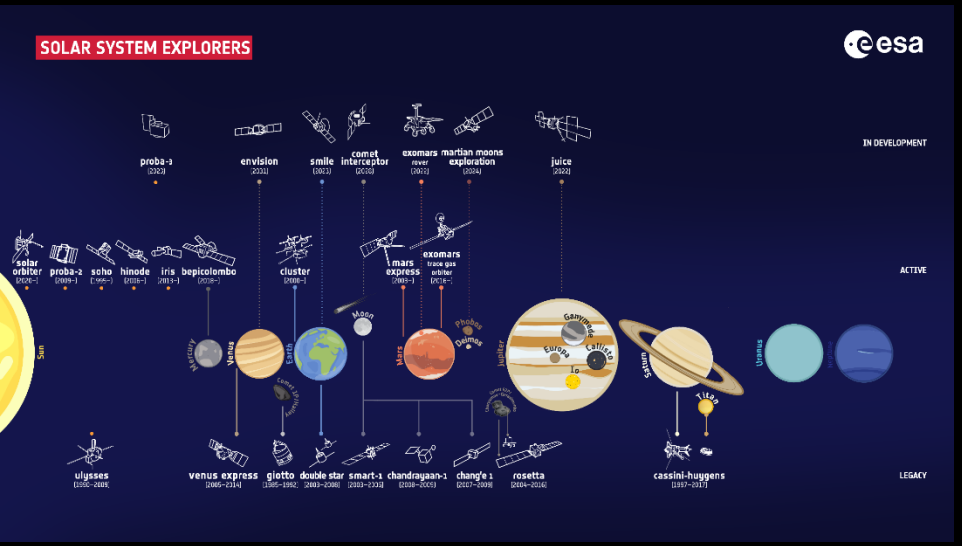
ESASky

Beatriz González-García on behalf of the ESAC Science Data Center Team & the CesaR Science Cases Team


SOLAR SYSTEM EXPLORERS
esa
IN DEVELOPMENT
ACTIVE
LEGACY
proba-3
envision
smile
comet interceptor
exomars rover
martian moons exploration
juice
solar orbiter
proba-2
soho
hinode
iris
bepicolombo
cluster
mars express
exomars trace gas orbiter
Sun
Mercury
Venus
Earth
Moon
Mars
Phobos
Deimos
Jupiter
Ganymede
Callisto
Europa
Io
Saturn
Titan
Uranus
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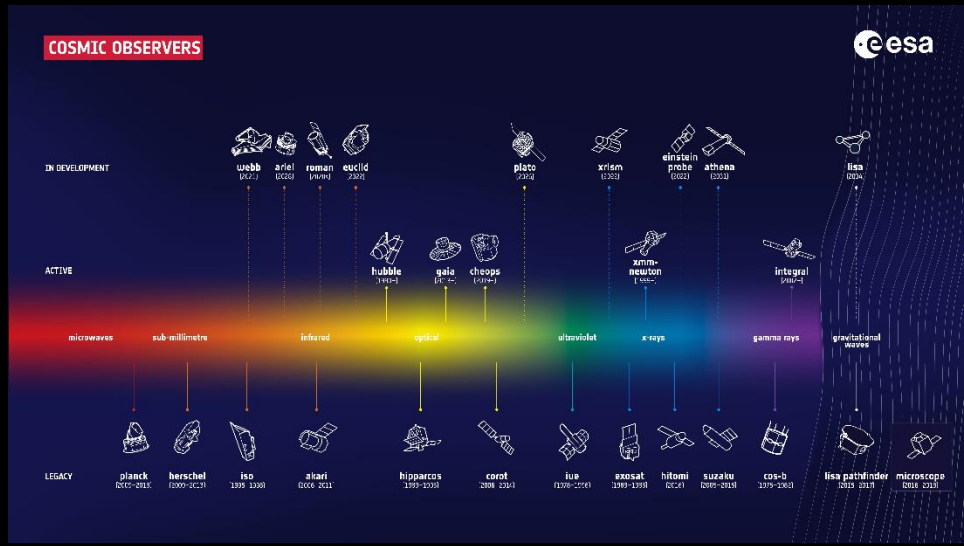
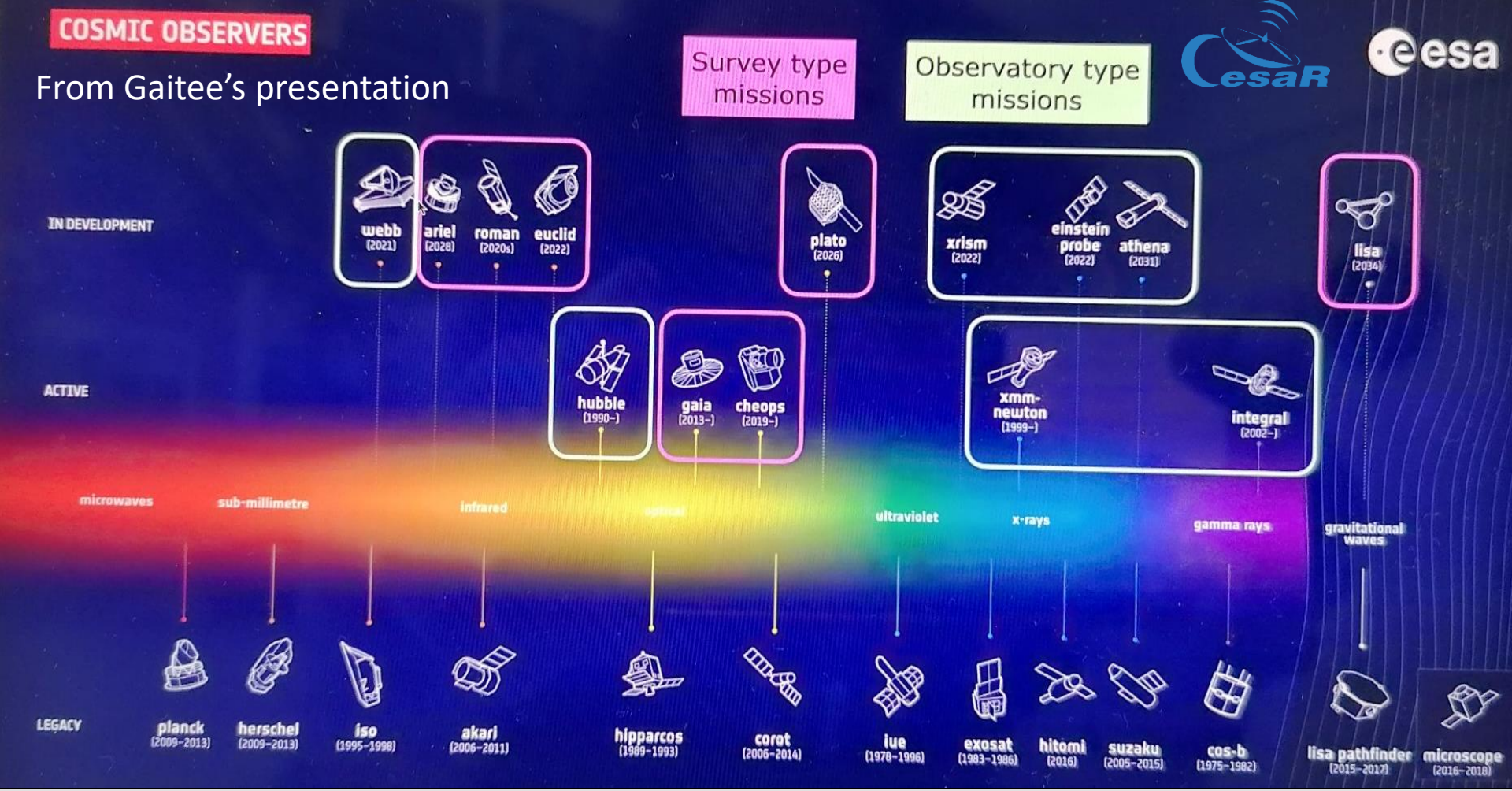
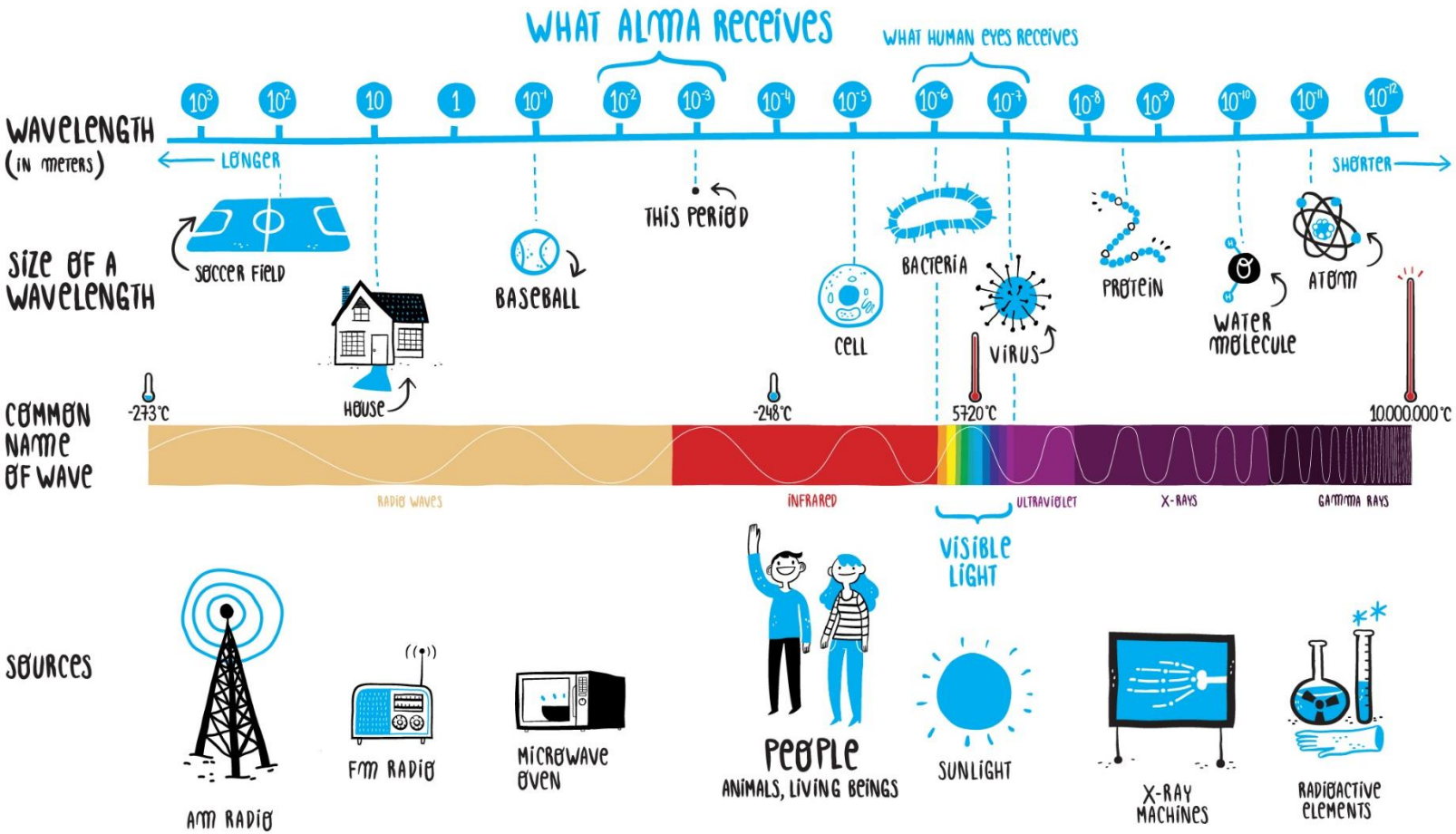
venus express
giotto
double star
smart-1
chandrayaan-1
chang'e 1
rosetta
cassini-huygens


COSMIC OBSERVERS
esa
IN DEVELOPMENT
ACTIVE
LEGACY
webb
ariel
roman
euclid
plato
xrism
einstein probe
athena
lisa
hubble
gaia
cheops
xmm-newton
integral
microwaves
sub-millimetre
infrared
optical
ultraviolet
x-rays
gamma rays
gravitational waves
planck
herschel
iso
akari
hipparcos
corot
iue
exosat
hitomi
suzaku
cos-b
lisa pathfinder
microscope

