



HURTIGRUTEN

Astronomy Voyage



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LECTURE PROGRAMME

- Tonight's Night Sky
- Astrophotography
- The Aurora
- Our Solar System
- **Our Galaxy**
- **Our Universe**
- **Modern Astronomy: Life as a
Astronomer & Tools of the Trade**
- **Why We Are Here: A 13.8-billion
year-old story**





Our Milky way Galaxy over Hawai'i
- the city of stars in which we live.

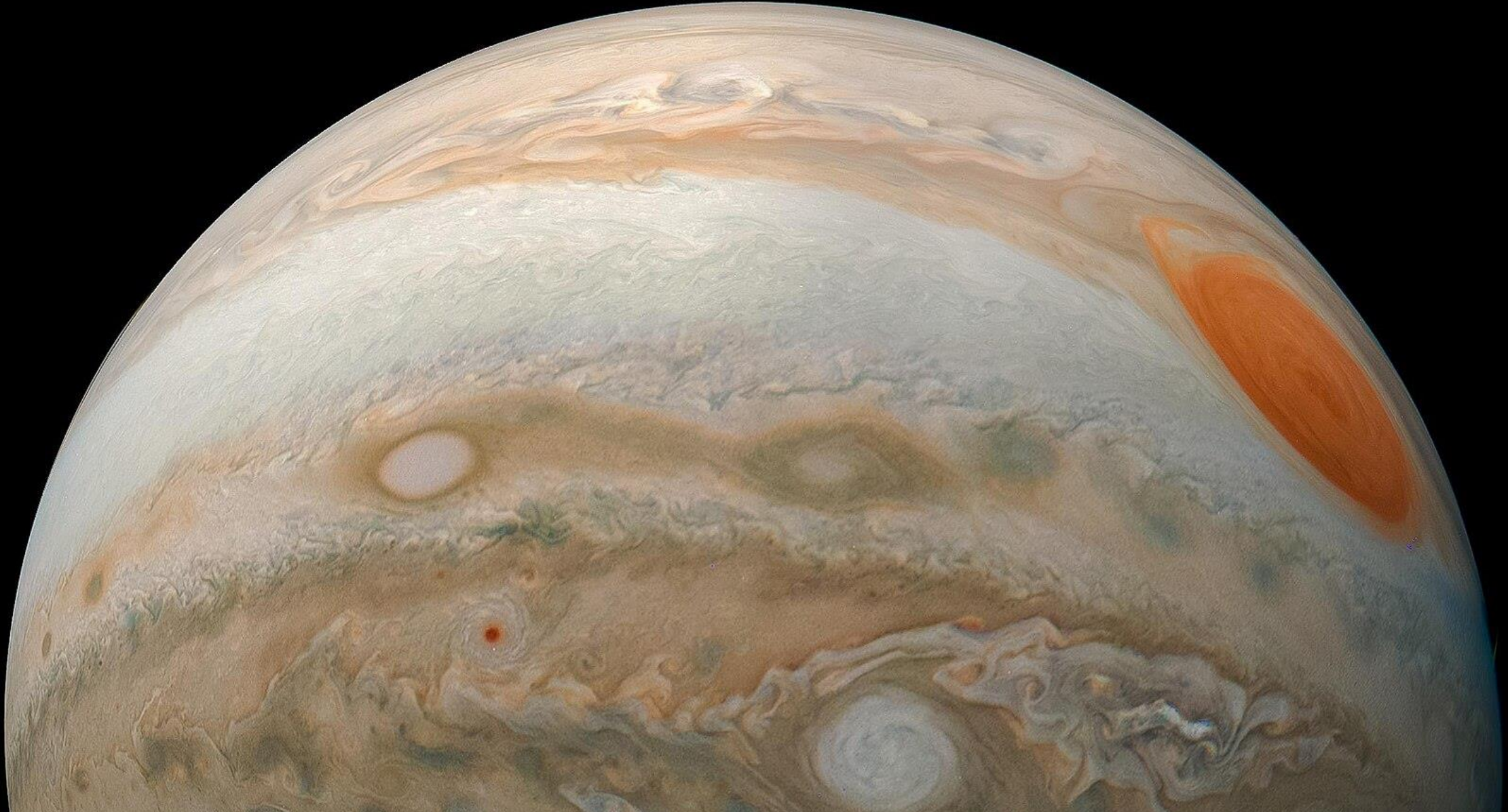
Stars V Planets

*Nuclear reactions (fusion) occur deep within **stars**...*



Stars V Planets

Planets are too small & cool for
nuclear fusion.

