

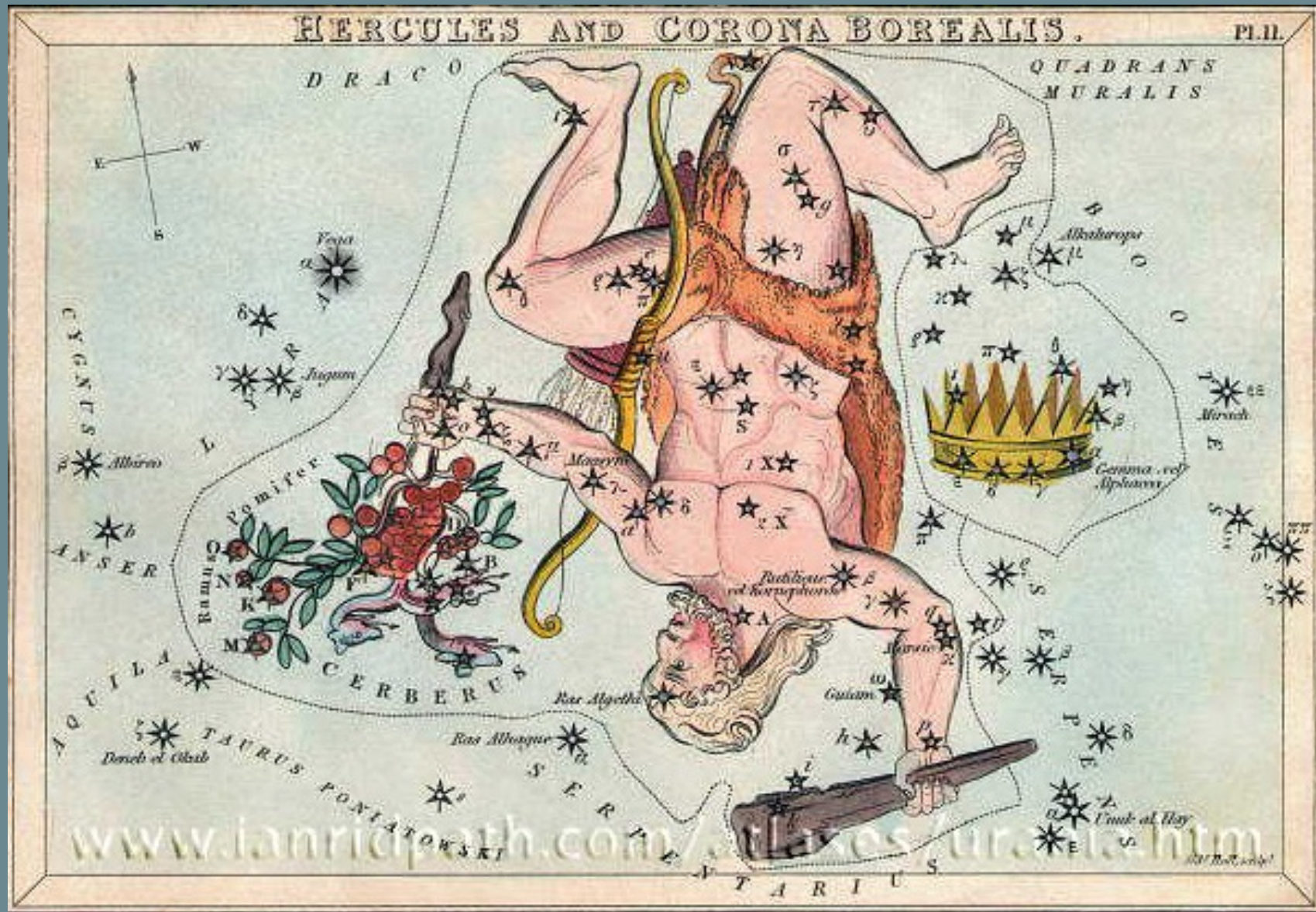


* Earth & Sun not to scale

Happy Aphelion!

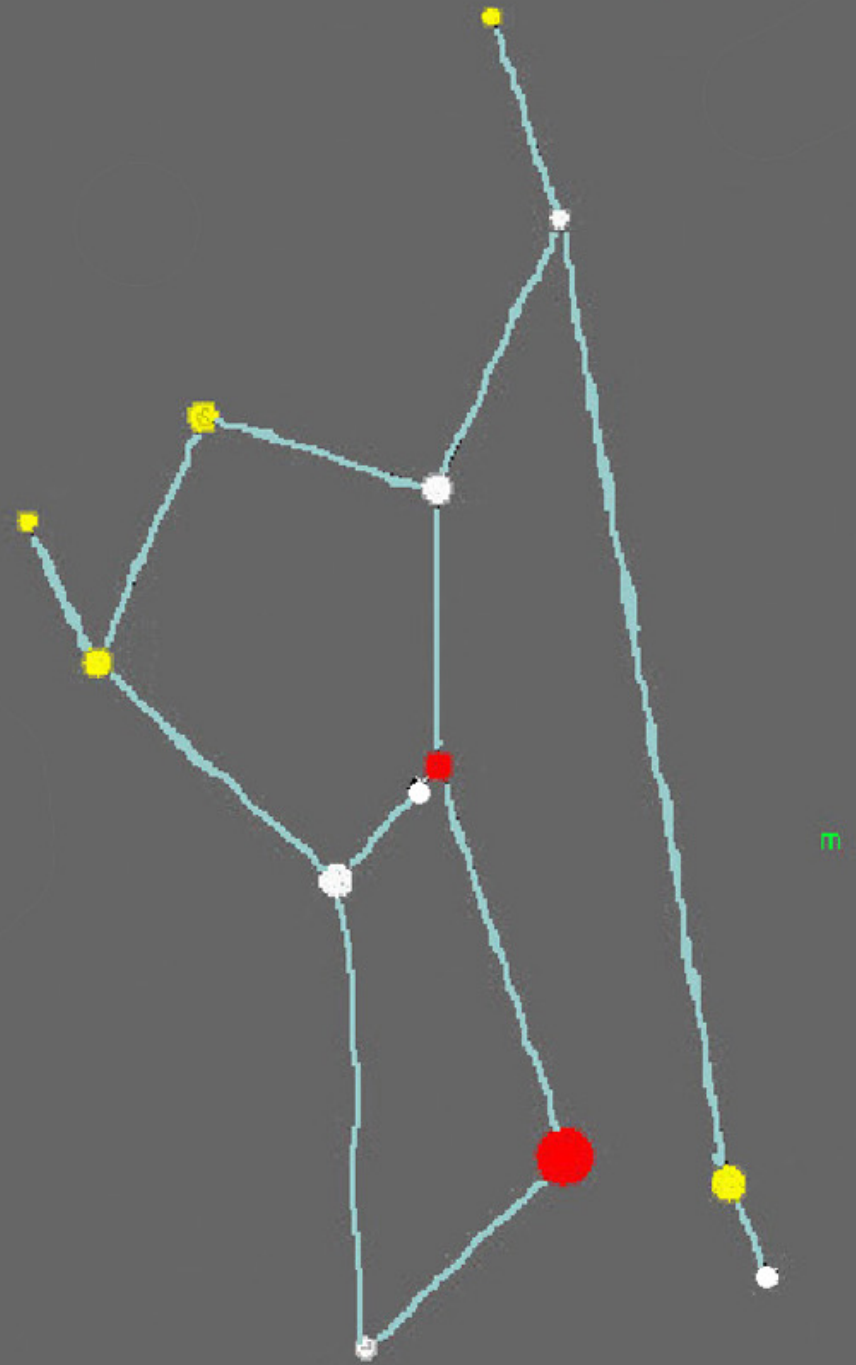
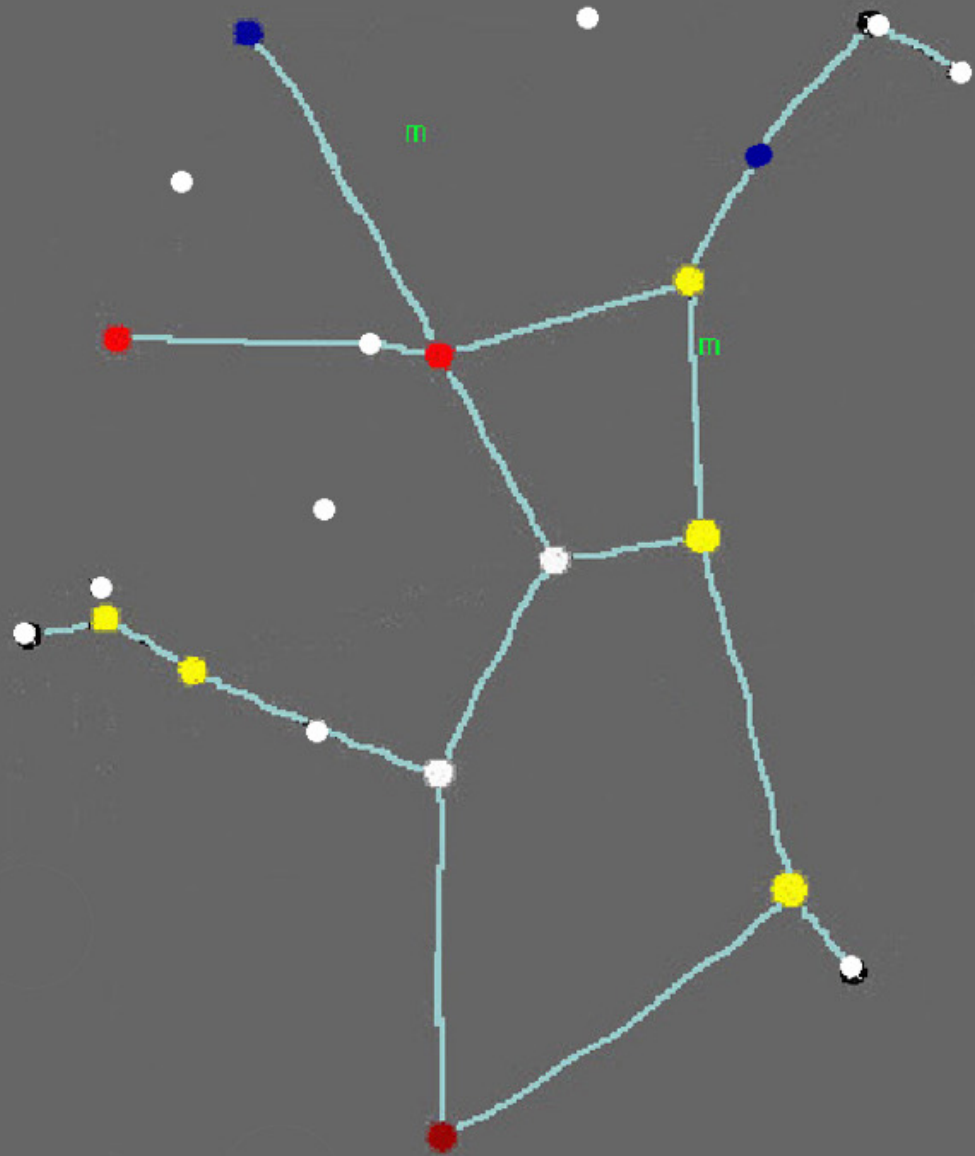
Earth's orbit will be at its farthest point from the Sun for the year!