From Gaitee's presentation




WHAT ALMA RECEIVES
WHAT HUMAN EYES RECEIVES
WAVELENGTH (IN METERS)
LONGER
SHORTER
10^{3} 10^{2} 10 1 10^{-1} 10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7} 10^{-8} 10^{-9} 10^{-10} 10^{-11} 10^{-12}
SIZE OF A WAVELENGTH
SOCCER FIELD
HOUSE
BASEBALL
THIS PERIOD
CELL
BACTERIA
VIRUS
PROTEIN
WATER MOLECULE
ATOM
COMMON NAME OF WAVE
-273°C
-248°C
5720°C
10000000°C
RADIO WAVES
INFRARED
VISIBLE LIGHT
ULTRAVIOLET
X-RAYS
GAMMA RAYS
SOURCES
AM RADIO
FM RADIO
MICROWAVE OVEN
PEOPLE
ANIMALS, LIVING BEINGS
SUNLIGHT
X-RAY MACHINES
RADIOACTIVE ELEMENTS

J2000 01 36 41.765 +15 47 00.82 FoV: 9.3' X 4.4' Spitzer cold SEIP IRAC3 faint

Sci. Mode En Feedback

m74

Select Sky

Soft X-ray	XMM-Newton EPIC color	
Optical	DSS2 color	
Near-Infrared	2MASS color JHK	
Mid-Infrared	Spitzer cold SEIP IRAC3 faint	
Radio	Planck LFI 030 GHz	

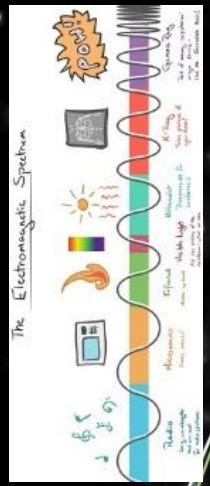


Image Opacity

esa ALADIN


J2000
20 34 52.332 +60 09 13.24
FoV: 31' X 15'
DSS2 color
Sci. Mode
En
Feedback
Search...
Target List
Select Target List
or
Upload Target List
Select Target List
Webb Early Release Targets
Spiral galaxies
Peculiar galaxies
Interacting galaxies
Galaxy clusters
Bright nebulae
Dark nebulae
Globular clusters
Open clusters
Star formation regions
Supernova remnants
Supermassive black holes
Brown dwarfs
Brown dwarfs in multiple systems
Closest exoplanetary systems
CESAR ISM
CESAR Galaxies
CESAR Colours
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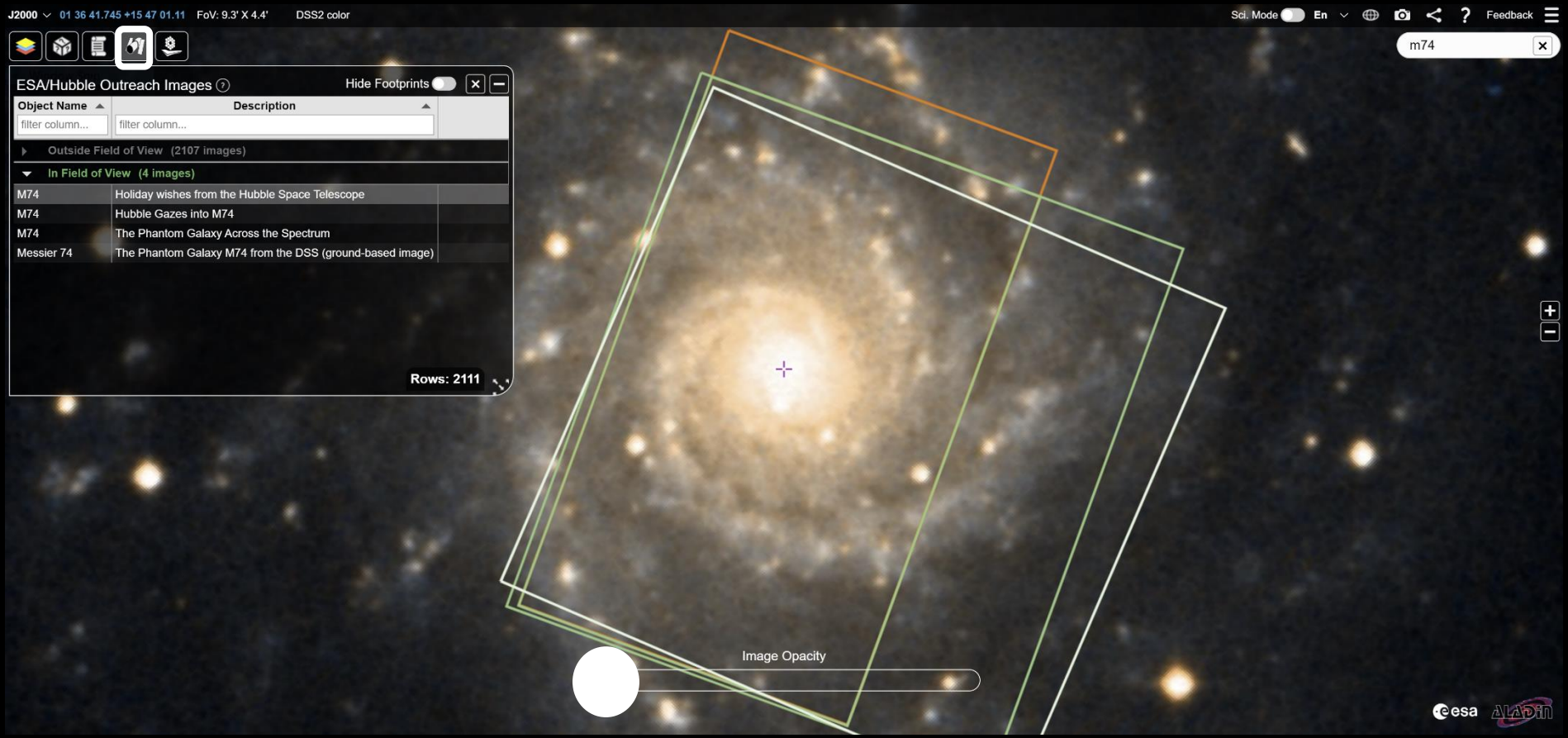
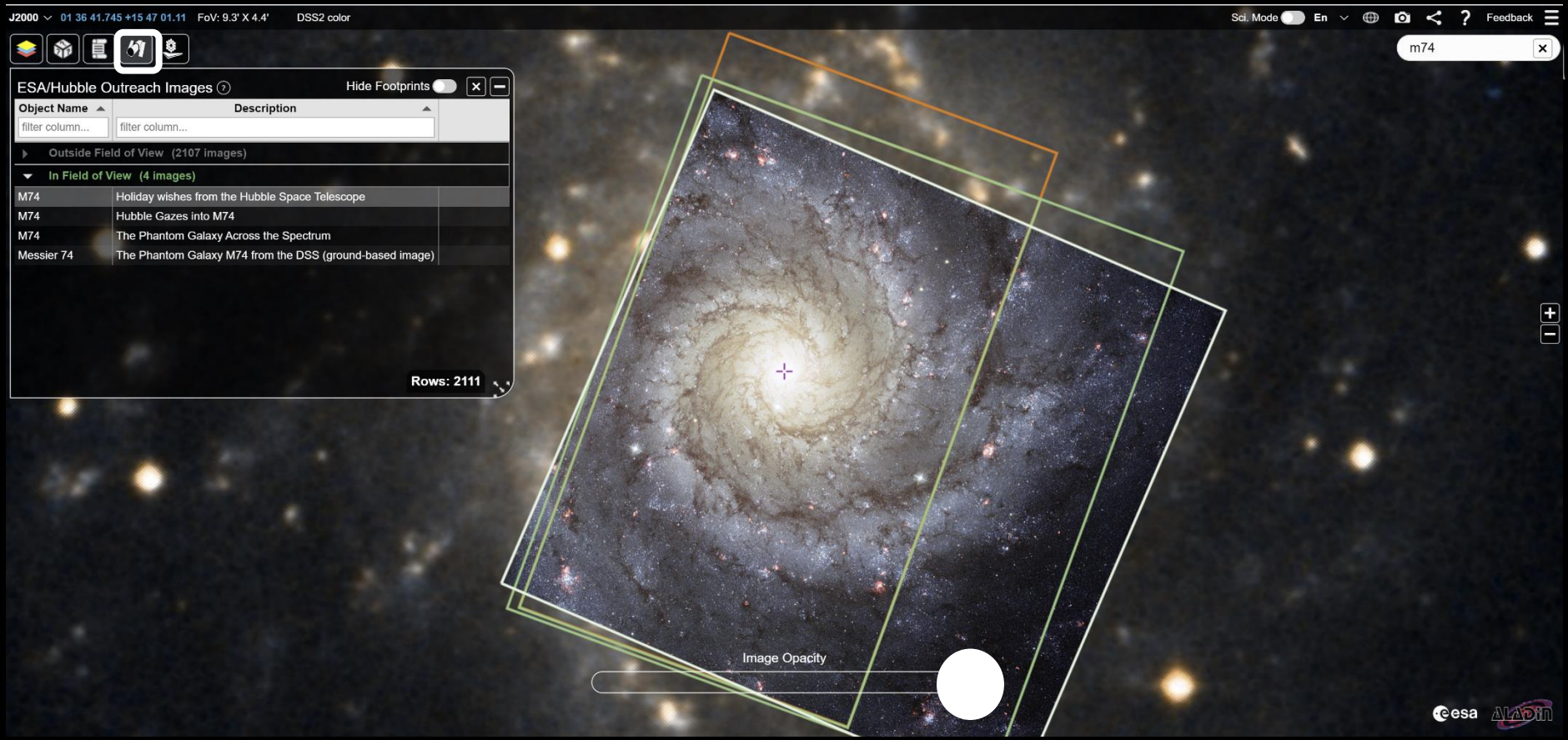
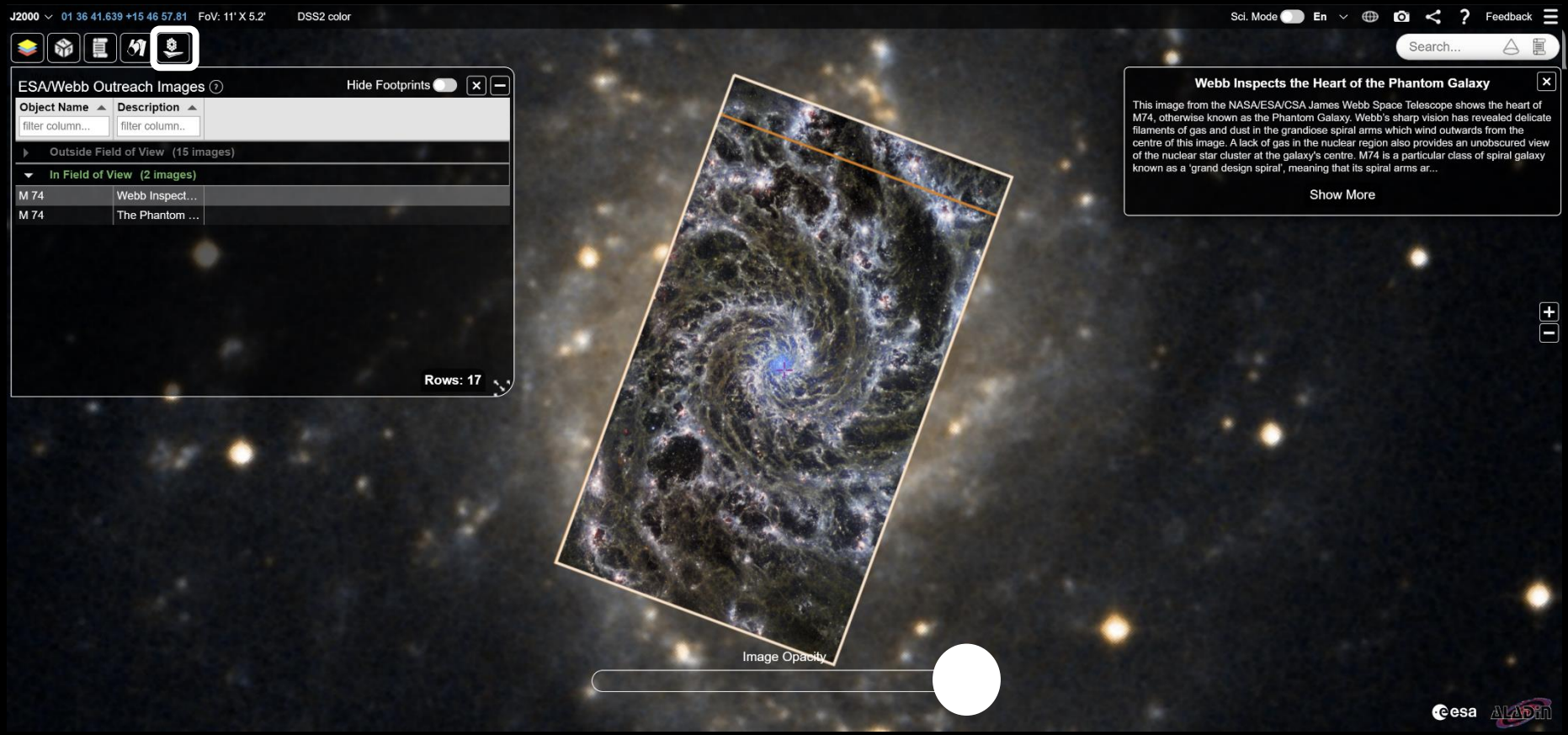

