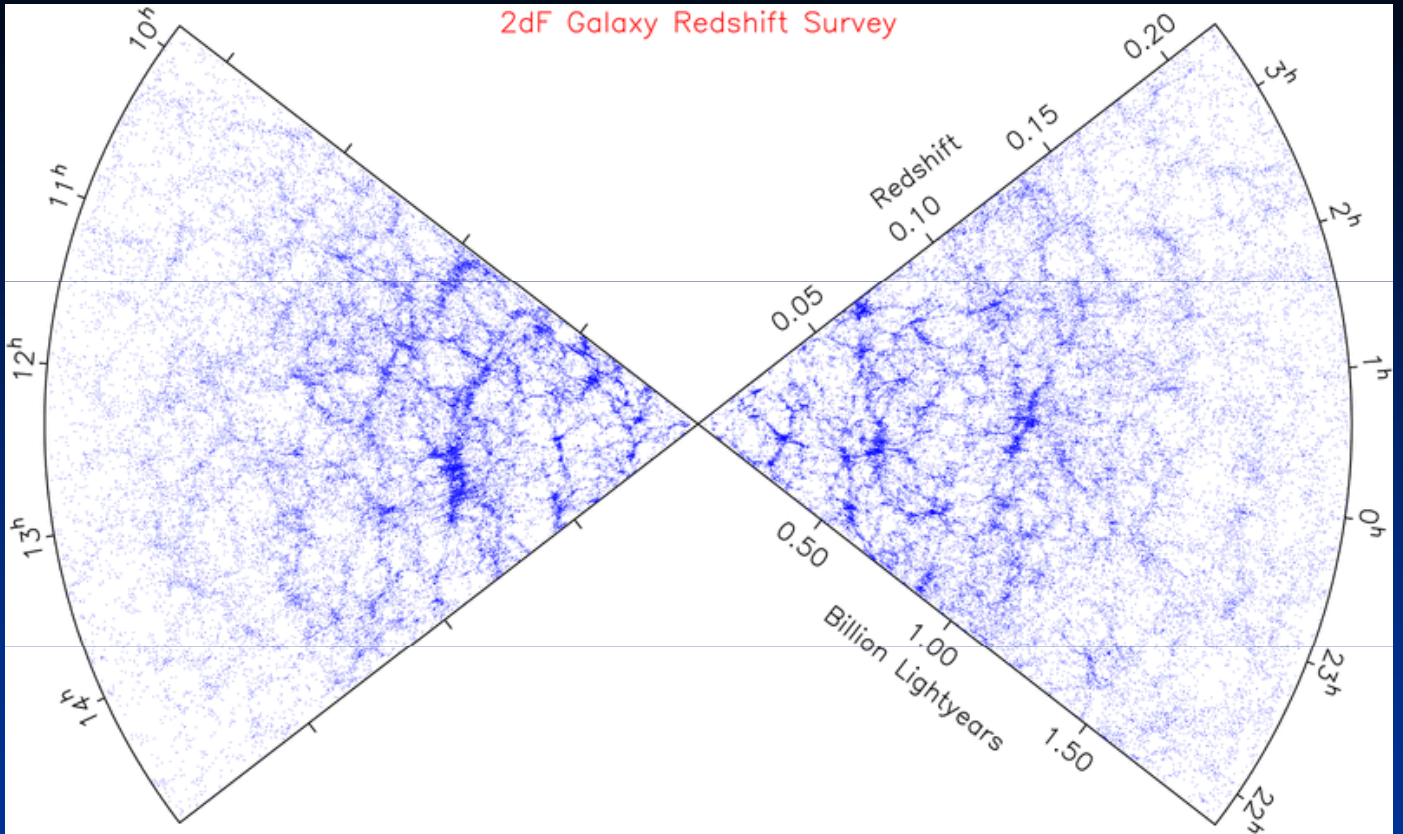


El "Universo Local"