@thesuntoday



Hercules In The News

Hercules





M 13 Globular Star Cluster

Adam Block



M 13 Heracles Cluster

NASA/Hubble



M 92
globular
cluster

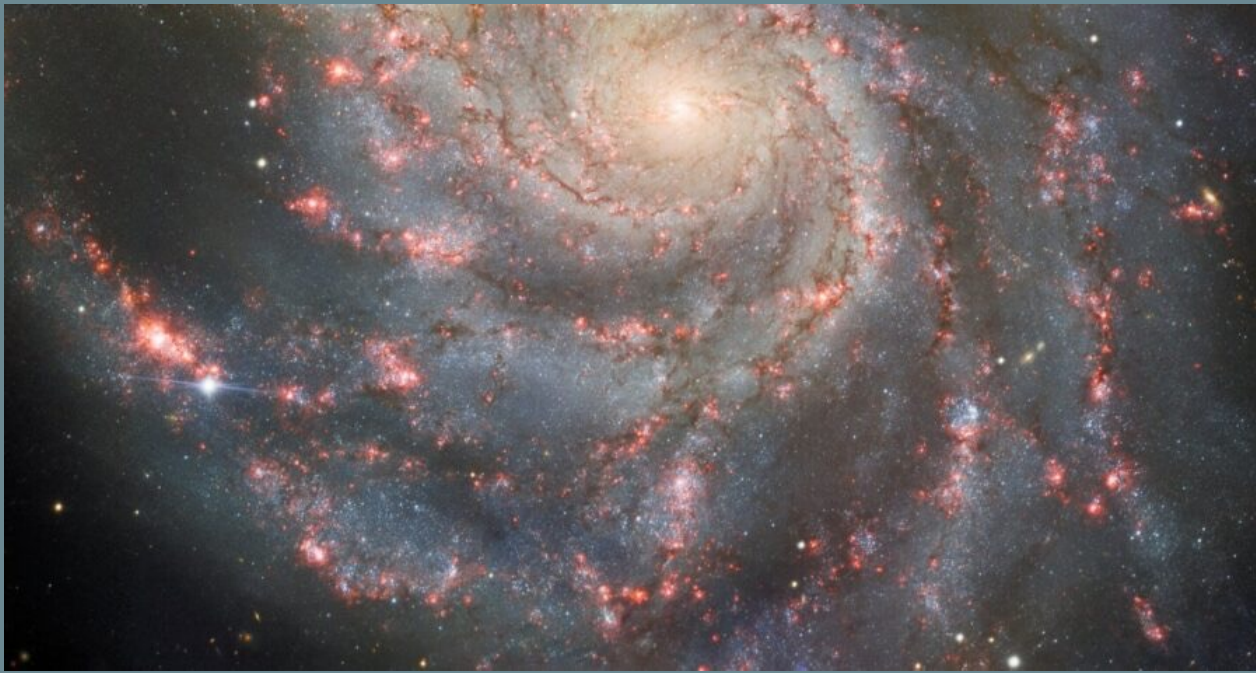


M 92 globular cluster

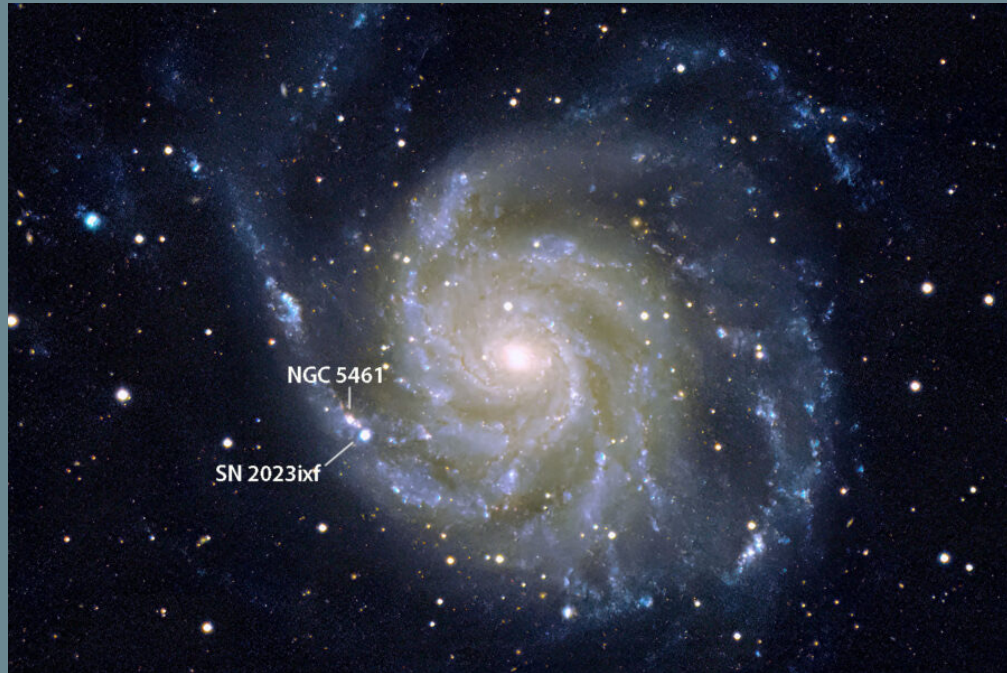
Hubble



Ursa Major In The News