J2000 01 36 41.745 +15 47 01.11 FoV: 9.3' X 4.4' DSS2 color
Sci. Mode En Feedback
m74
ESA/Hubble Outreach Images
Hide Footprints
Object Name
Description
filter column...
filter column...
Outside Field of View (2107 images)
In Field of View (4 images)
M74 Holiday wishes from the Hubble Space Telescope
M74 Hubble Gazes into M74
M74 The Phantom Galaxy Across the Spectrum
Messier 74 The Phantom Galaxy M74 from the DSS (ground-based image)
Rows: 2111
Image Opacity
esa
ALADIN


J2000 01 36 41.745 +15 47 01.11 FoV: 9.3' X 4.4' DSS2 color
Sci. Mode En Feedback
m74
ESA/Hubble Outreach Images
Hide Footprints
Object Name
Description
filter column...
filter column...
Outside Field of View (2107 images)
In Field of View (4 images)
M74 Holiday wishes from the Hubble Space Telescope
M74 Hubble Gazes into M74
M74 The Phantom Galaxy Across the Spectrum
Messier 74 The Phantom Galaxy M74 from the DSS (ground-based image)
Rows: 2111
Image Opacity
esa
ALADIN


J2000 01 36 41.639 +15 46 57.81 FoV: 11' X 5.2' DSS2 color
Sci. Mode En Feedback
Search...
ESA/Webb Outreach Images
Hide Footprints
Object Name
Description
filter column...
filter column..
Outside Field of View (15 images)
In Field of View (2 images)
M 74 Webb Inspect...
M 74 The Phantom ...
Rows: 17
Webb Inspects the Heart of the Phantom Galaxy
This image from the NASA/ESA/CSA James Webb Space Telescope shows the heart of M74, otherwise known as the Phantom Galaxy. Webb's sharp vision has revealed delicate filaments of gas and dust in the grandiose spiral arms which wind outwards from the centre of this image. A lack of gas in the nuclear region also provides an unobscured view of the nuclear star cluster at the galaxy's centre. M74 is a particular class of spiral galaxy known as a 'grand design spiral', meaning that its spiral arms ar...
Show More
Image Opacity
esa
ALADIN

Teach with ESASky

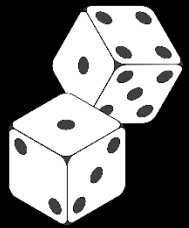
Credit: https://panwybierak.pl/

Credit: https://www.zaol.hu/

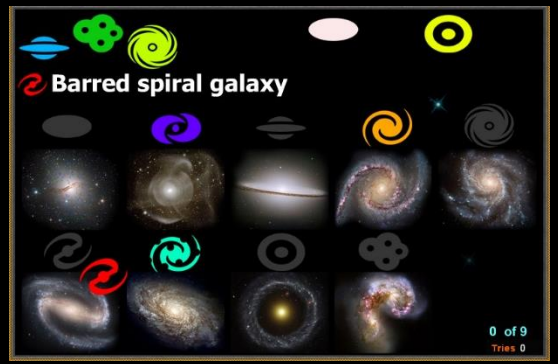
Credit: https://blog.tiket.com/

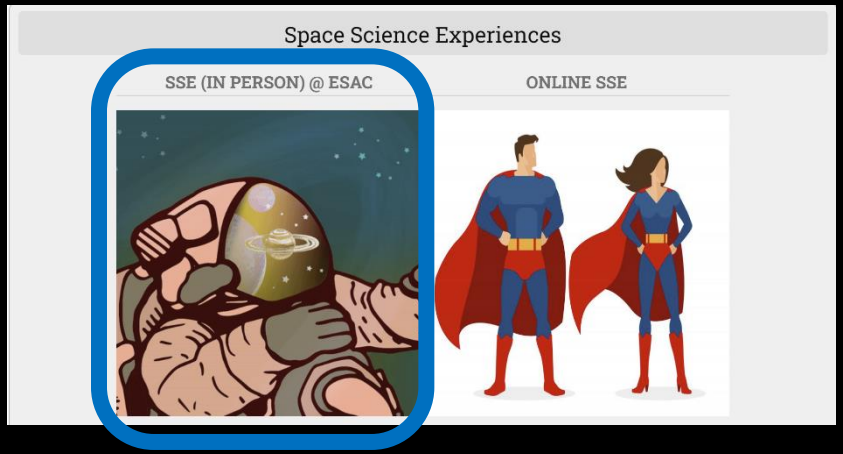
Credit: https://www.advancedtechnologyic.com/

- ✓ Playing with the Universe



✓ Recognizing patterns





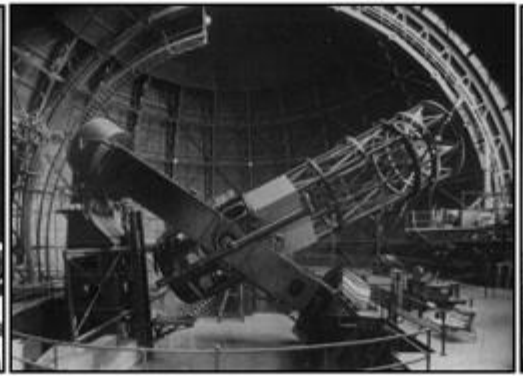
Bit.ly/cesarSSE

ROLES:

- Documentalist:
- Telescope operator:
- Astronomer:
- Support astronomer:
- Spokesperson:

STORY TELLING (in the 1920s):

Edwin Hubble
1889 – 1953



100 inch Mt Wilson Telescope

Milton Humason
1891 – 1972

The secrets of the galaxies

12-15 years old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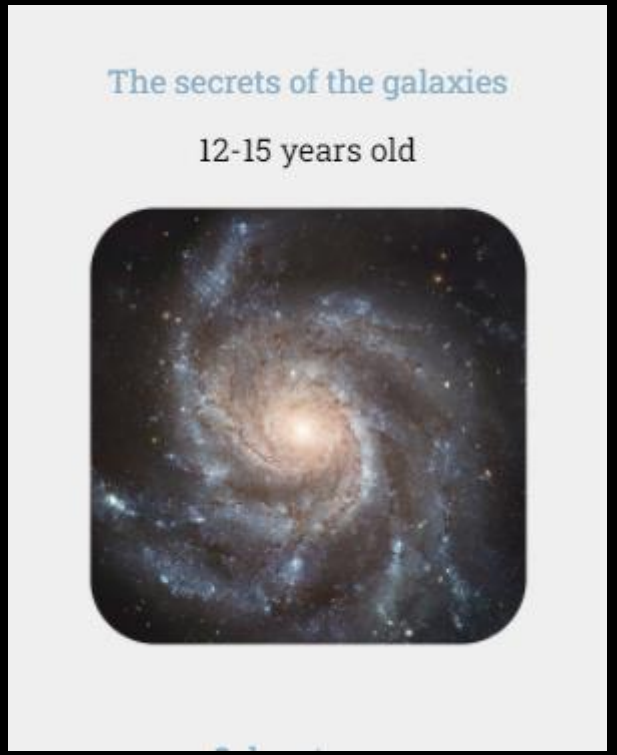
The secrets of the galaxies
12-15 years old


J2000 20 34 52.332 +60 09 13.24 FoV: 31' X 15' DSS2 color
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Search...
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Webb Early Release Targets
Spiral galaxies
Peculiar galaxies
Interacting galaxies
Galaxy clusters
Bright nebulae
Dark nebulae
Globular clusters
Open clusters
Star formation regions
Supernova remnants
Supermassive black holes
Brown dwarfs
Brown dwarfs in multiple systems
Closest exoplanetary systems
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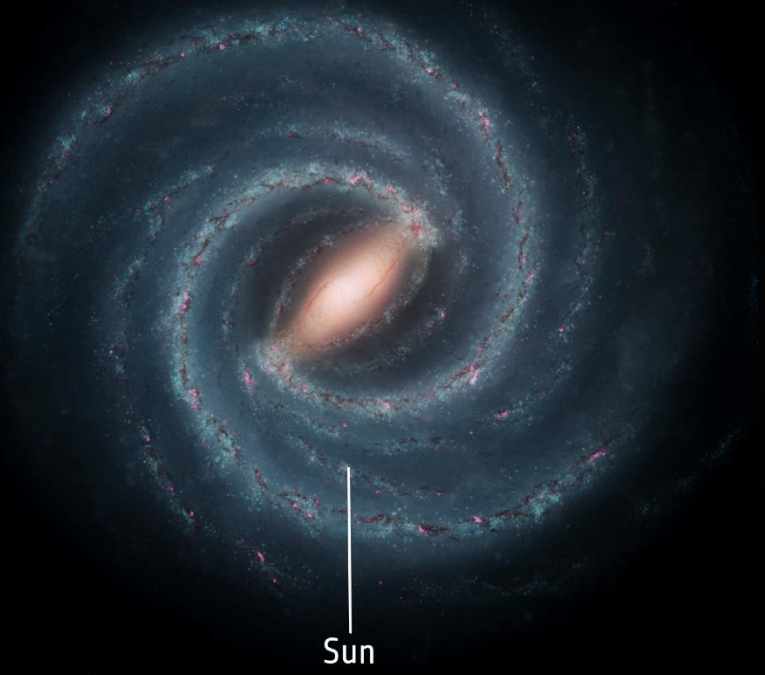
→ ANATOMY OF THE MILKY WAY



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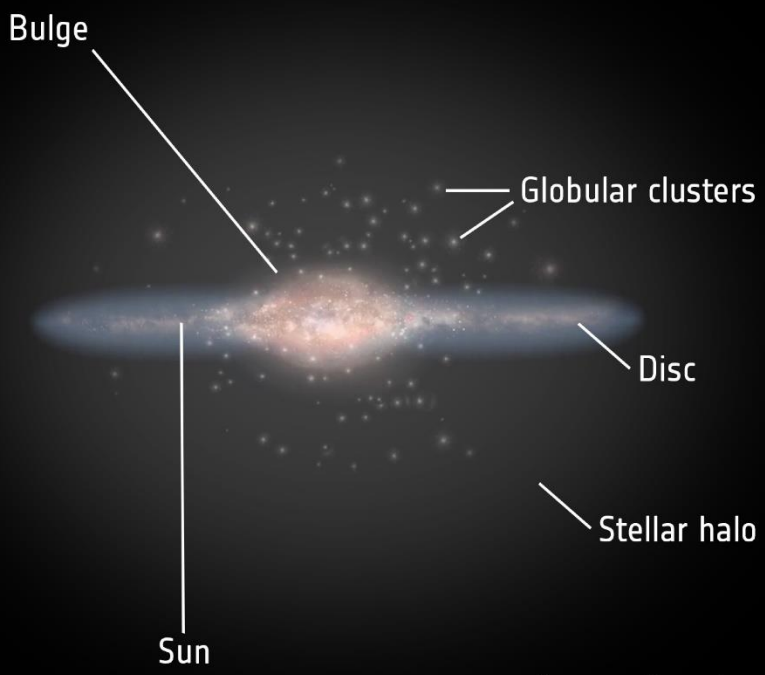


