Overview of the Milky Way Galaxy

Luminous (stellar) Mass:

$3 \times 10^{10}\ M_{sun}$

Dynamical Mass (total)

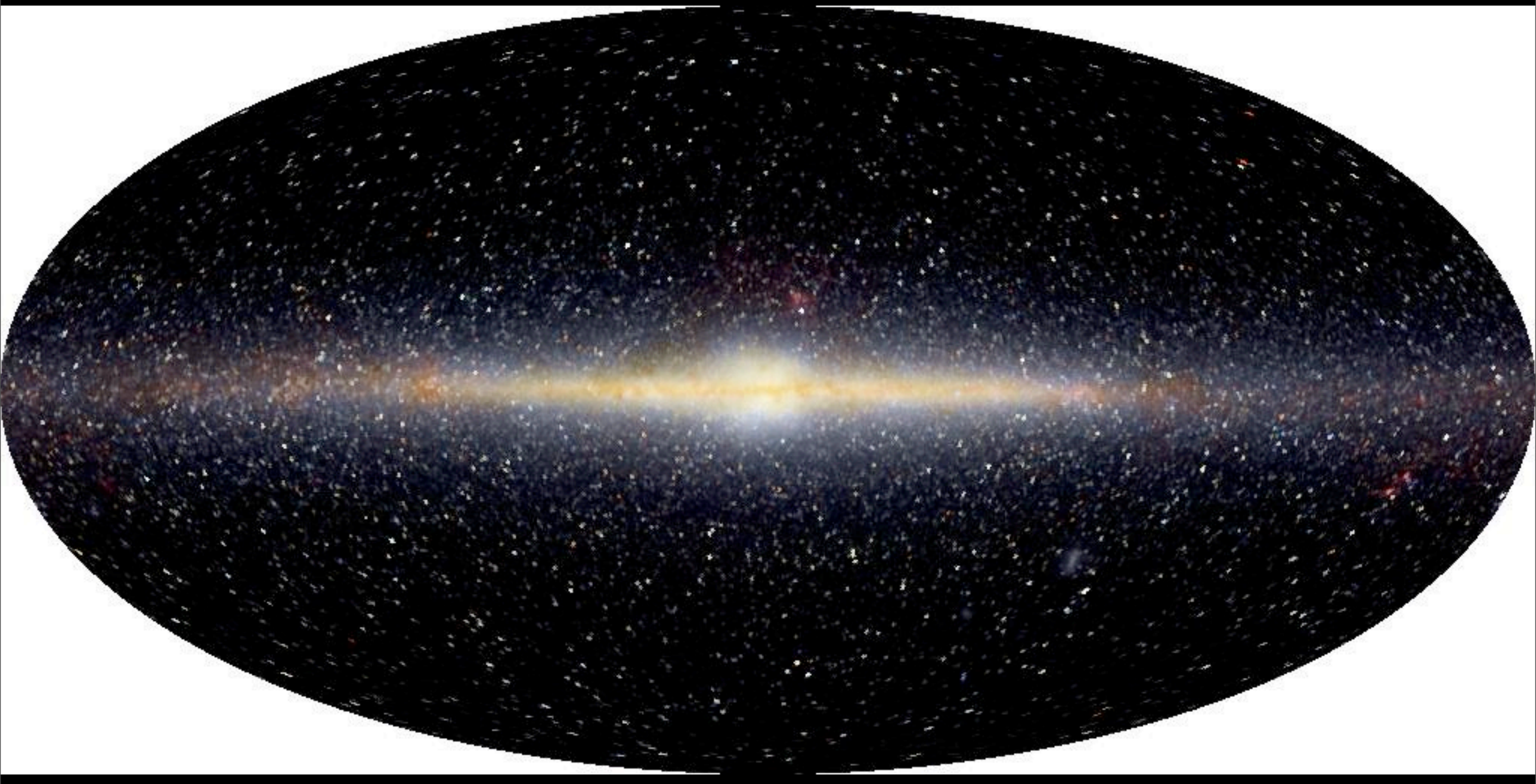
$2 \times 10^{12}\ M_{sun}$

Interstellar Mass:

Neutral (H I)	$3 \times 10^{9}\ M_{sun}$
Ionized (H II)	$1 \times 10^{9}\ M_{sun}$
Molecular (H_2)	$1 \times 10^{9}\ M_{sun}$
	$7 \times 10^{9}\ M_{sun}$