hasta ~ 300 Mpc

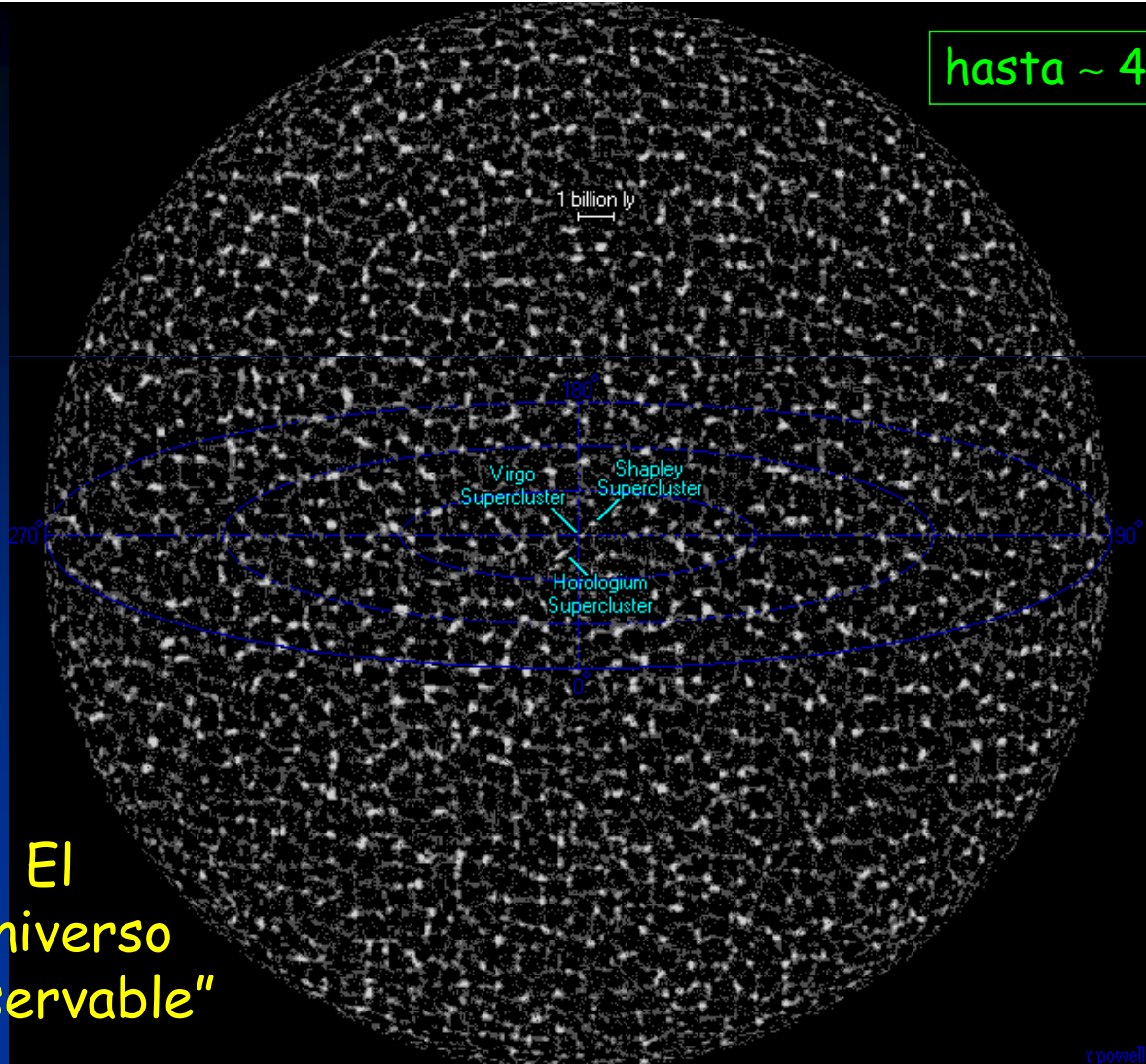
2dF Galaxy Redshift Survey



hasta ~ 600 Mpc

$$z = \frac{\lambda_o - \lambda_e}{\lambda_e} = \frac{H_0 \times d}{c}$$

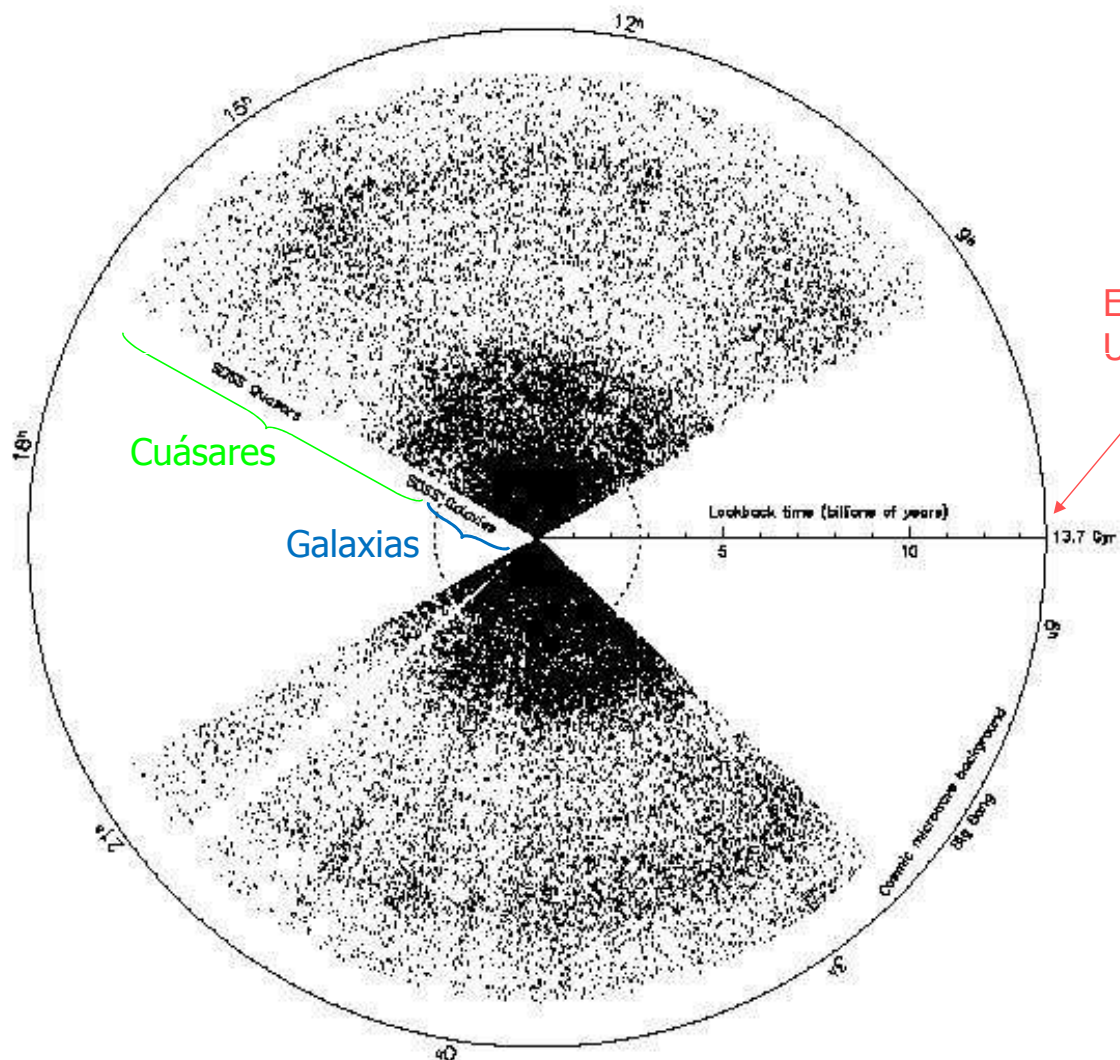
hasta ~ 4 Gpc

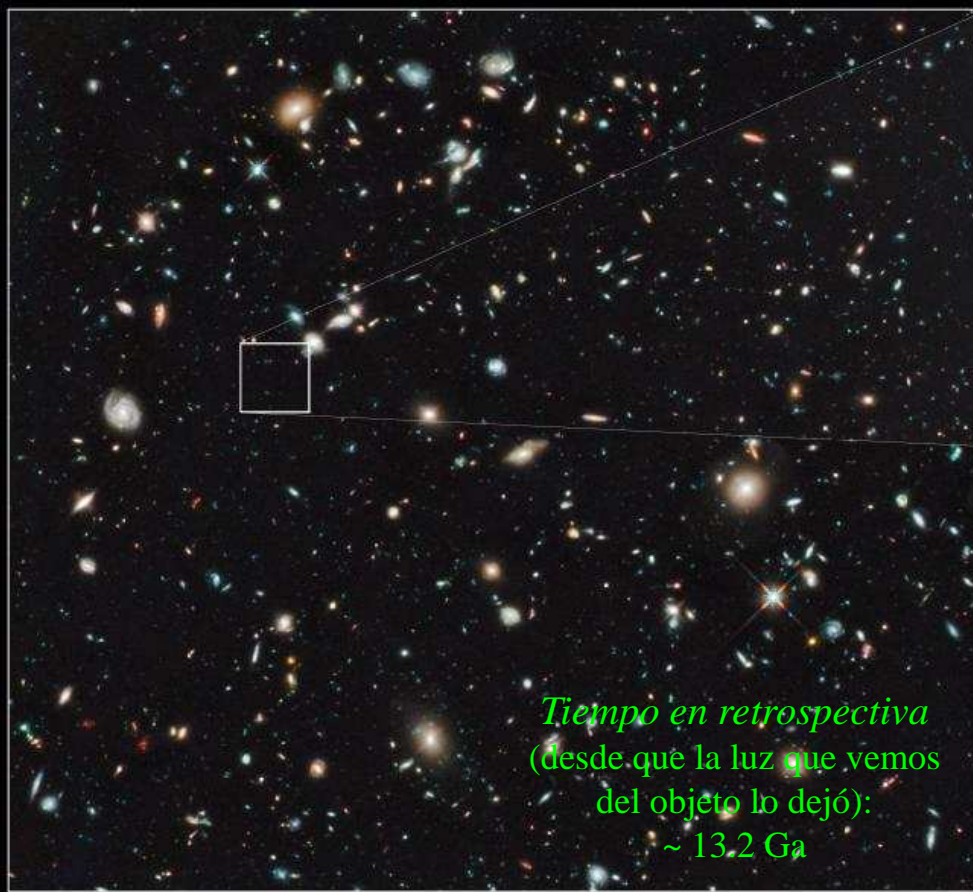


EI
"Universo
Observable"