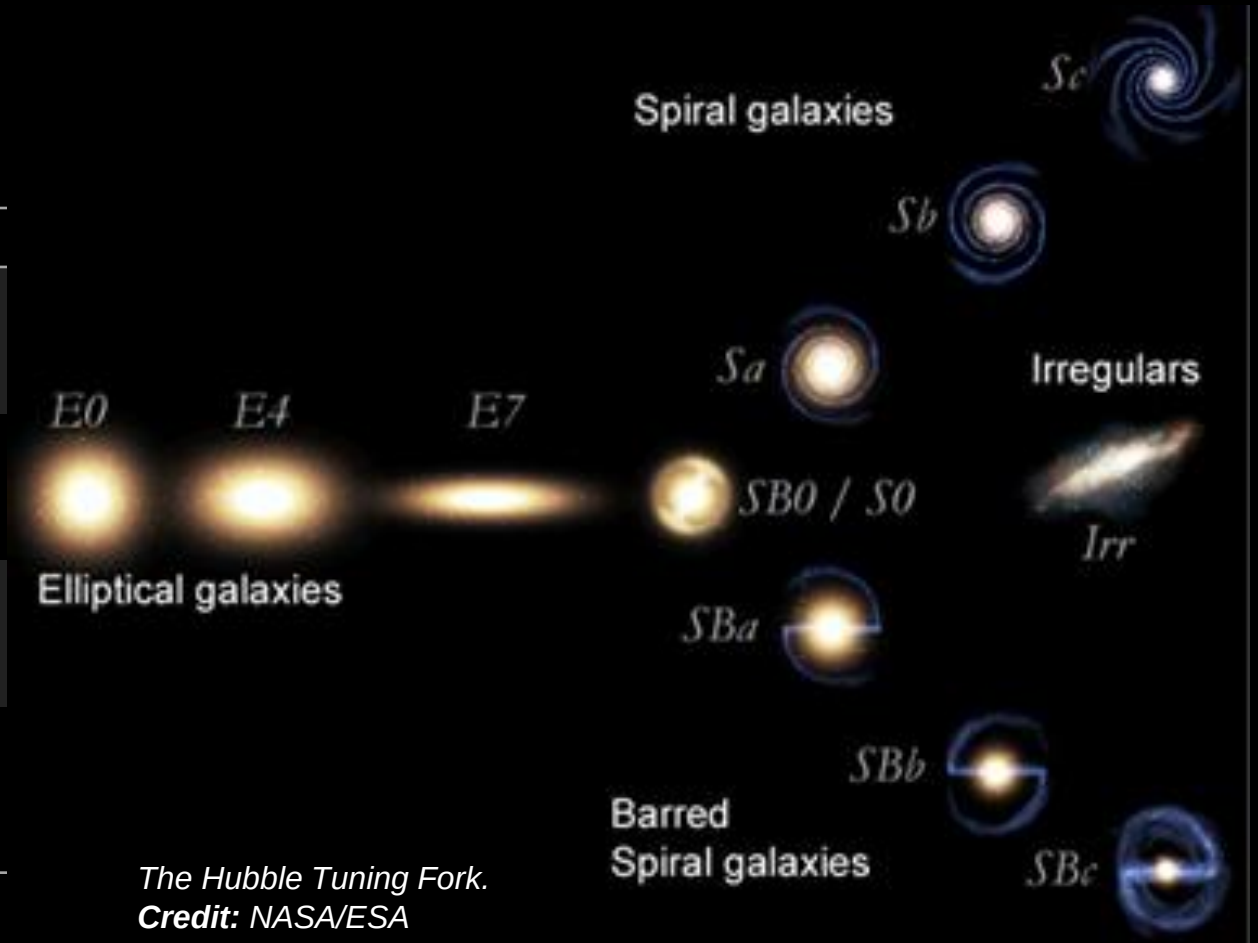
European Space Agency

Let’s work together

Name	Characteristics
Type 1:	
Type 2:	
Type 3:	
Type 4:	

Let’s work together

Name
Type 1: Elliptical
Type 2: Spiral
Type 3: Barred spirals
Type 4: Irregular



The Hubble Tuning Fork.
Credit: *NASA/ESA*

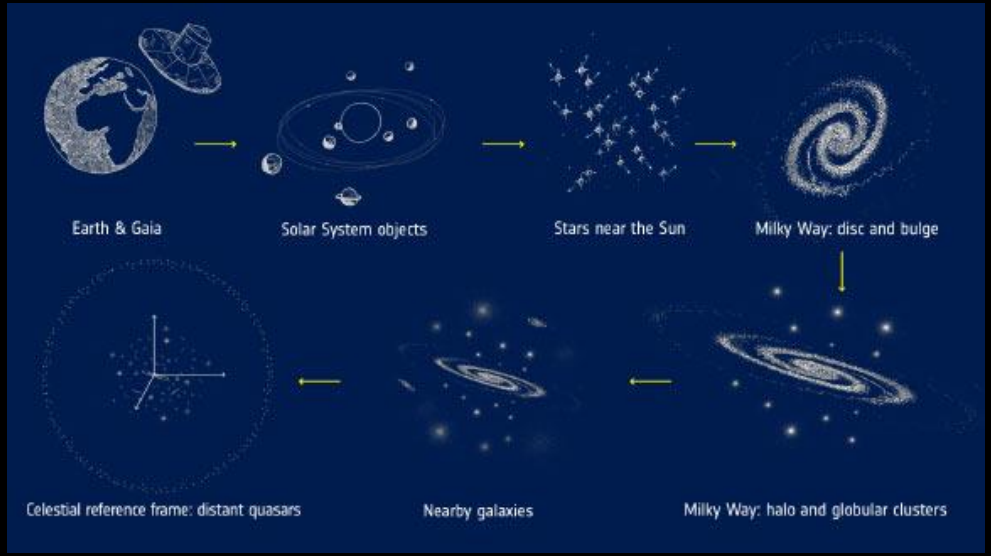
Let’s work together

Name	Name of the galaxy
Type 1: Elliptical	
Type 2: Spiral	
Type 3: Barred spirals	
Type 4: Irregular	

Let’s work together

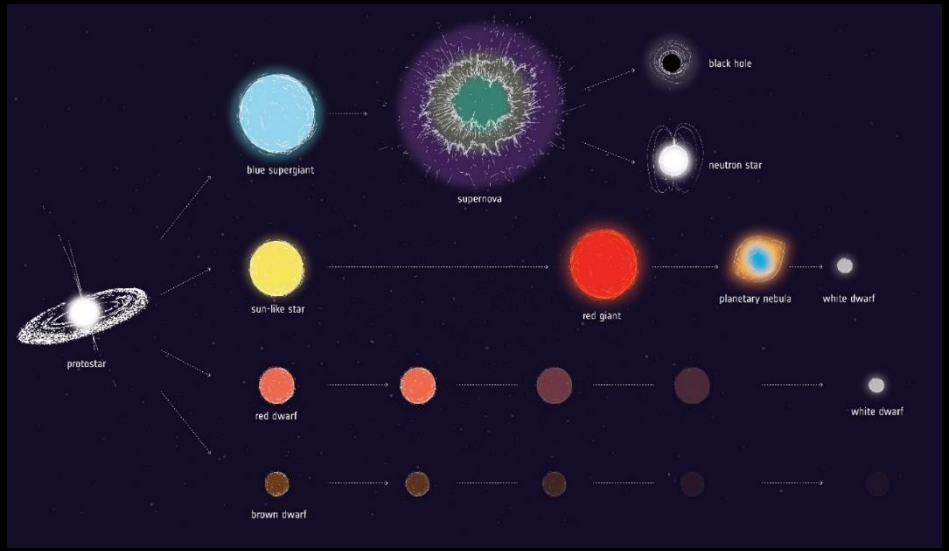
Name	Name of the galaxy
Type 1: Elliptical	M87, NGC 1132, M60
Type 2: Spiral	NGC 2997, M101, M31
Type 3: Barred spirals	M91, NGC 1300, NGC 4565
Type 4: Irregular	LMC, NGC 4449, IC 5152

- ✓ Understanding the structures of the Universe



Credit: https://blog.tiket.com/

- ✓ Understanding star evolution



Credit: https://blog.tiket.com/


J2000 20 34 52.332 +60 09 13.24 FoV: 31' X 15' DSS2 color
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Search...
Target List
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Supermassive black holes
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Brown dwarfs in multiple systems
Closest exoplanetary systems
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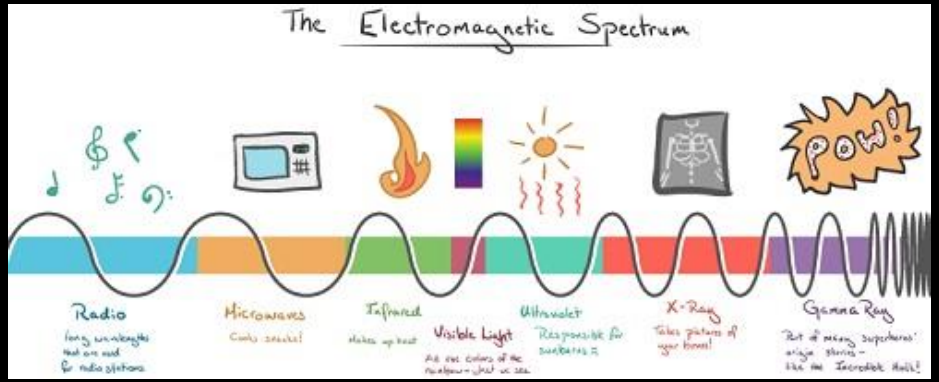
✓ Traveling through the Universe

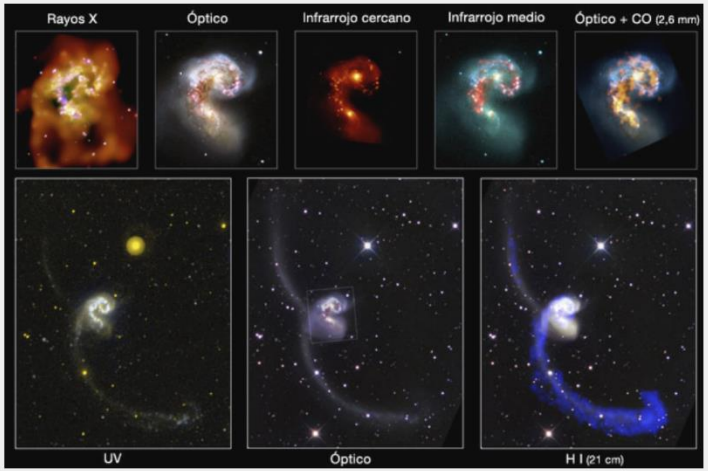
- ✓ Different processes in the Universe



Credit: https://blog.tiket.com/

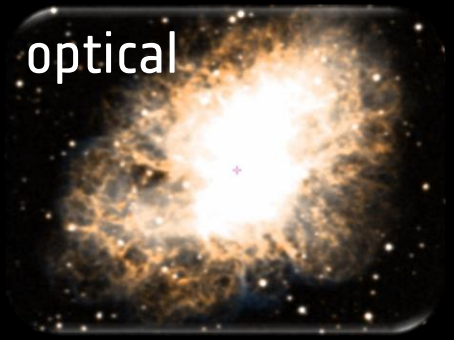
Revealing the mysteries of the Universe

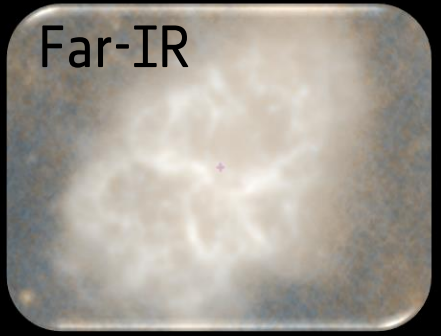
(15 -18) years old



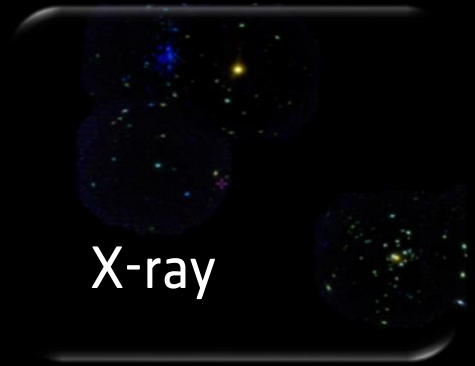
Object	Description	Activity
The Crab Nebula (M1) 	It is a cloud formed by the remains of an aged star that exploded as a supernova nearly 2000 years ago. Read more here	Activity 11.1
NGC 3766 	**NGC 3766** is an open star cluster in the southern constellation Centaurus. It contains more than 100 stars relatively young (blue) and two red supergiant stars Read more here	Activity 11.2
The Horsehead nebula 	It is a small dark nebula in the constellation Orion. It is one of the most identifiable nebulae because of its resemblance to a horse's head. Read more here.	Activity 11.3
The Whirlpool galaxy 	It is an interacting grand-design spiral galaxy with an active galactic nucleus. It was the first galaxy to be classified as a spiral galaxy. Read more here	Activity 11.4