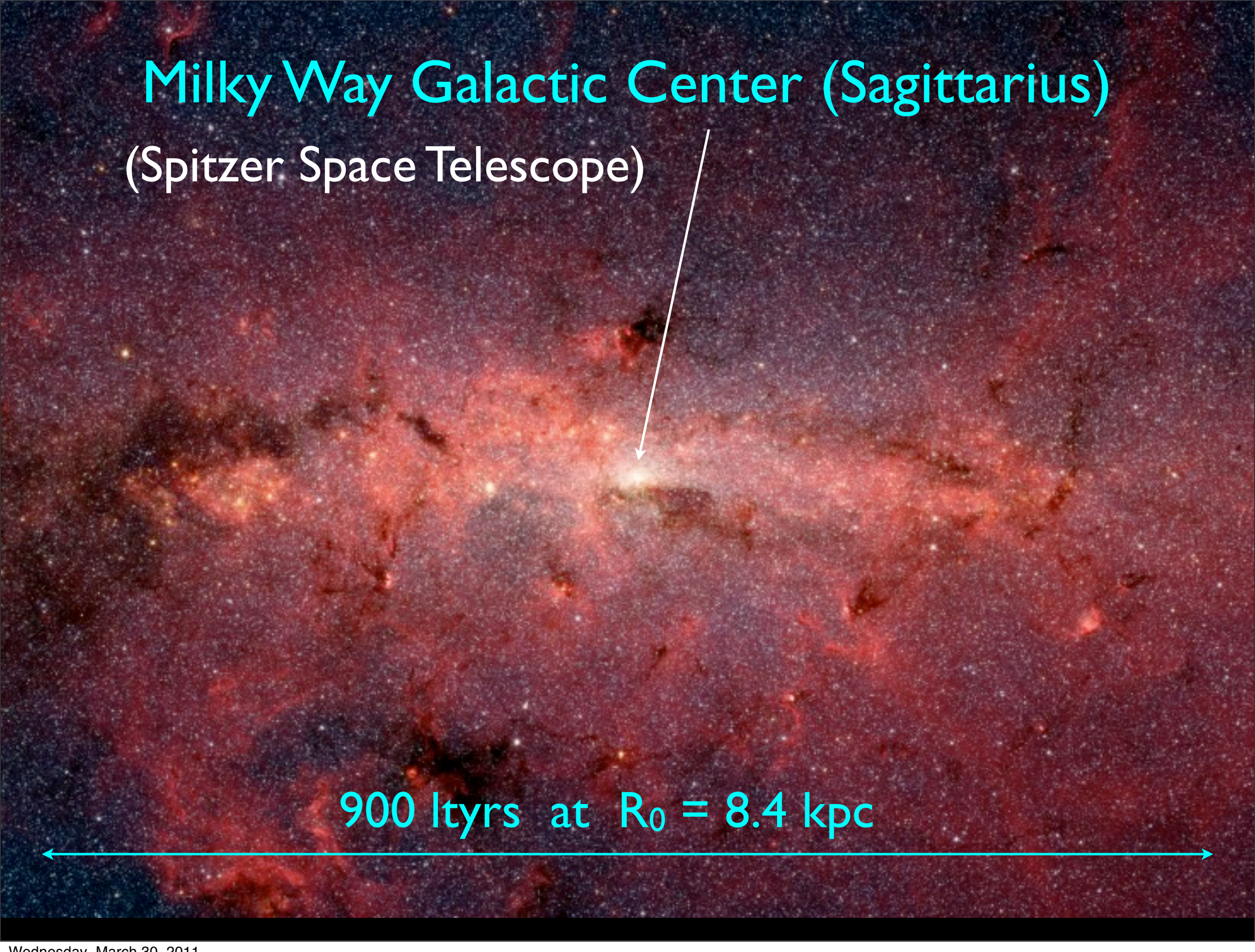
Total incl Helium (36%)

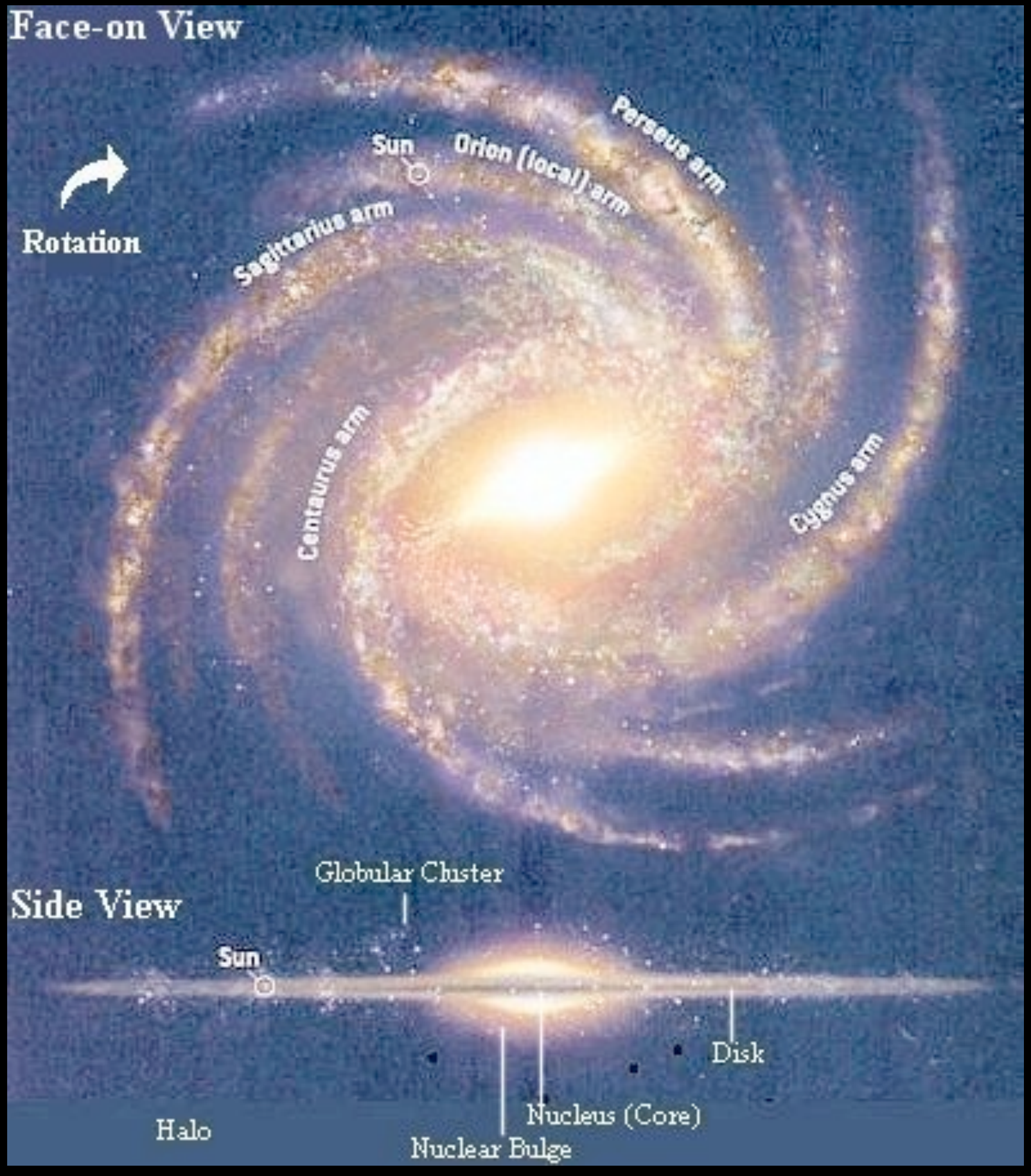
Milky Way (infrared image)