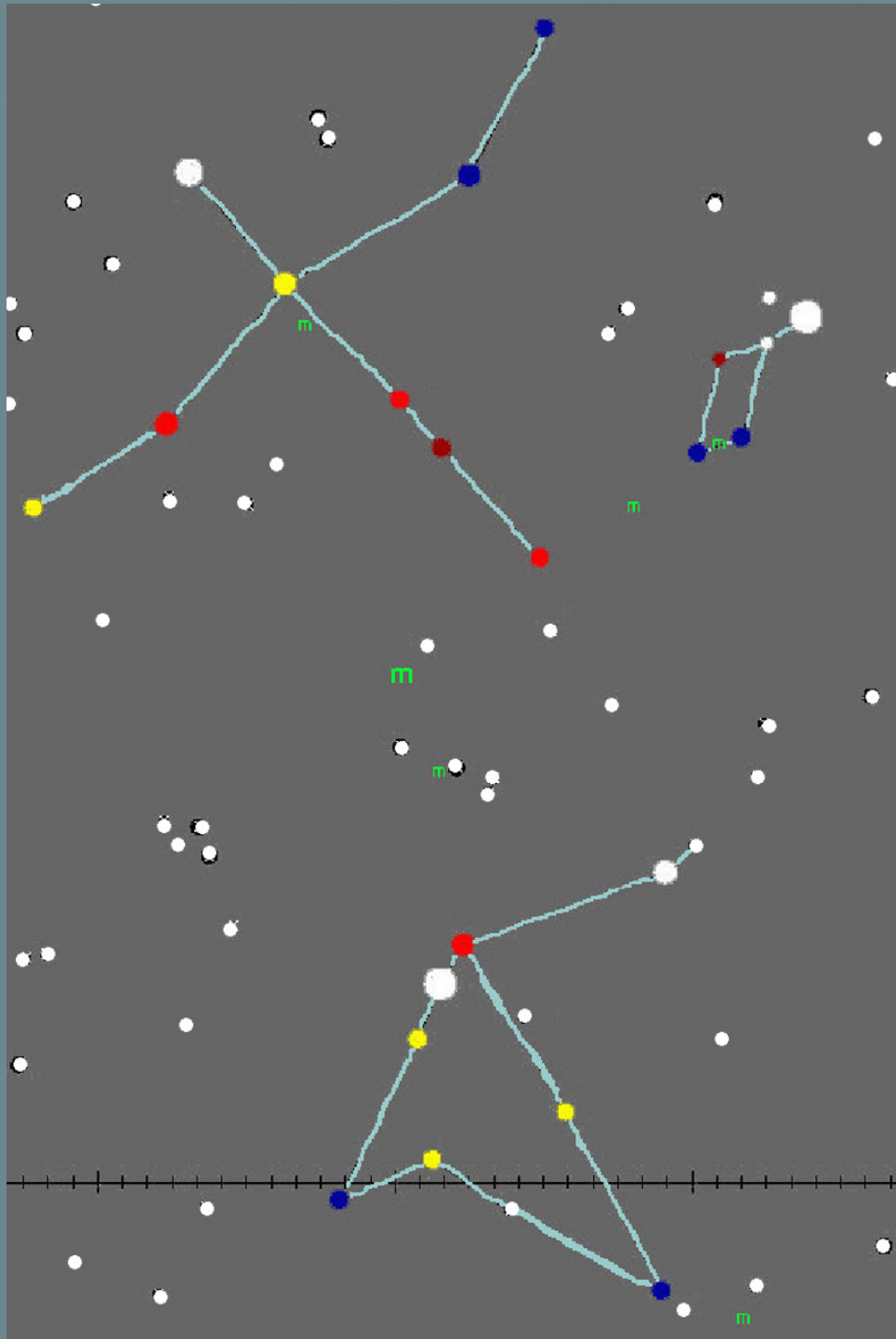


M 101
Pinwheel
Galaxy
Supernova



SN2023ixf

Cygnus



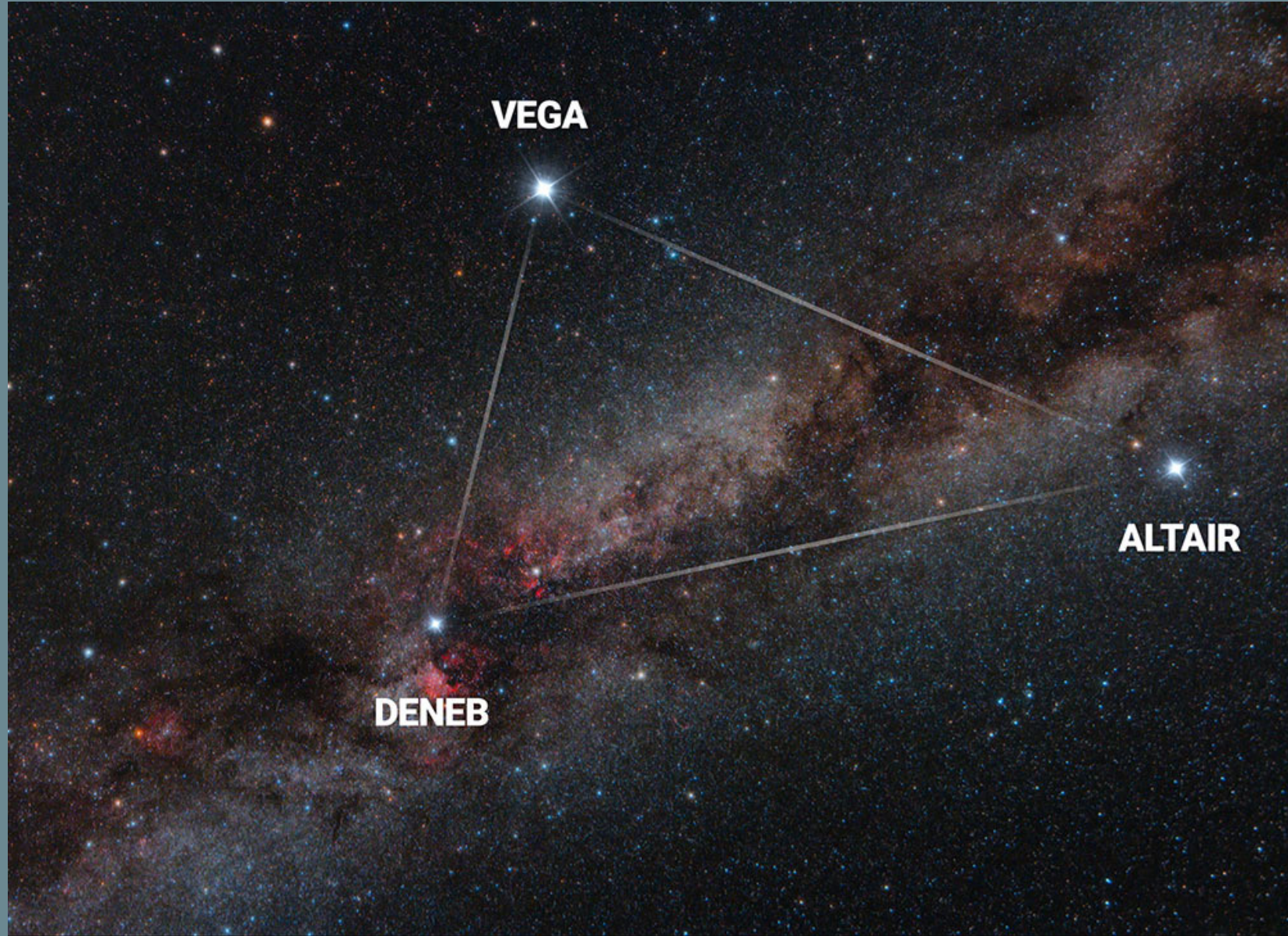
Lyra

Aquila



Summer
Triangle

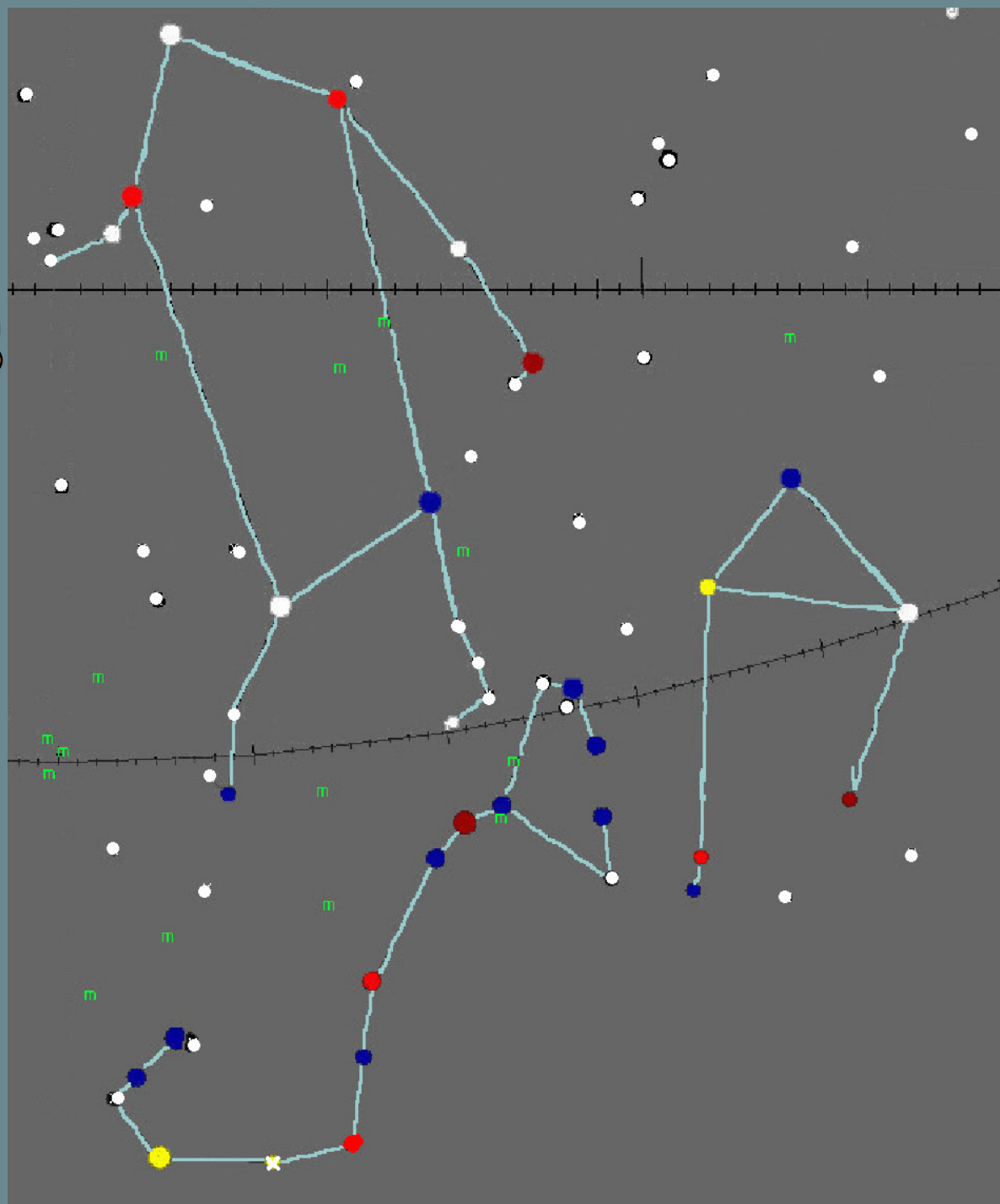
Vega
Deneb
Altair



THE SUMMER TRIANGLE

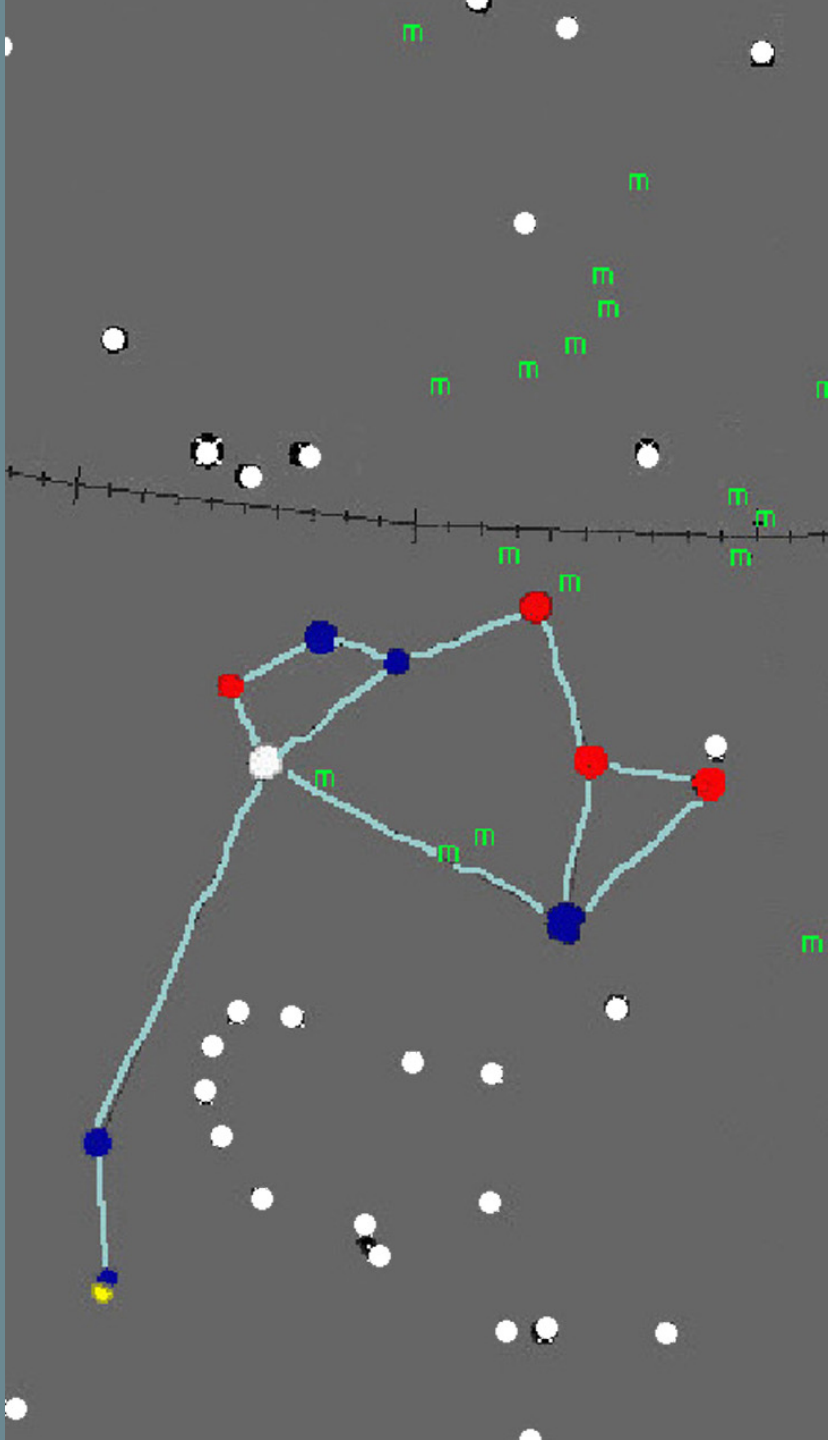