The Crab (M1)

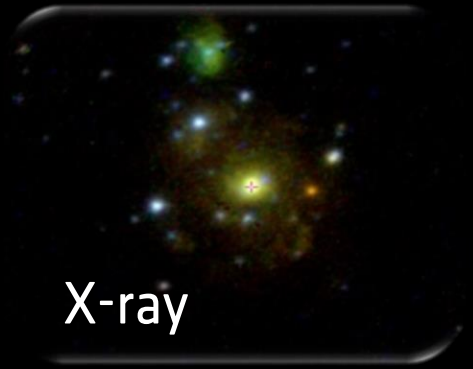


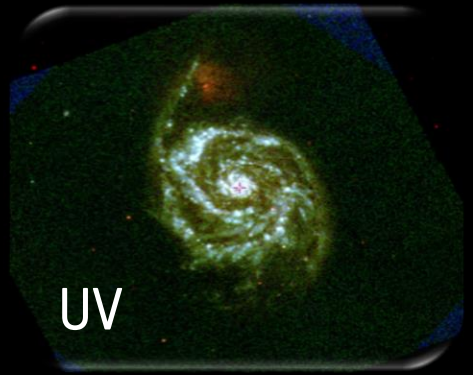


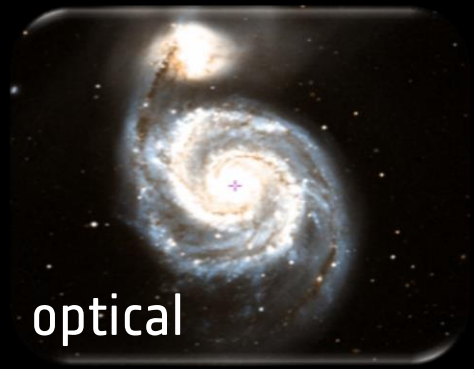
Horsehead Nebula



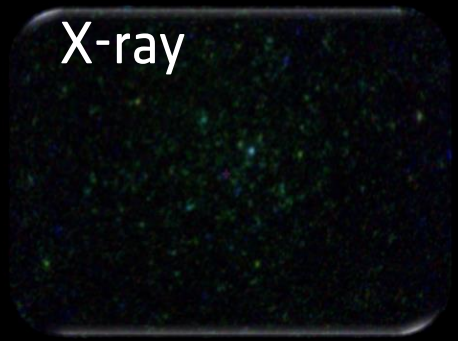
M51 (the Whirlpool Galaxy)

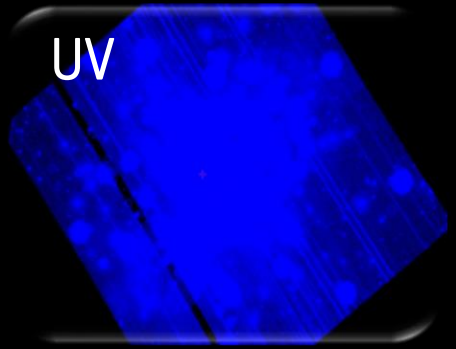






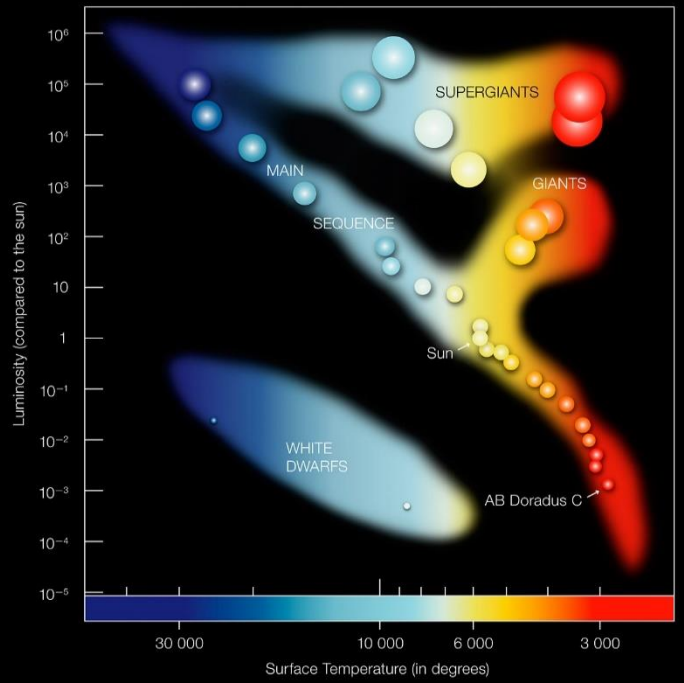
NGC 3766



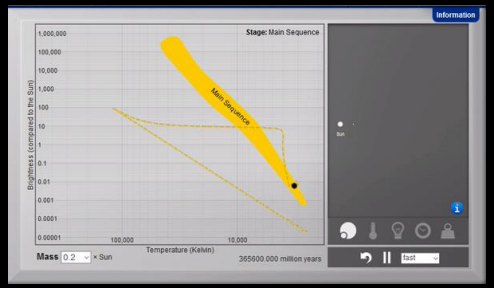


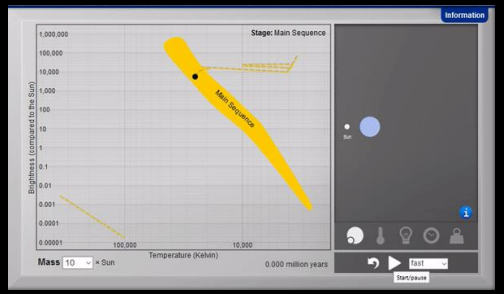
Radiation types	Temperature	Energy	Typical sources
Gamma-rays	$>10^8$ K	$> 2\times10^{-14}$ J	Matter falling into black holes
X-rays	10^6 - 10^8 K	2×10^{-17} - 2×10^{-14} J	Gas in clusters of galaxies Hot gas clouds in supernova remnants Stellar coronae Neutron stars
Ultraviolet	10^4 - 10^6 K	5×10^{-19} - 2×10^{-17} J	Hot gas clouds in supernova remnants Very hot stars
Visible	10^3 - 10^4 K	3×10^{-19} - 5×10^{-19} J	Stars Hot clouds of gas
Infrared	10 - 10^3 K	2×10^{-22} - 3×10^{-19} J	Very cool stars Planets
Infrared	10 - 10^3 K	2×10^{-22} - 3×10^{-19} J	Cool clouds of dust
Microwave and radio	<10 K	$< 2\times10^{-22}$ J	Cool clouds of gas The Cosmic Microwave Background (CMB) Electrons moving in magnetic fields

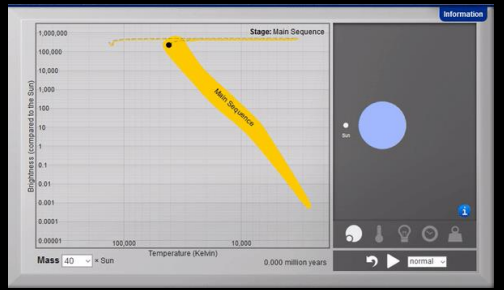
✓ Understanding star evolution



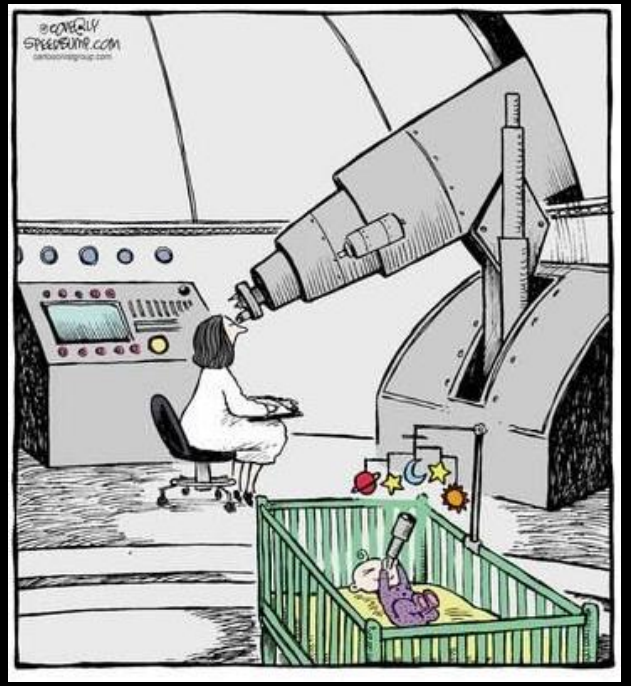
(Credit: ESO)







(Credit: LCO, https://starinabox.lco.global/)

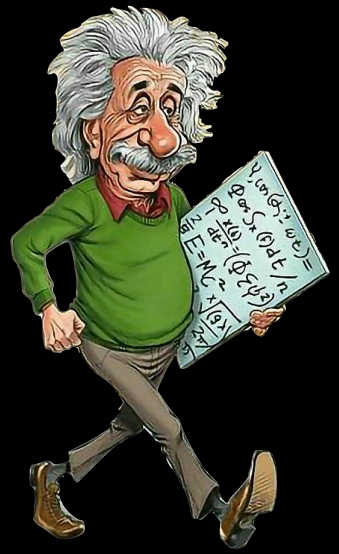


- ✓ Conduct your scientific research

The hidden Universe - AVAILABLE SOON

(16 -18) years old **& University students**

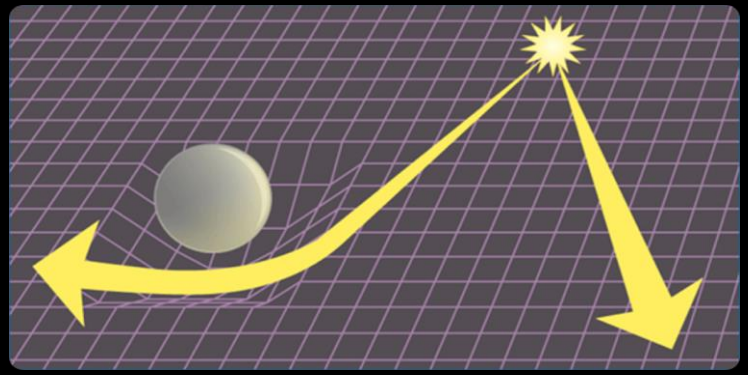
Discovering the Einstein Ring SDSS J073728.45+321618.5

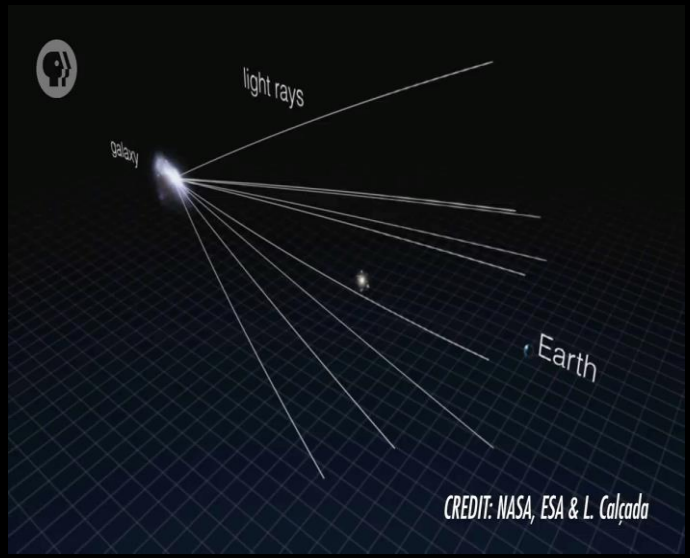


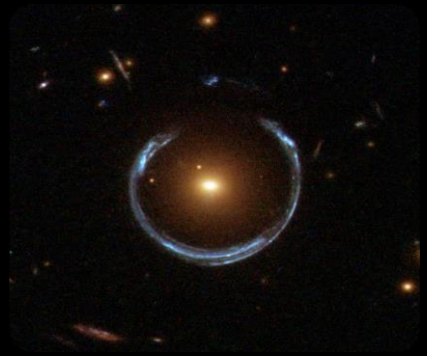
GENERAL RELATIVITY

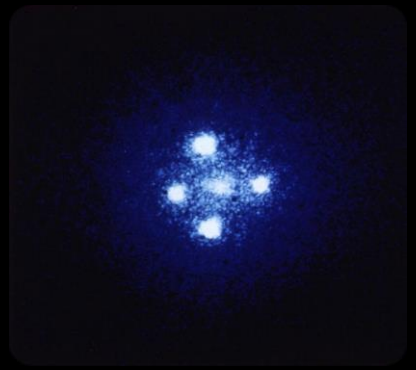
“Matter tells space how to curve”