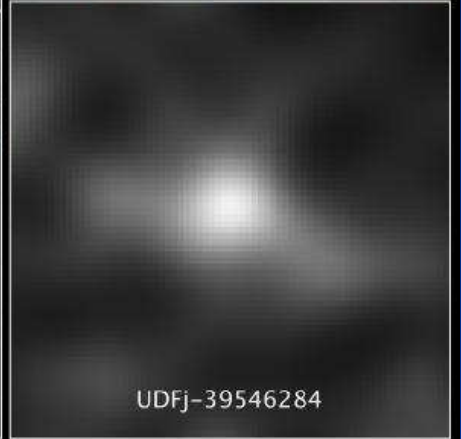
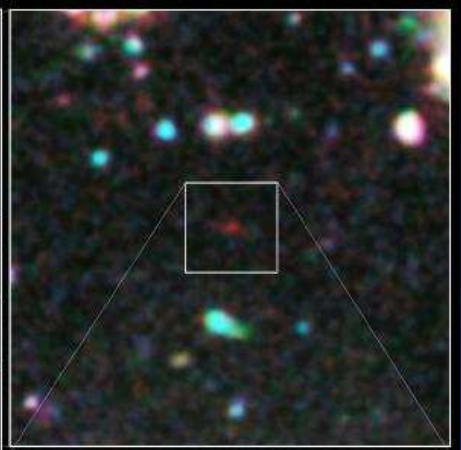
Velocidad de la luz (en el vacío) → 299,792.458 km/s

Sol (1 UA)	8 min
Neptuno	4 horas
aCen	4.35 años
Centro de la Vía-Láctea (Sgr A*)	25,900 años
Galaxia de Andrómeda (M31)	2,500,000 años
Cúmulo de Virgo	54,000,000 años
Objeto mas lejano ya observado	13,200,000,000 años





Tiempo en retrospectiva
(desde que la luz que vemos
del objeto lo dejó):
~ 13.2 Ga



Hubble Ultra Deep Field 2009–2010
Hubble Space Telescope • WFC3/IR

NASA, ESA, G. Illingworth and R. Bouwens (University of California, Santa Cruz), and the HUDF09 Team

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