Ophiuchus

Scorpius



Libra

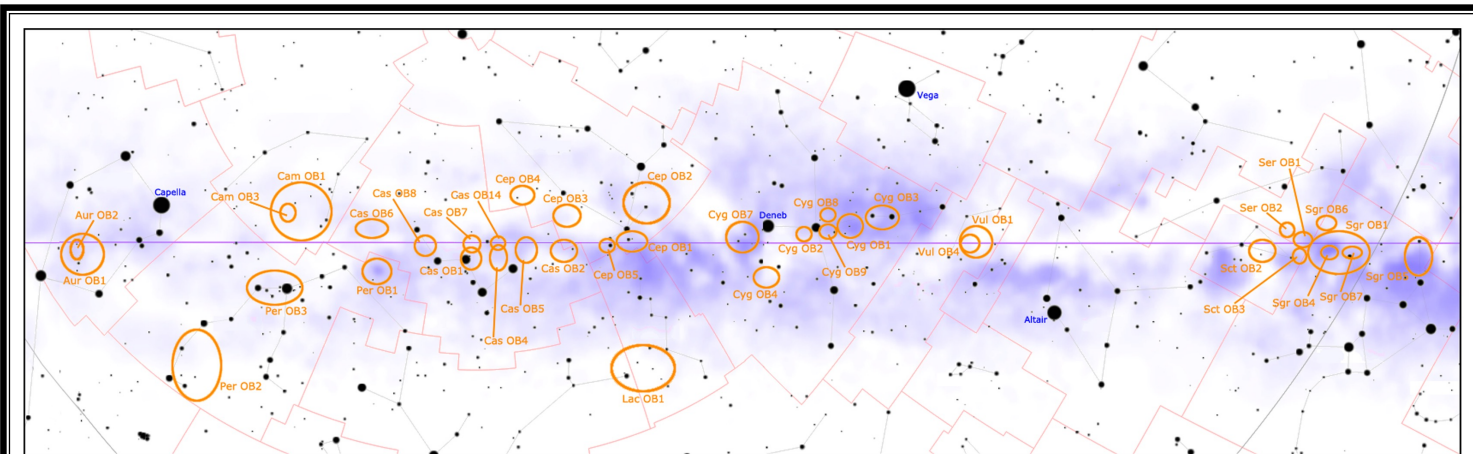
Sagittarius



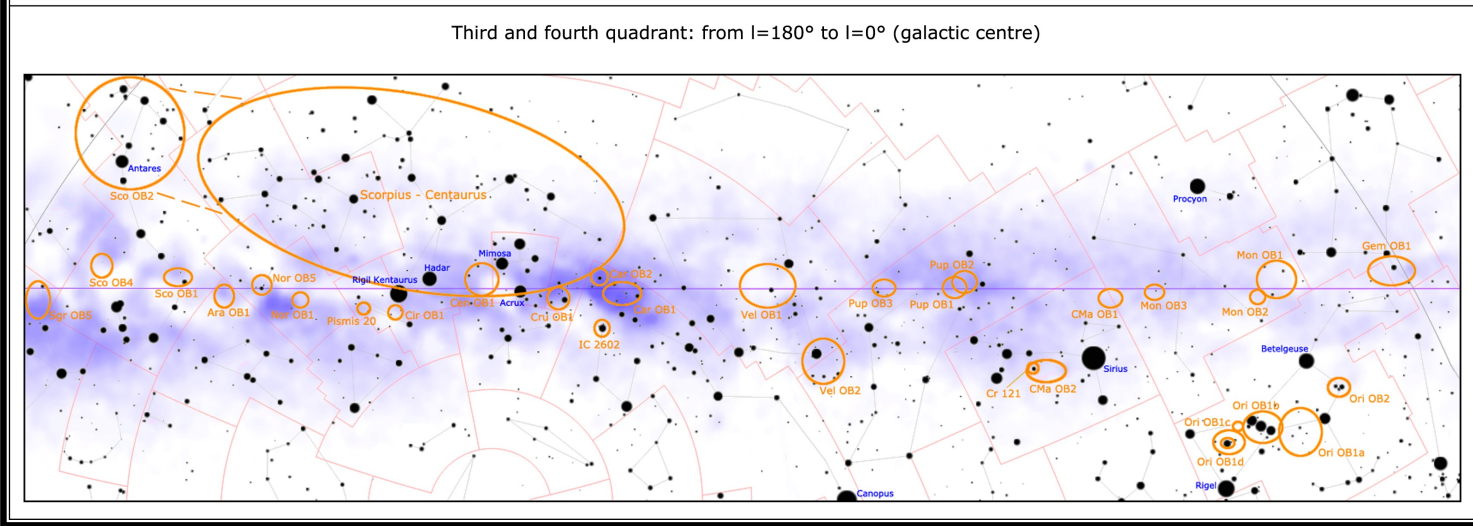


NORTHERN HEMISPHERE SUMMER -- LOOKING SOUTH

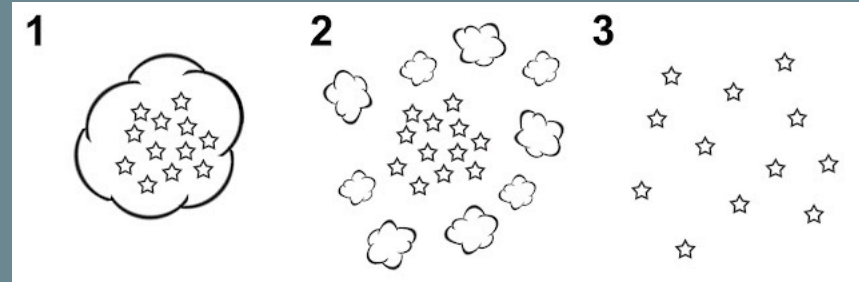




First and second quadrant: from $l=0^\circ$ (galactic centre) to $l=180^\circ$