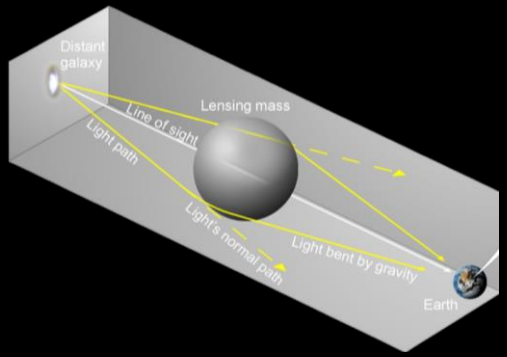
“Space-time tells matter how to move;

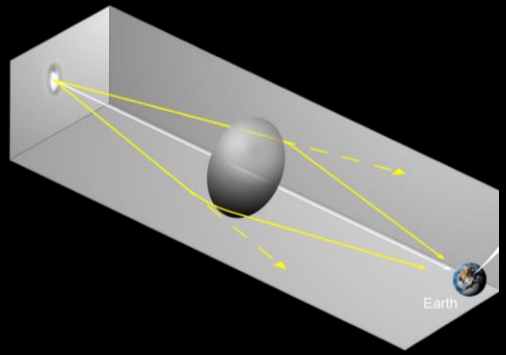


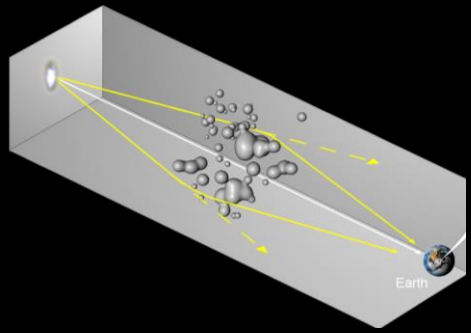

light rays
Galaxy
Earth
CREDIT: NASA, ESA & L. Calçada

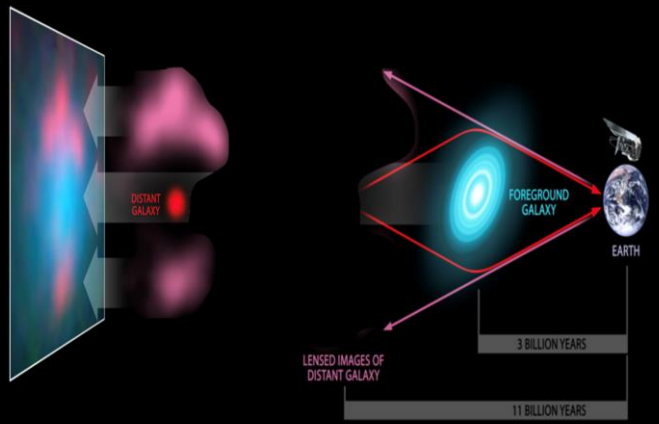


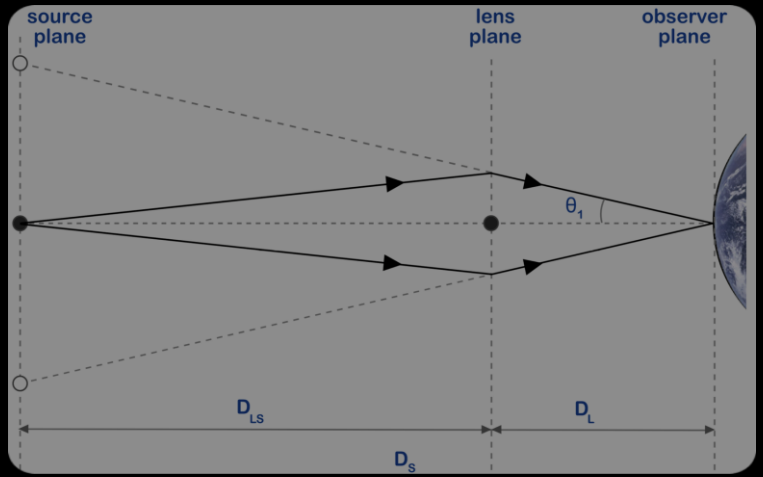



Distant galaxy
Line of sight
Lensing mass
Light path
Light's normal path
Light bent by gravity
Earth

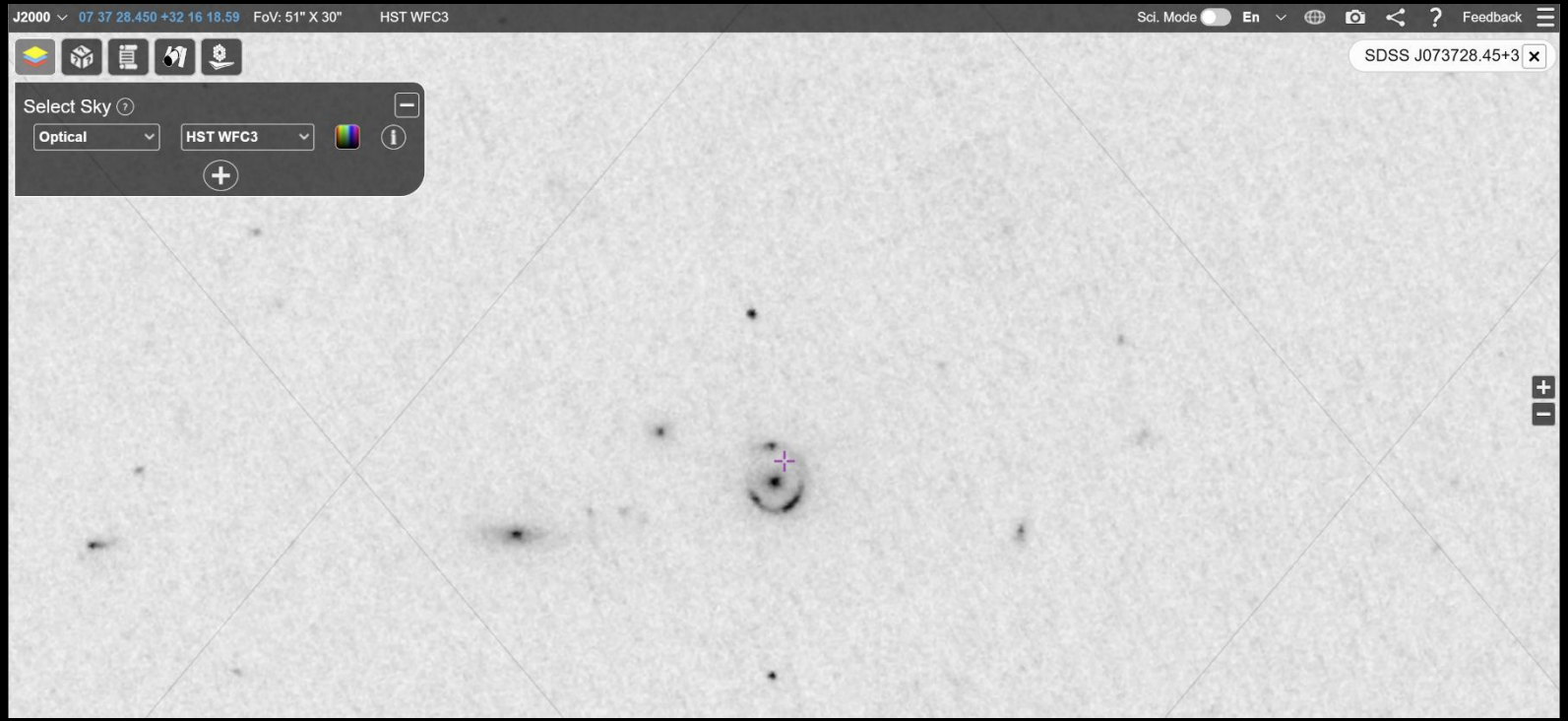

Earth


Earth

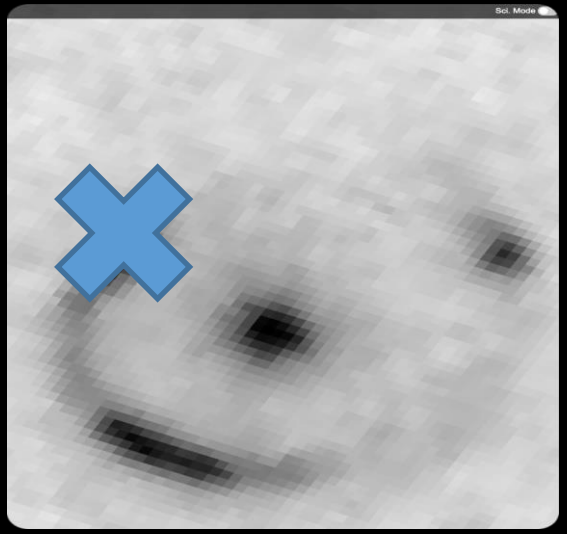

DISTANT GALAXY
FOREGROUND GALAXY
EARTH
LENSED IMAGES OF DISTANT GALAXY
3 BILLION YEARS
11 BILLION YEARS


source plane
lens plane
observer plane
θ1
DLS
DL
DS


J2000 07 38 10.210 +32 21 17.21 FoV: 24' X 14' DSS2 color
Sci. Mode
En
Feedback
SDSS J073728.45+3


J2000 07 37 28.450 +32 16 18.59 FoV: 51" X 30" HST WFC3
Sci. Mode En Feedback
SDSS J073728.45+3
Select Sky
Optical
HST WFC3


Select Sky
Optical
HST WFC3

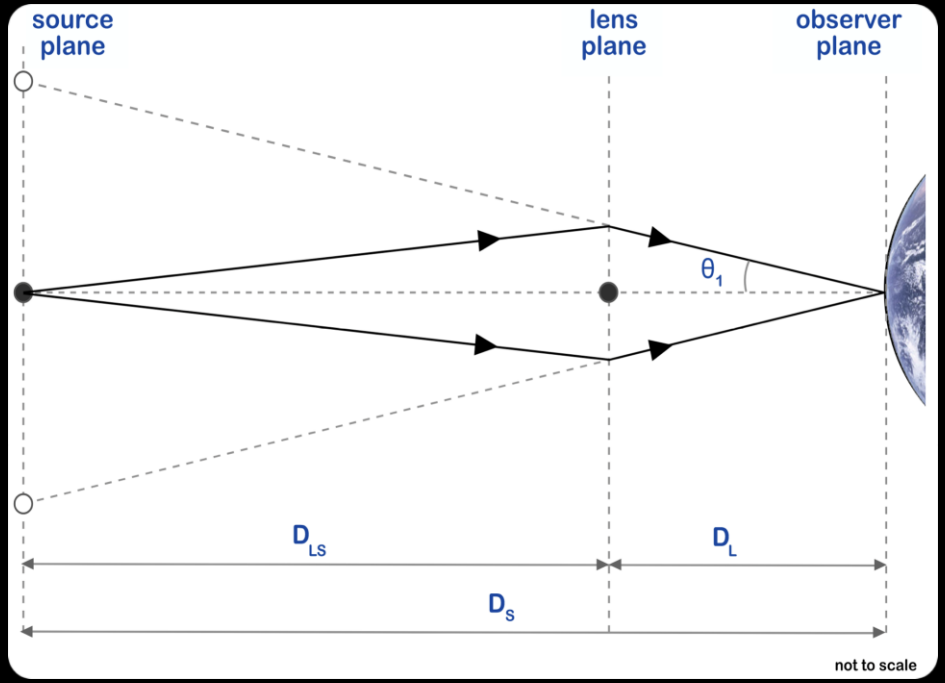

Sci. Mode

$$\theta_1 = \sqrt{\frac{4GM}{c^2}\frac{D_{LS}}{D_S D_L}}$$

$$M = \frac{\theta_1 c^2}{4G}\frac{D_S D_L}{D_S - D_L}$$

$D_L \propto z_L = 0{,}3223$ (redshift)