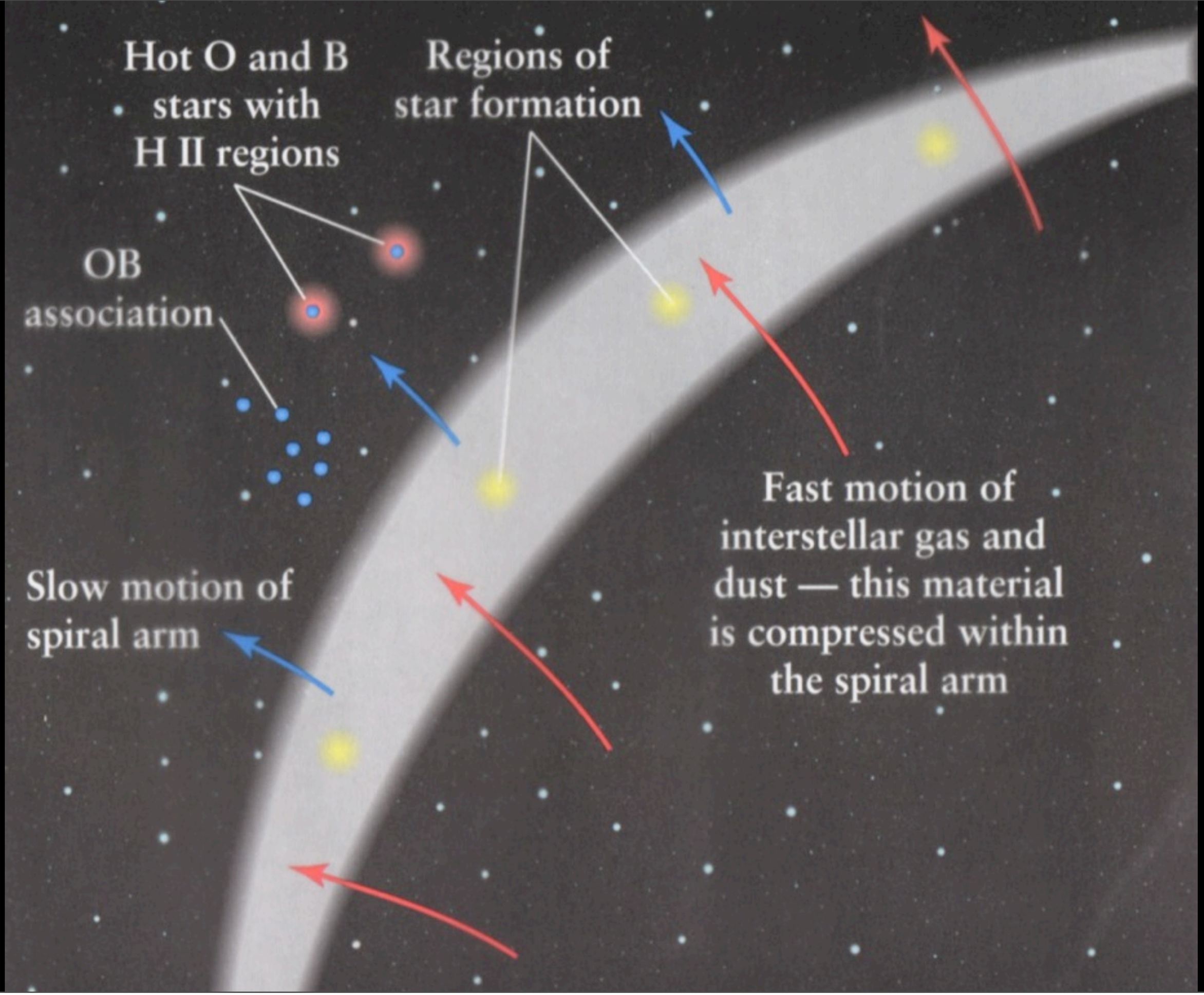


Milky Way Galactic Center (Sagittarius)