Third and fourth quadrant: from $l=180^\circ$ to $l=0^\circ$ (galactic centre)



OB Association

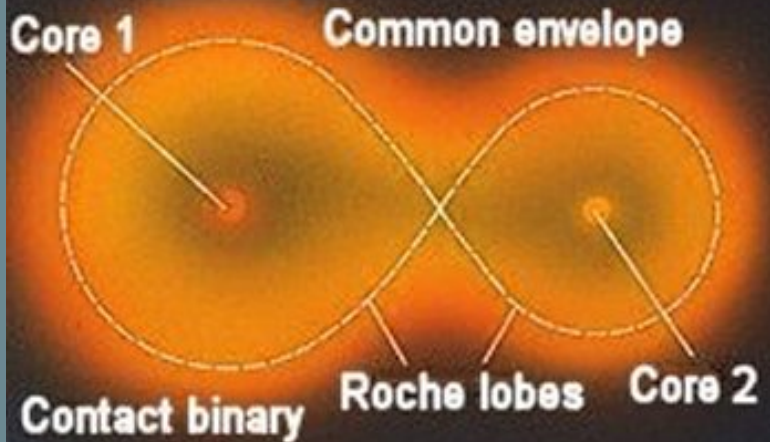
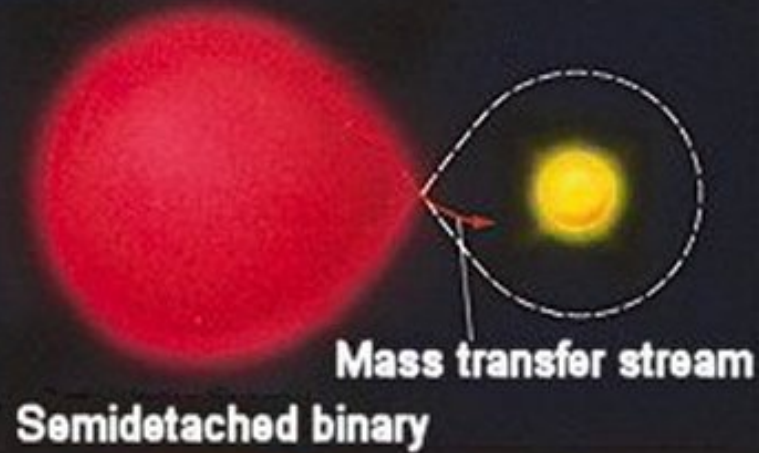
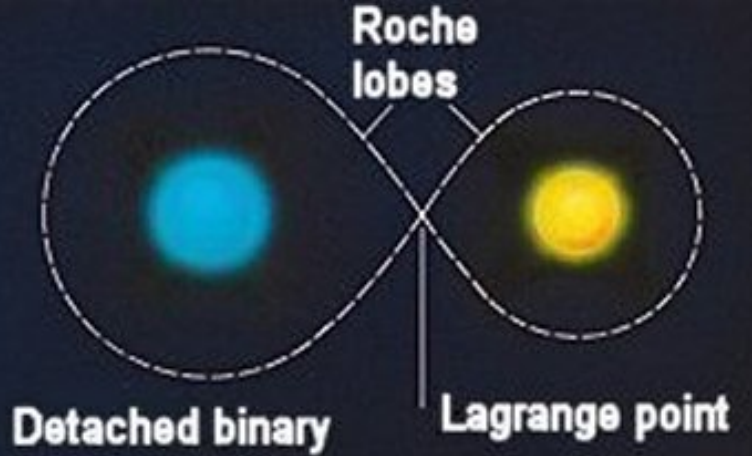
Usually cannot be observed without a telescope.