$D_S \propto z_S = 0{,}5812$ (redshift)

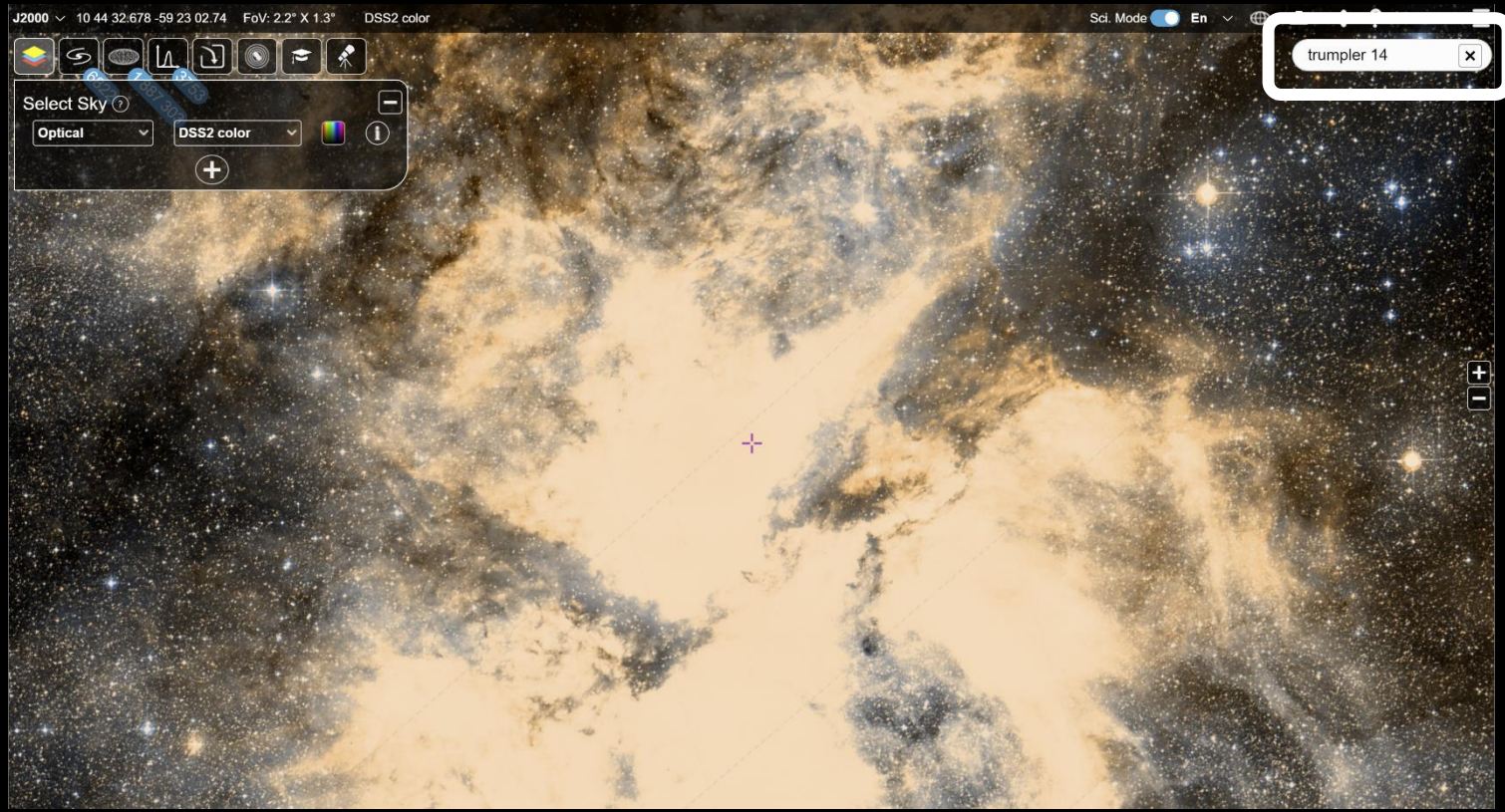


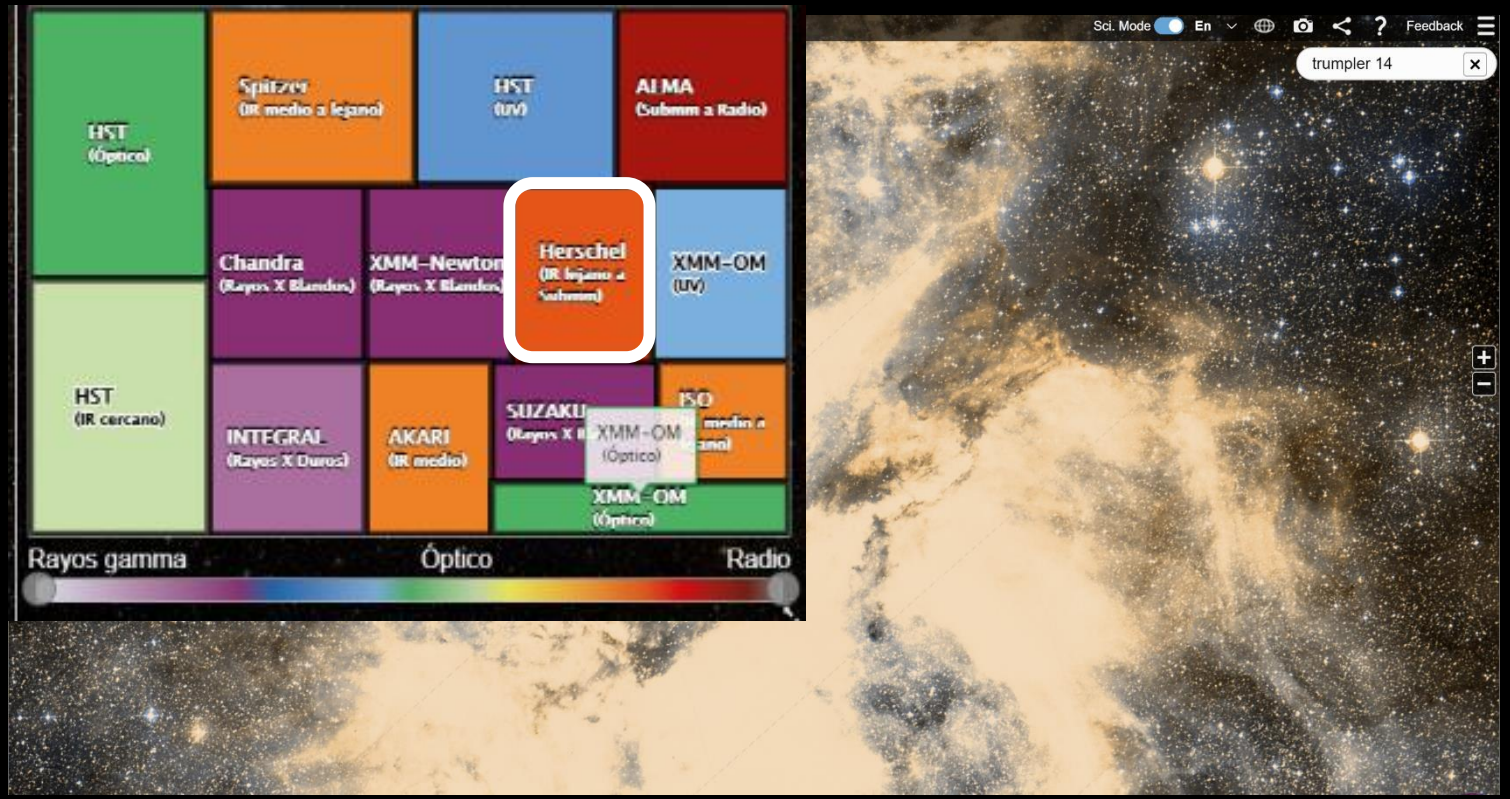
esa

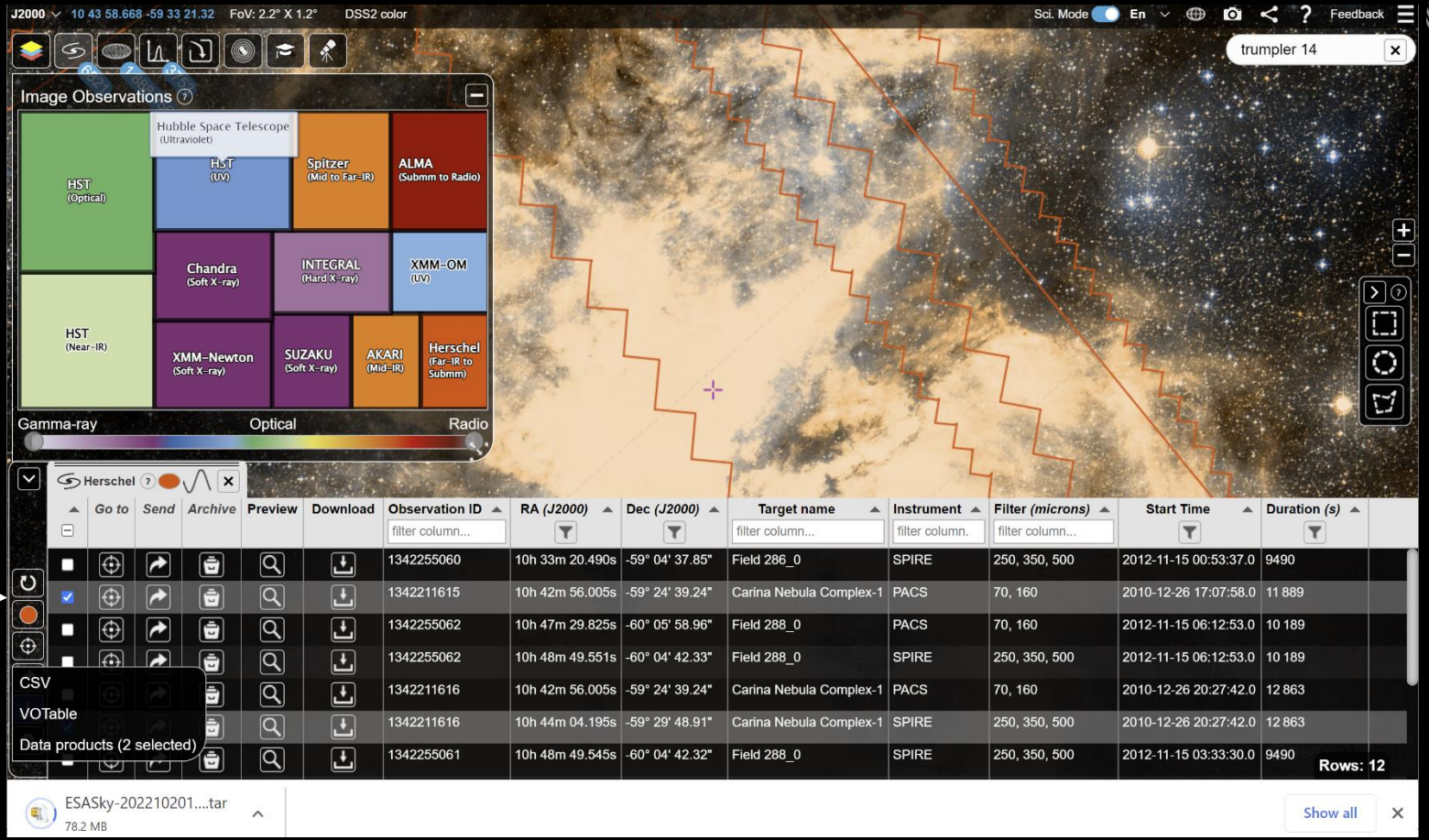
ESASky

In search of our origins NEW !