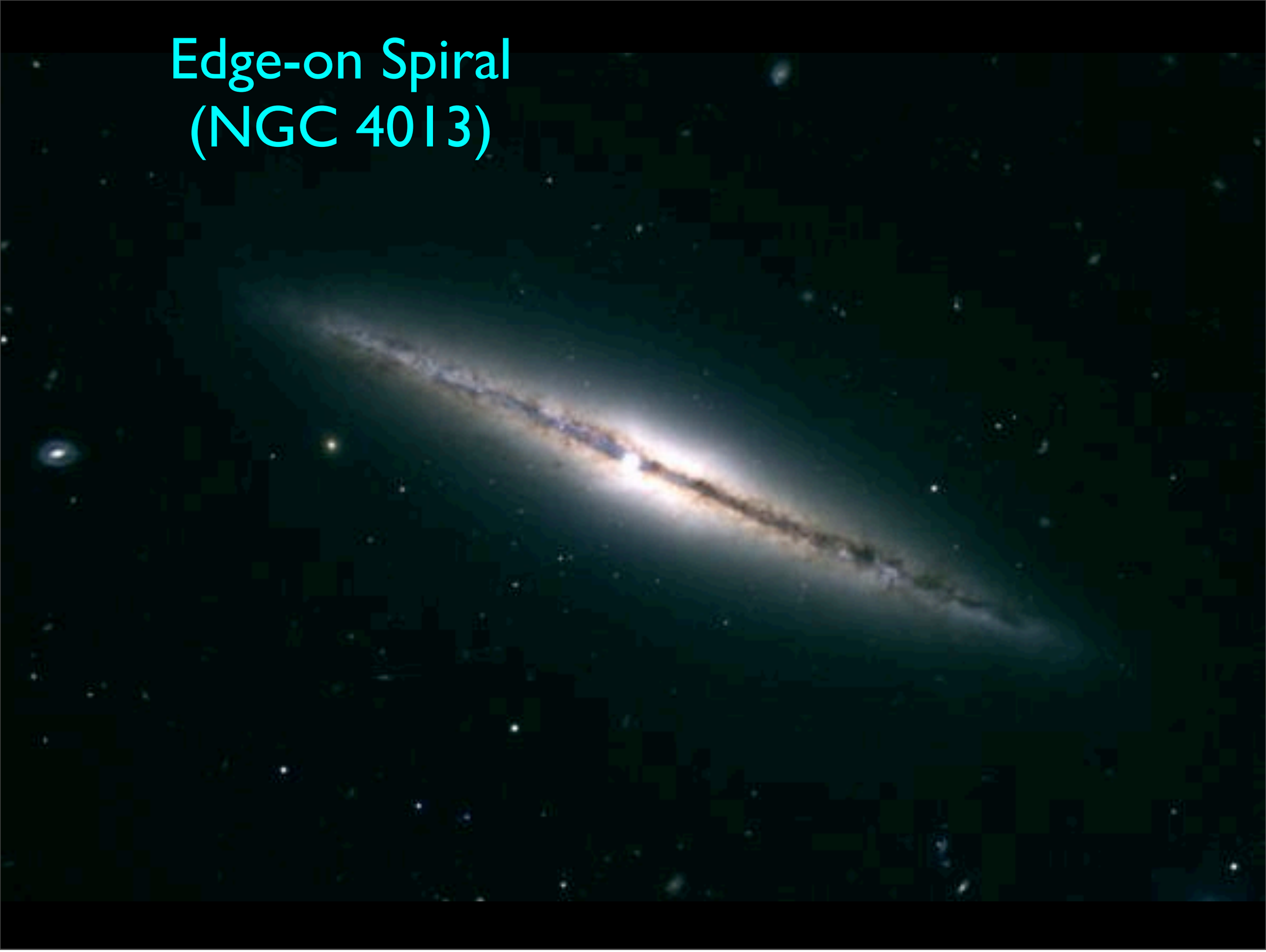
(Spitzer Space Telescope)




Face-on View
Rotation
Sun
Orion (local) arm
Perseus arm
Sagittarius arm
Centaurus arm
Cygnus arm
Side View
Globular Cluster
Sun
Disk
Halo
Nucleus (Core)
Nuclear Bulge


Hot O and B stars with H II regions
Regions of star formation
OB association
Fast motion of interstellar gas and dust — this material is compressed within the spiral arm
Slow motion of spiral arm

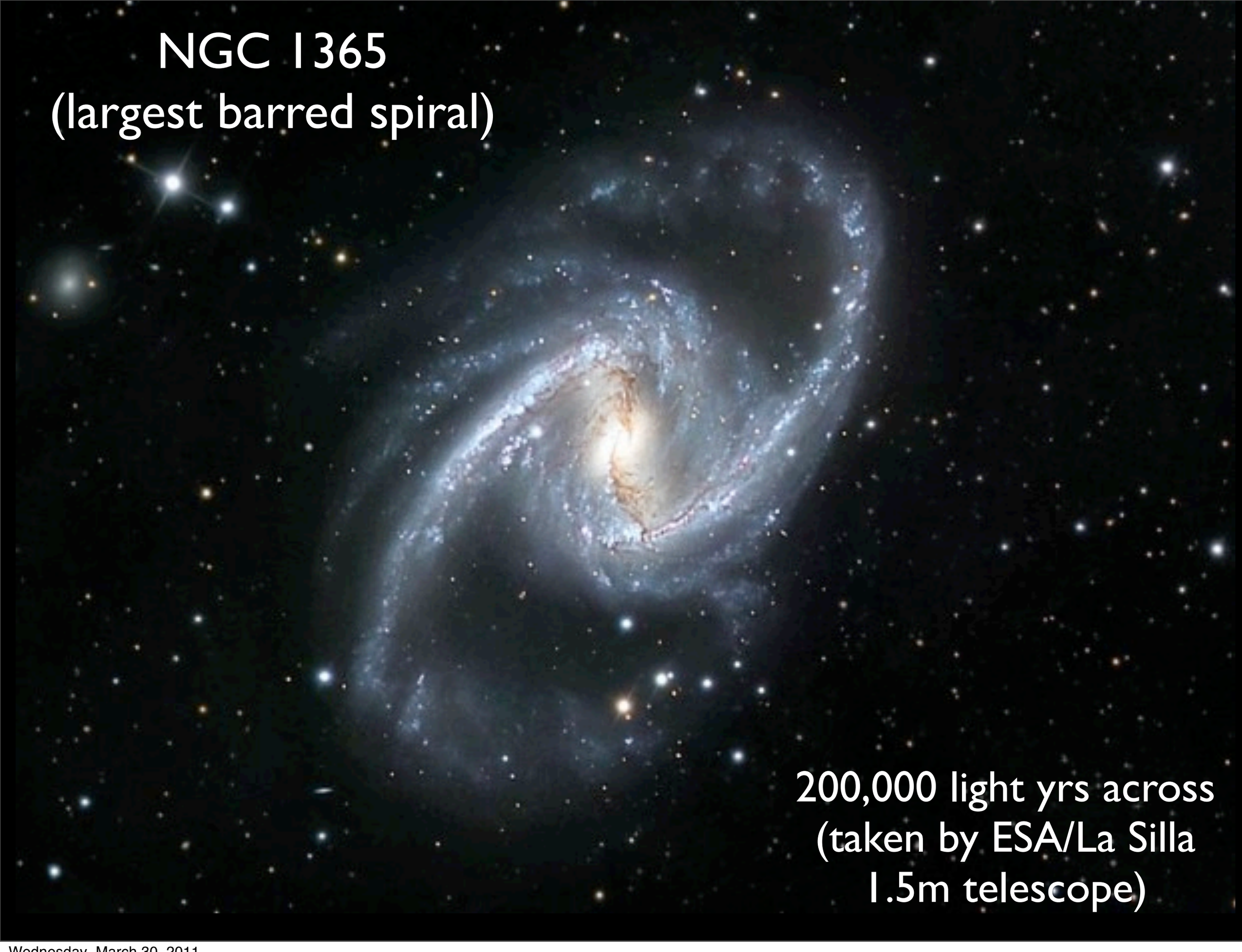
Edge-on Spiral (NGC 4013)