Visual Binaries

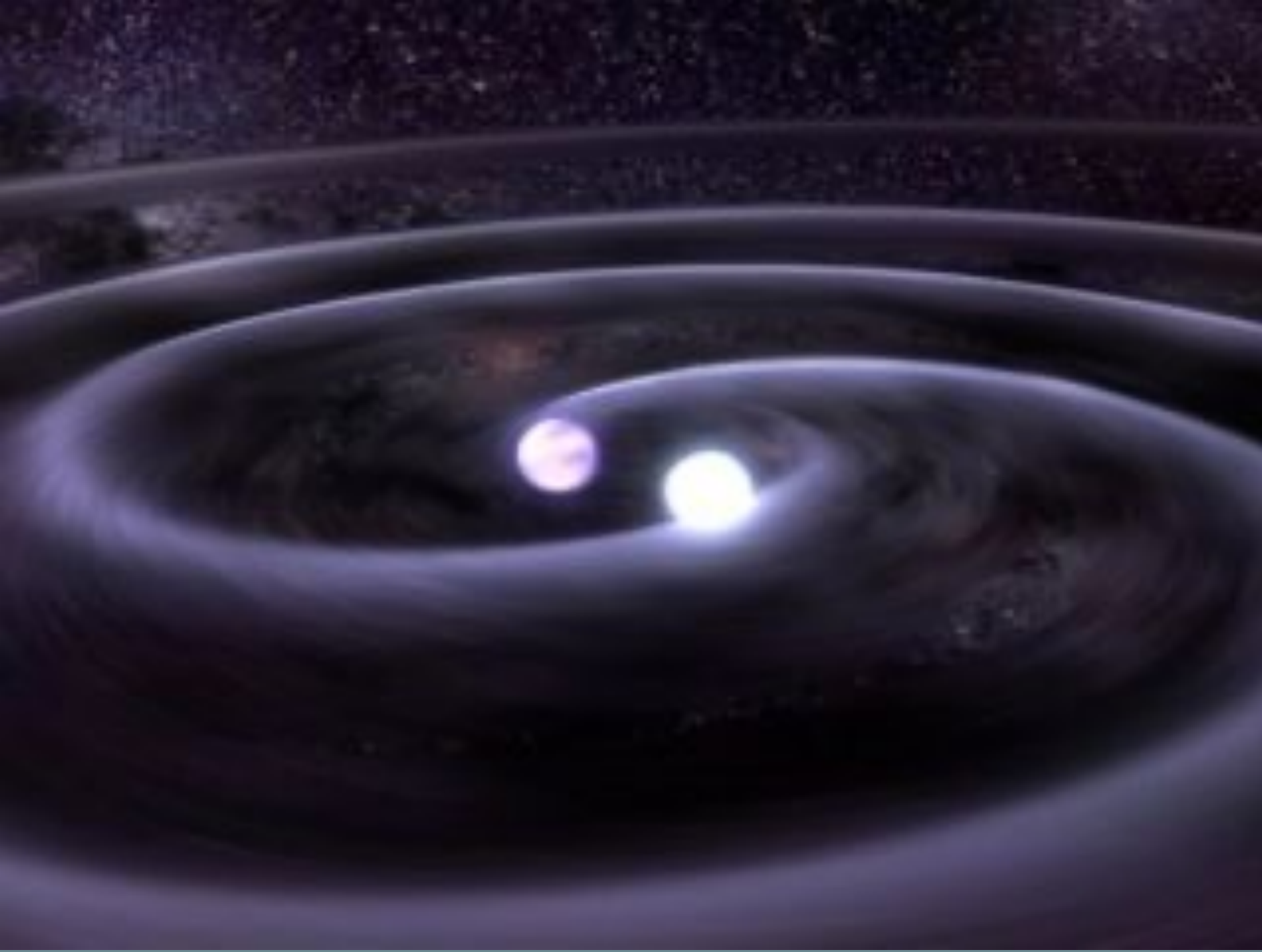
Cannot be seen as individual stars. The light curve, color and spectra will change as they eclipse or rotate.

Eclipsing Binaries

Spectrographic Binaries



Types of Binary Stars



Binary
Stars
Artist
rendering

Sirius A & B
Separation = 11.2"

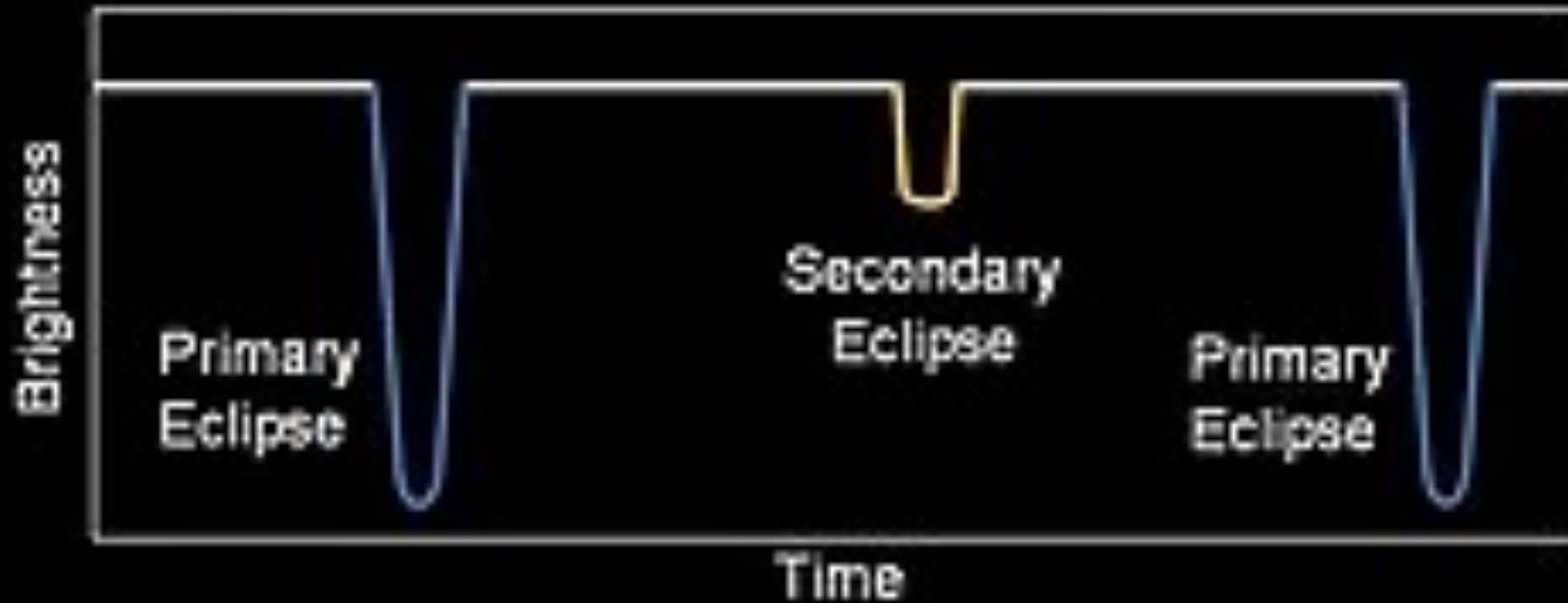


Binary
Star
Alpha
Canis
Majoris

Sirius

Sirius A
Sirius B

Eclipsing Binary Stars



Assuming
the red
star is
less
bright
than the
yellow
star



WR-140
(V1687Cyg)