(15 -18) years old


J2000 10 44 32.678 -59 23 02.74 FoV: 2.2° X 1.3° DSS2 color
Sci. Mode
En
trumpler 14
Select Sky
Optical
DSS2 color


HST
(Óptico)
Spitzer
(IR medio a lejano)
HST
(UV)
ALMA
(Submm a Radio)
Chandra
(Rayos X Blandos)
XMM-Newton
(Rayos X Blandos)
Herschel
(IR lejano a Submm)
XMM-OM
(UV)
HST
(IR cercano)
INTEGRAL
(Rayos X Duros)
AKARI
(IR medio)
SUZAKU
ISO
XMM-OM
(Óptico)
XMM-OM
(Óptico)
Rayos gamma
Óptico
Radio
Sci. Mode
En
Feedback
trumpler 14


J2000 10 43 58.668 -59 33 21.32 FoV: 2.2° X 1.2° DSS2 color
Sci. Mode En Feedback
trumpler 14
Image Observations
Hubble Space Telescope (Ultraviolet)
HST (Optical)
HST (UV)
Spitzer (Mid to Far-IR)
ALMA (Submm to Radio)
Chandra (Soft X-ray)
INTEGRAL (Hard X-ray)
XMM-OM (UV)
HST (Near-IR)
XMM-Newton (Soft X-ray)
SUZAKU (Soft X-ray)
AKARI (Mid-IR)
Herschel (Far-IR to Submm)
Gamma-ray
Optical
Radio
Herschel
Go to
Send
Archive
Preview
Download
Observation ID
RA (J2000)
Dec (J2000)
Target name
Instrument
Filter (microns)
Start Time
Duration (s)
filter column...
1342255060 10h 33m 20.490s -59° 04' 37.85" Field 286_0 SPIRE 250, 350, 500 2012-11-15 00:53:37.0 9490
1342211615 10h 42m 56.005s -59° 24' 39.24" Carina Nebula Complex-1 PACS 70, 160 2010-12-26 17:07:58.0 11 889
1342255062 10h 47m 29.825s -60° 05' 58.96" Field 288_0 PACS 70, 160 2012-11-15 06:12:53.0 10 189
1342255062 10h 48m 49.551s -60° 04' 42.33" Field 288_0 SPIRE 250, 350, 500 2012-11-15 06:12:53.0 10 189
1342211616 10h 42m 56.005s -59° 24' 39.24" Carina Nebula Complex-1 PACS 70, 160 2010-12-26 20:27:42.0 12 863
1342211616 10h 44m 04.195s -59° 29' 48.91" Carina Nebula Complex-1 SPIRE 250, 350, 500 2010-12-26 20:27:42.0 12 863
1342255061 10h 48m 49.545s -60° 04' 42.32" Field 288_0 SPIRE 250, 350, 500 2012-11-15 03:33:30.0 9490
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VOTable
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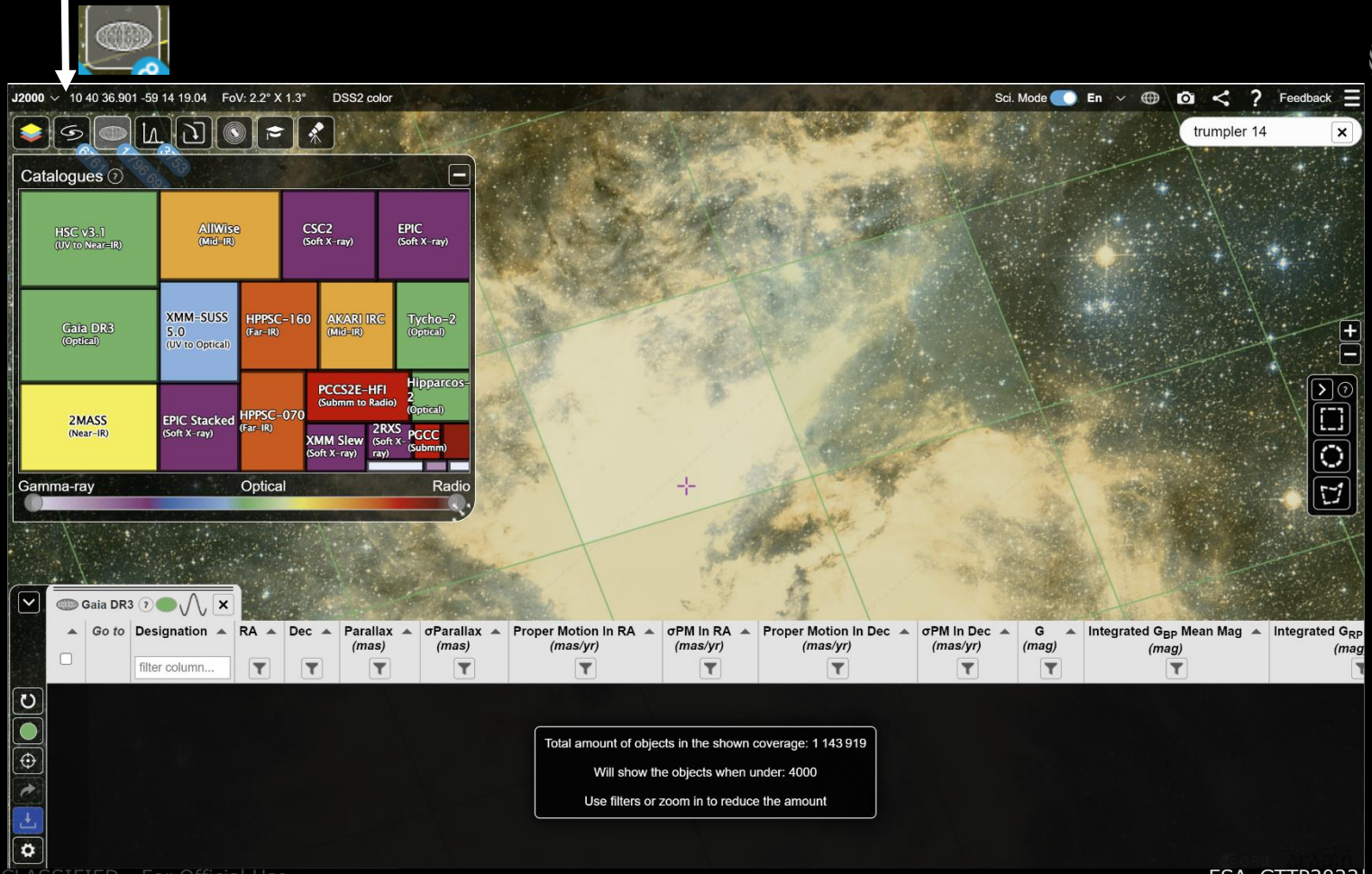
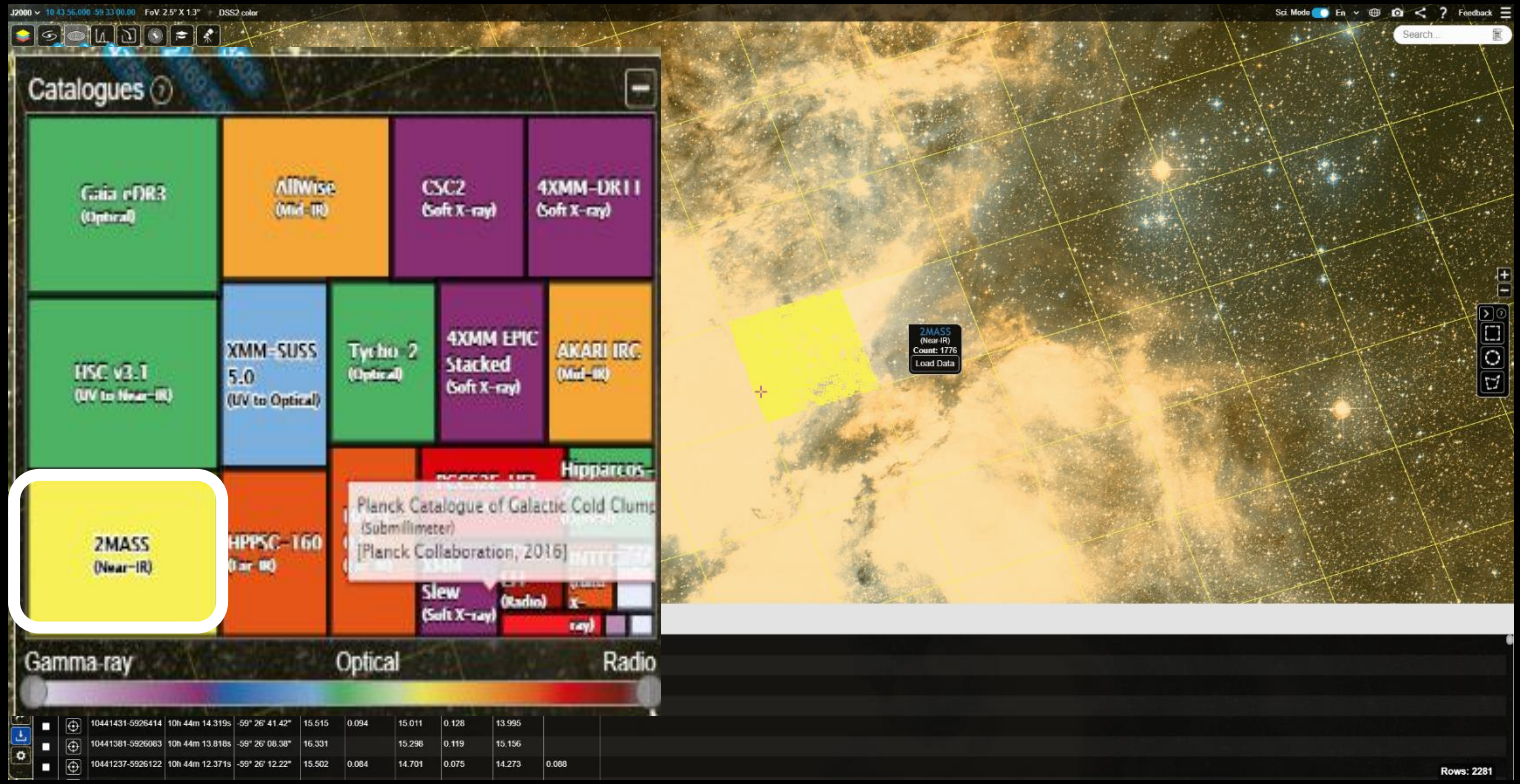
ESASky-202210201....tar
78.2 MB
Show all


J2000 10 40 36.901 -59 14 19.04 FoV: 2.2° X 1.3° DSS2 color
Sci. Mode En Feedback
trumpler 14
Catalogues
HSC v3.1 (UV to Near-IR)
AllWise (Mid-IR)
CSC2 (Soft X-ray)
EPIC (Soft X-ray)
Gaia DR3 (Optical)
XMM-SUSS 5.0 (UV to Optical)
HPPSC-160 (Far-IR)
AKARI IRC (Mid-IR)
Tycho-2 (Optical)
2MASS (Near-IR)
EPIC Stacked (Soft X-ray)
HPPSC-070 (Far-IR)
PCCS2E-HFI (Submm to Radio)
Hipparcos-2 (Optical)
XMM Slew (Soft X-ray)
2RXS (Soft X-ray)
PGCC (Submm)
Gamma-ray
Optical
Radio
Gaia DR3
Go to
Designation
filter column...
RA
Dec
Parallax (mas)
σParallax (mas)
Proper Motion In RA (mas/yr)
σPM In RA (mas/yr)
Proper Motion In Dec (mas/yr)
σPM In Dec (mas/yr)
G (mag)
Integrated G_BP Mean Mag (mag)
Integrated G_RP (mag)
Total amount of objects in the shown coverage: 1 143 919
Will show the objects when under: 4000
Use filters or zoom in to reduce the amount


Catalogues
Gaia eDR3
(Optical)
AllWise
(Mid-IR)
CSC2
(Soft X-ray)
4XMM-DR11
(Soft X-ray)
HSC v3.1
(UV to Near-IR)
XMM-SUSS
5.0
(UV to Optical)
Tycho-2
(Optical)
4XMM EPIC
Stacked
(Soft X-ray)
AKARI IRC
(Mid-IR)
2MASS
(Near-IR)
Planck Catalogue of Galactic Cold Clump
(Submillimeter)
[Planck Collaboration, 2016]
Gamma-ray
Optical
Radio
2MASS
(Near-IR)
Count: 1776
Load Data
Rows: 2281