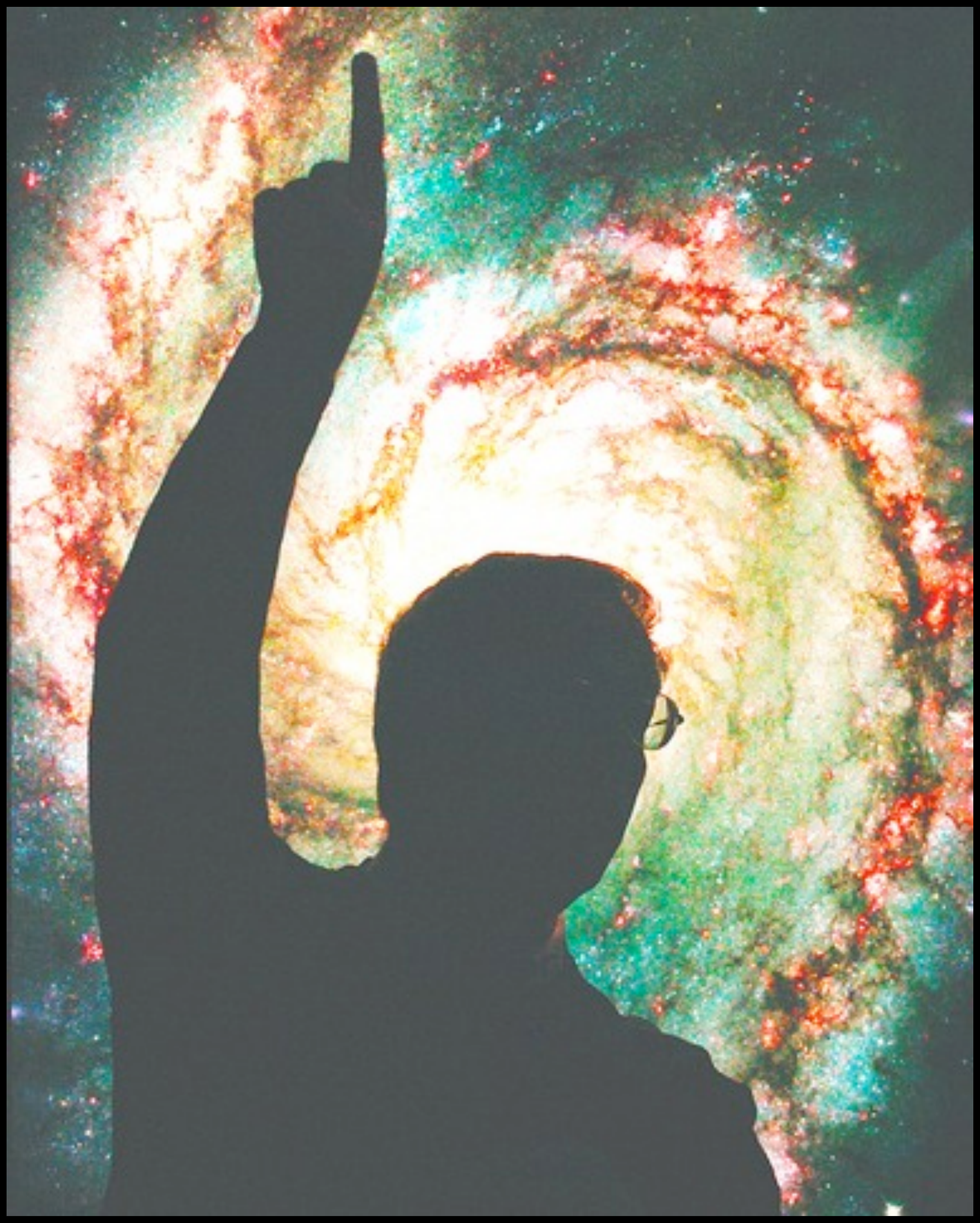
Another Spiral Galaxy

Barred Spiral (Hubble image)