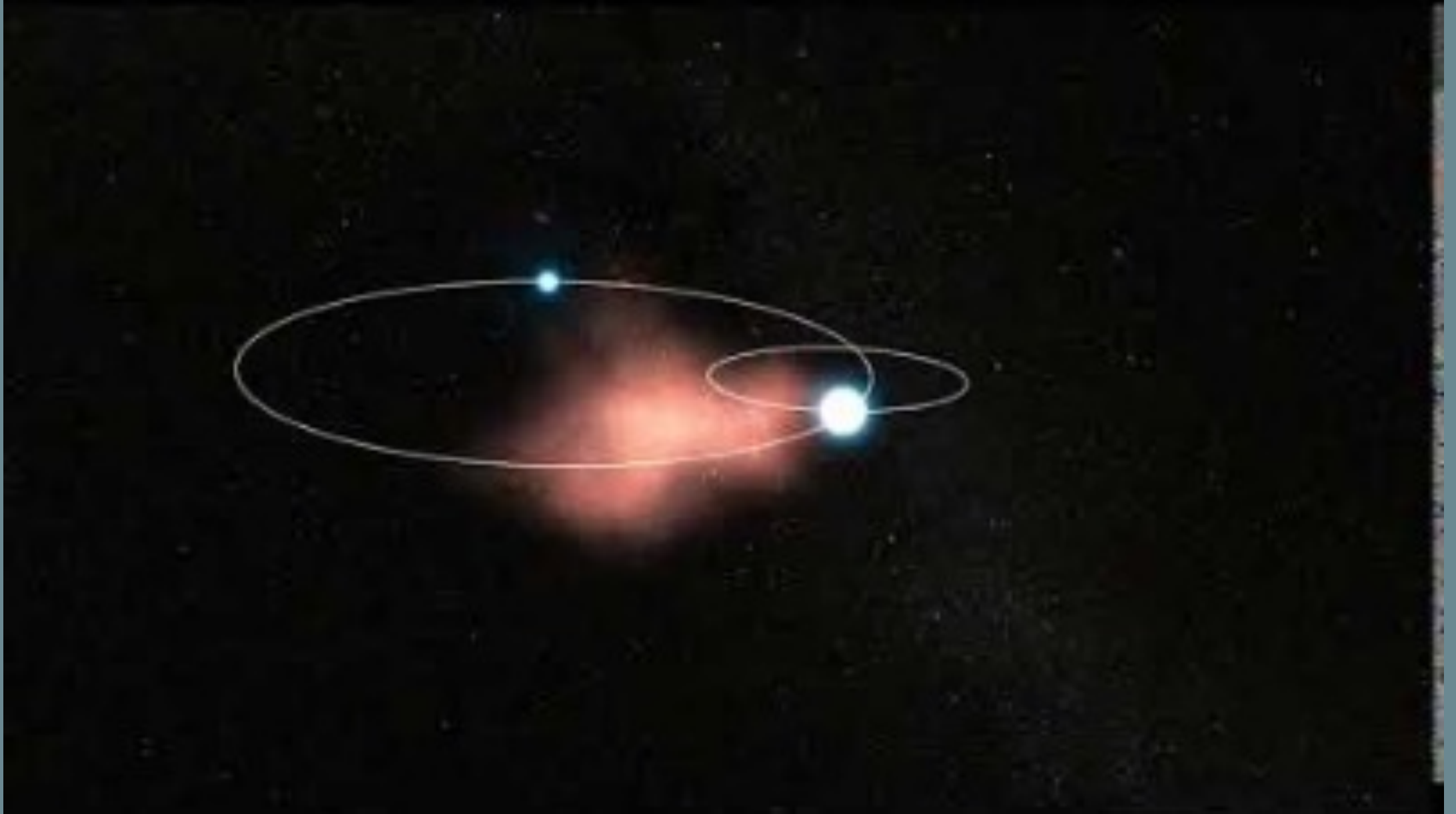
Binary

system

SBC91232

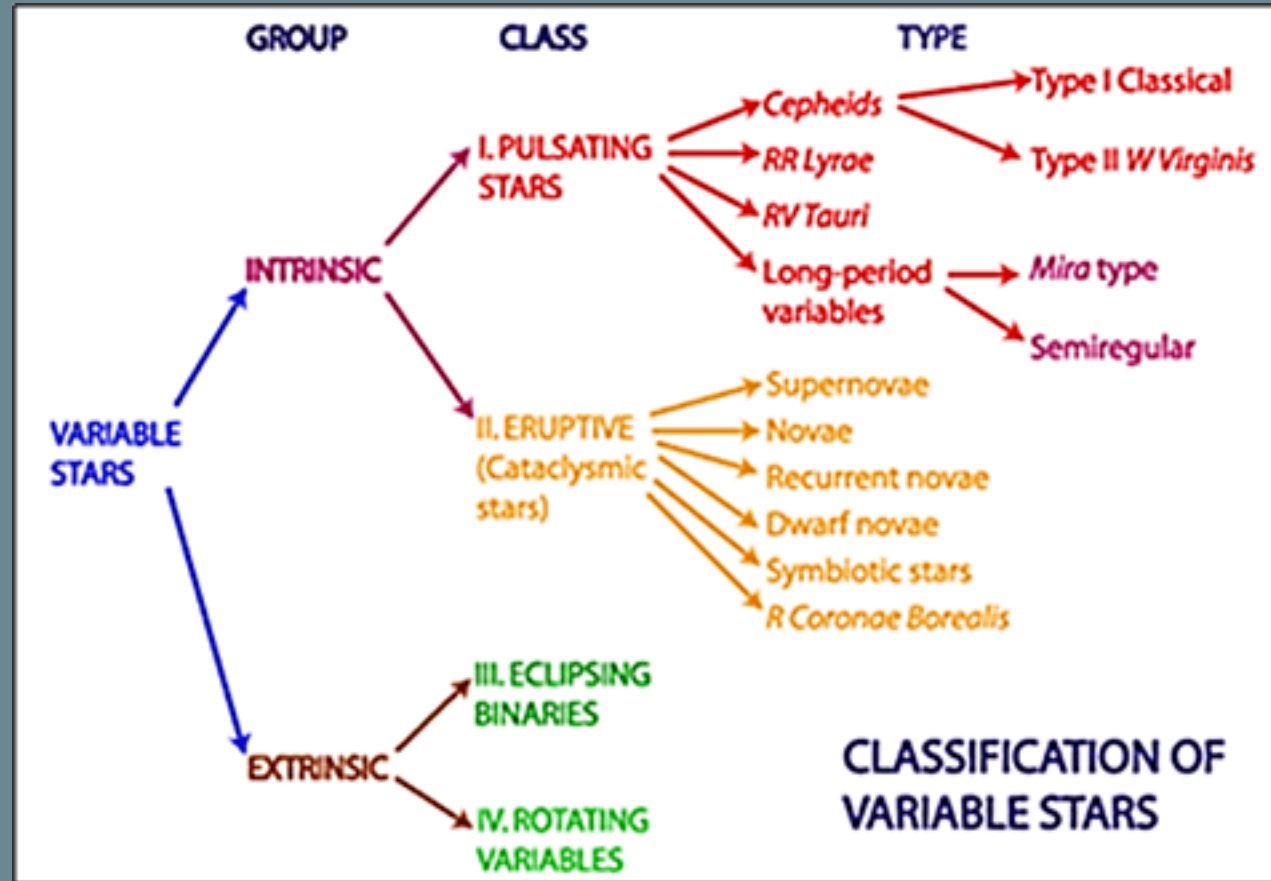
In Cygnus

Dust shells



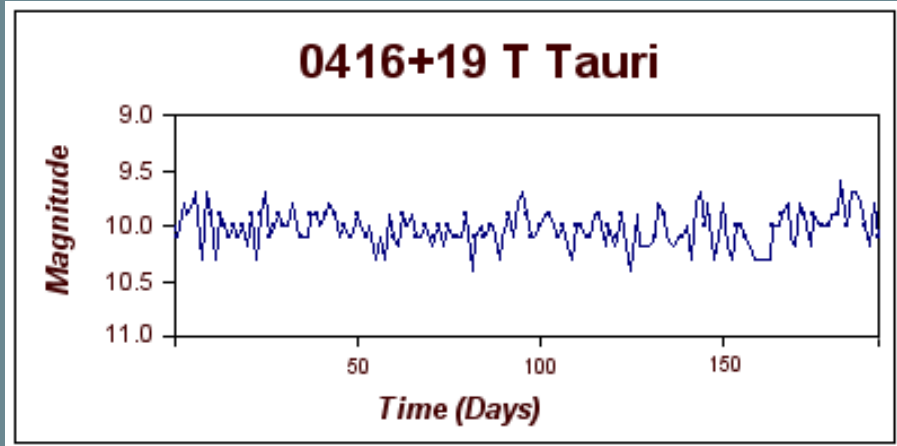
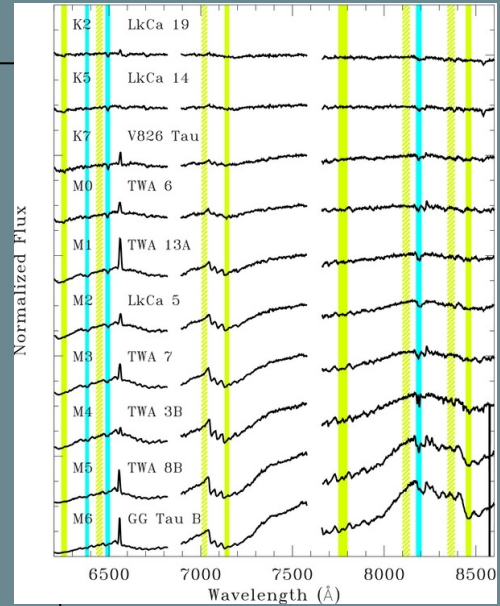
WR 140 system