NGC 1365
(largest barred spiral)



200,000 light yrs across
(taken by ESA/La Silla
1.5m telescope)



Young stars form in spiral arms of galaxies

Interstellar gas clouds are organized and compacted by "spiral density waves"

Then, gravity takes over

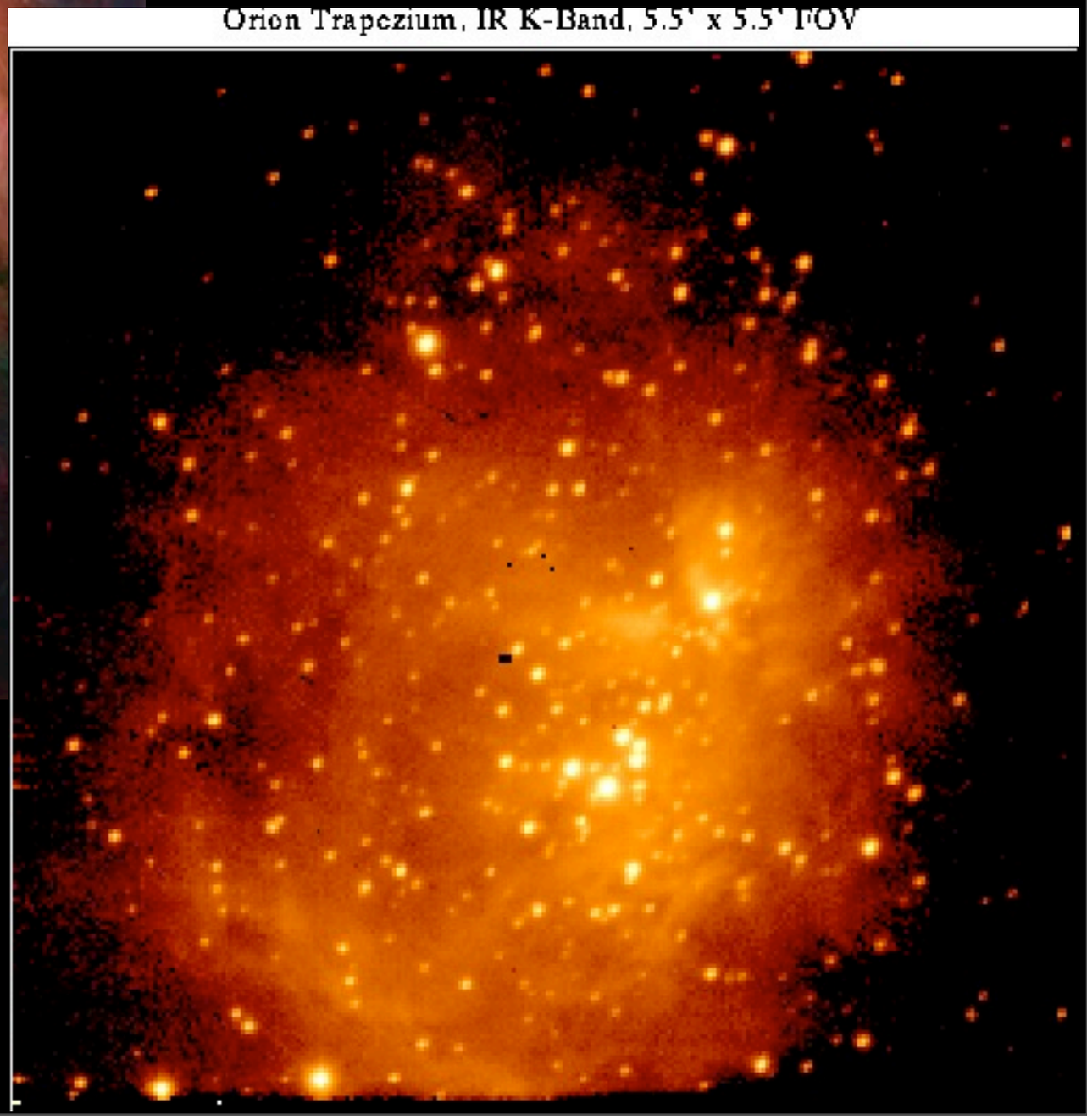
LMC

Highlighting
Supernova
Remnants

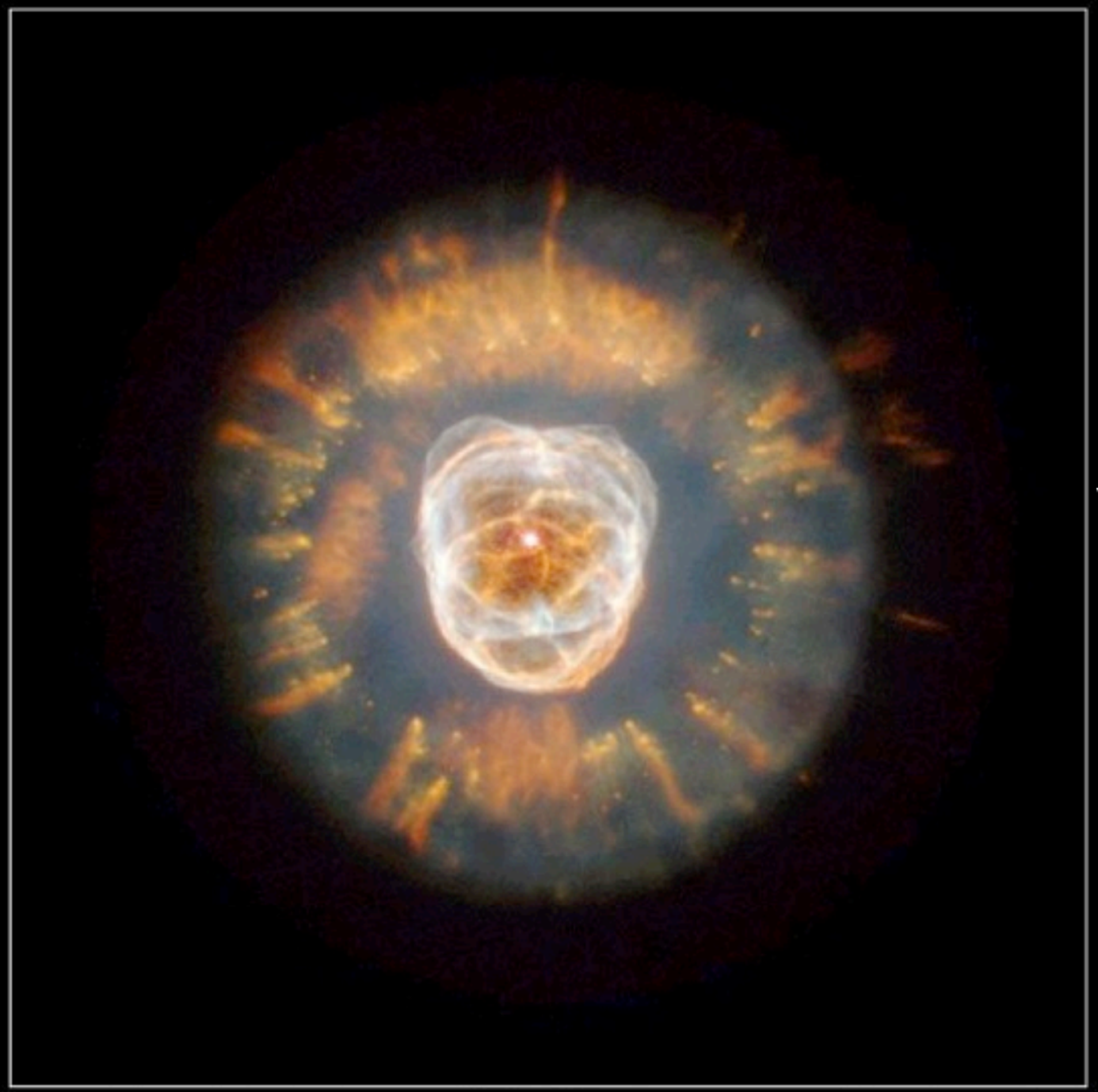
d ≈ 50 kpc

Orion Nebula and Trapezium Stars

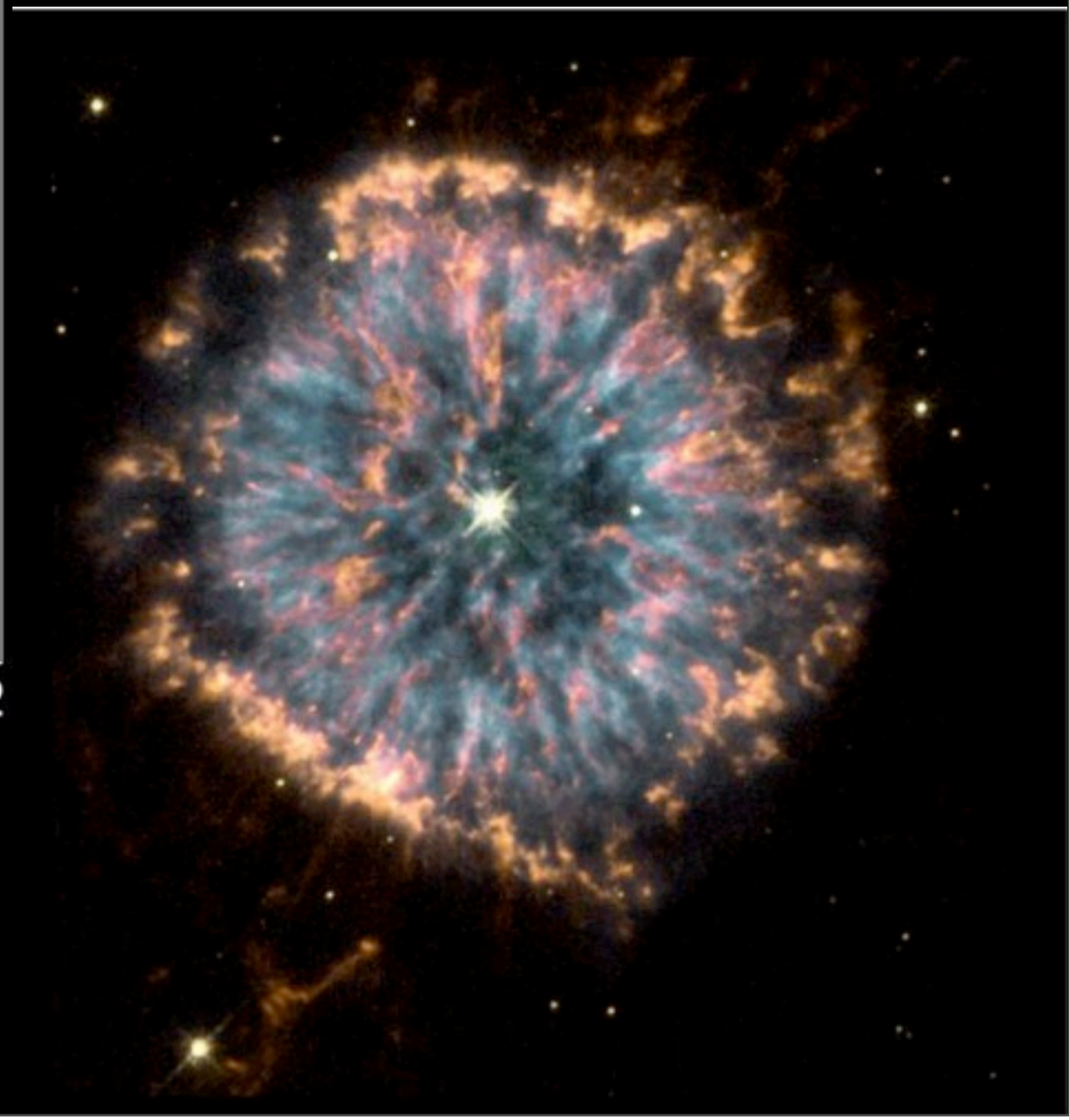
Orion Star Cluster
(infrared image) ⇒



Dying Stars
(Planetary Nebulae with White Dwarf)



NGC 2392 • "Eskimo" Nebula **HST** • WFPC2