Variables





T Tauri Variable Star +/-200 day periodicity*





PULSARS

SNR

MI Crab

Nebula

NASA

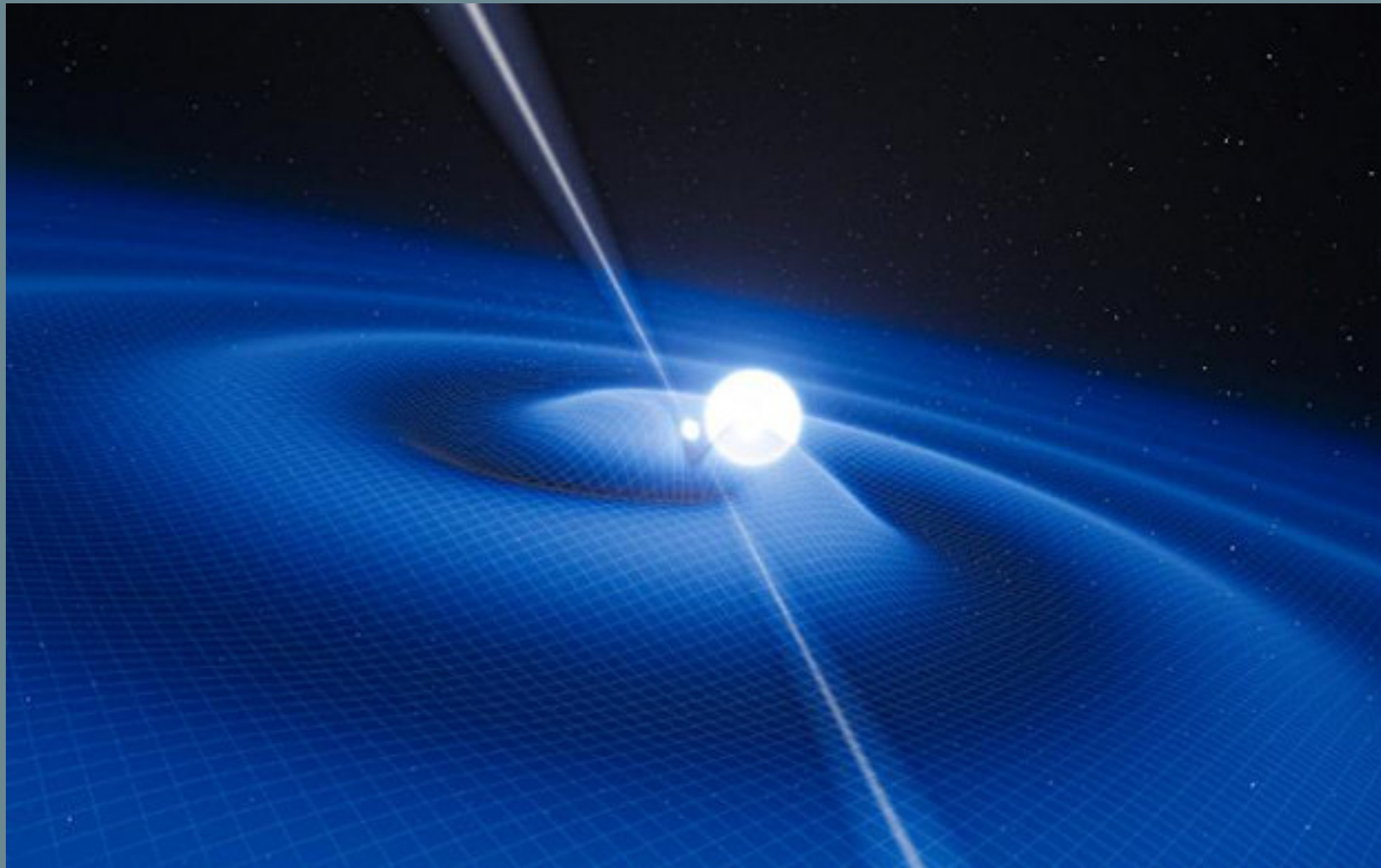


Pulsar

SN Ia
Collapsed
8-20 Ms star
Crab Pulsar

Hubble, Chandra (xray)

What is a Pulsar?



White Dwarf Pulsar

Artist's impression of an exotic binary system (orbiting each other) consisting of two stellar remnants:

a white dwarf (larger)
a 5 MINUTE pulsar,
PSR J0348+0432

Artist's interpretation of an array of pulsars being affected by gravitational ripples [in space-time] produced by a supermassive black hole binary in a distant galaxy.

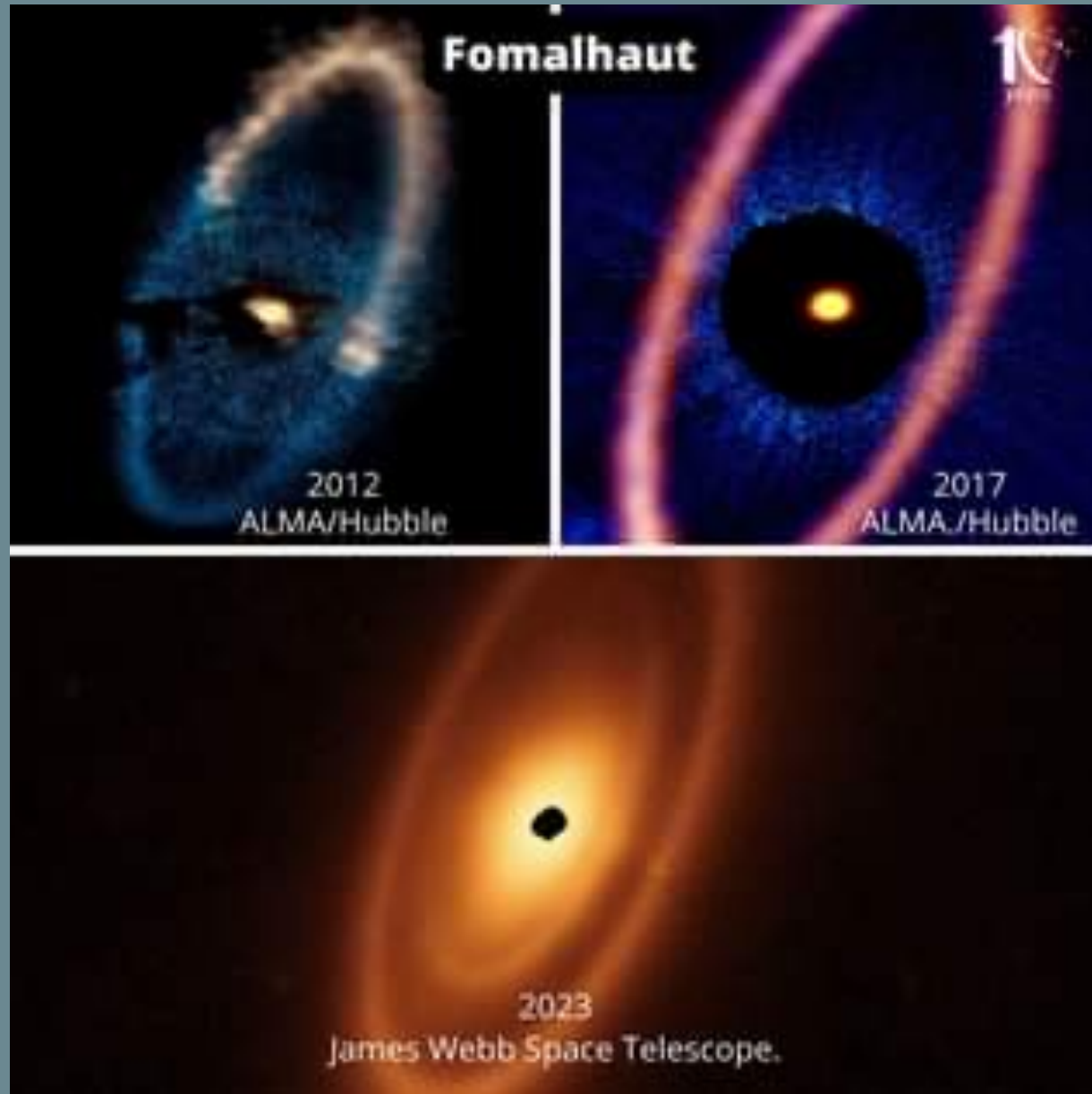
Credit: Aurore Simonnet, NANOGrav



JWST: 4 MISSION GOALS, ALLOCATION OF OBSERVING TIME PLUS PI TIME

MISSION GOALS

- Search for the first galaxies or luminous objects formed after the Big Bang
- Determine how galaxies evolved from their formation until now
- Observe the formation of stars from the first stages to the formation of planetary systems
- Measure the physical and chemical properties of planetary systems, including our own Solar System, and investigate the potential for life in those systems



Alpha Piscis Austrinus b (Fomalhaut b)