NASA, A. Fruchter and the ERO Team (STScI) • STScI-PRC00-07

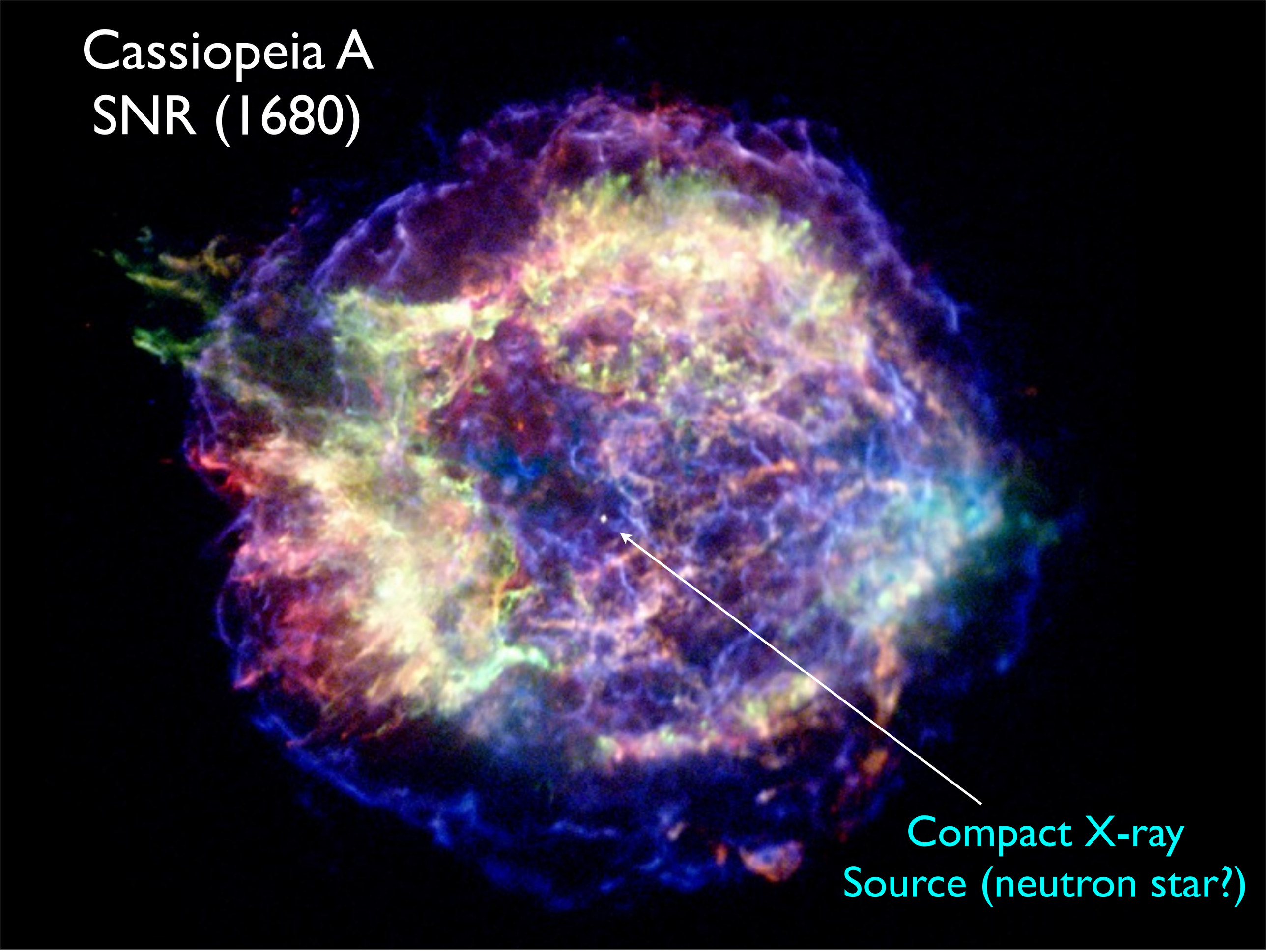


Tycho's SNR (1572)

Tycho Brahe
1546 -1601

7500 light years away

Cassiopeia A
SNR (1680)



Crab Supernova
1054 AD

S-147 in Taurus

Older SNR

40,000 yrs ?

Wednesday, March 30, 2011