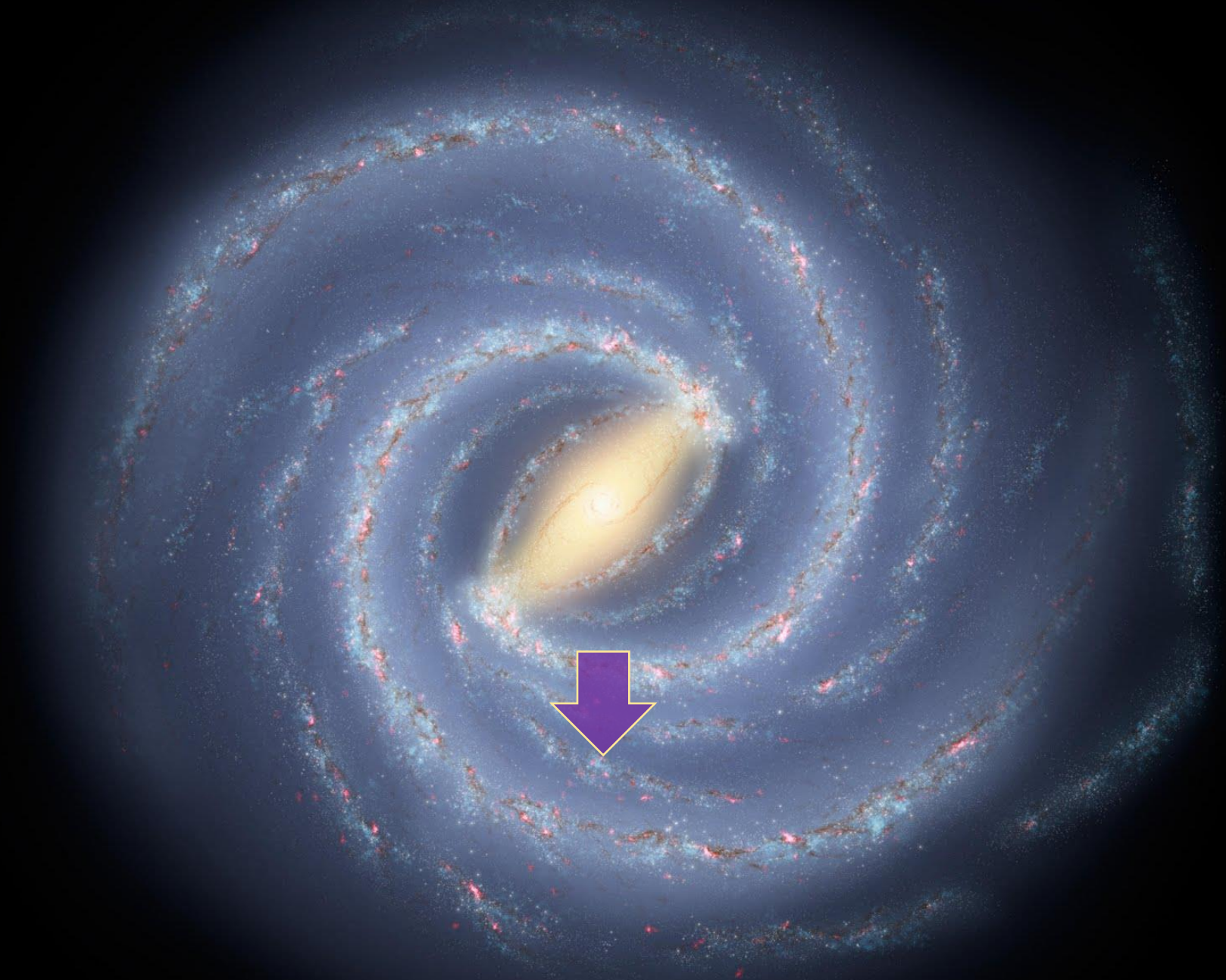




Moons orbit planets.



The Milky-way



Artistic impression





Artistic view of our galaxy from the side – showing dust lanes.

Nebulae

The
Orion
Nebula



Nebulae

The Orion Nebula

Nebulae



Nebulae

Hubble Space
Telescope
observation of
the Orion
Nebula



Nebulae

Hubble Space
Telescope
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Nebula

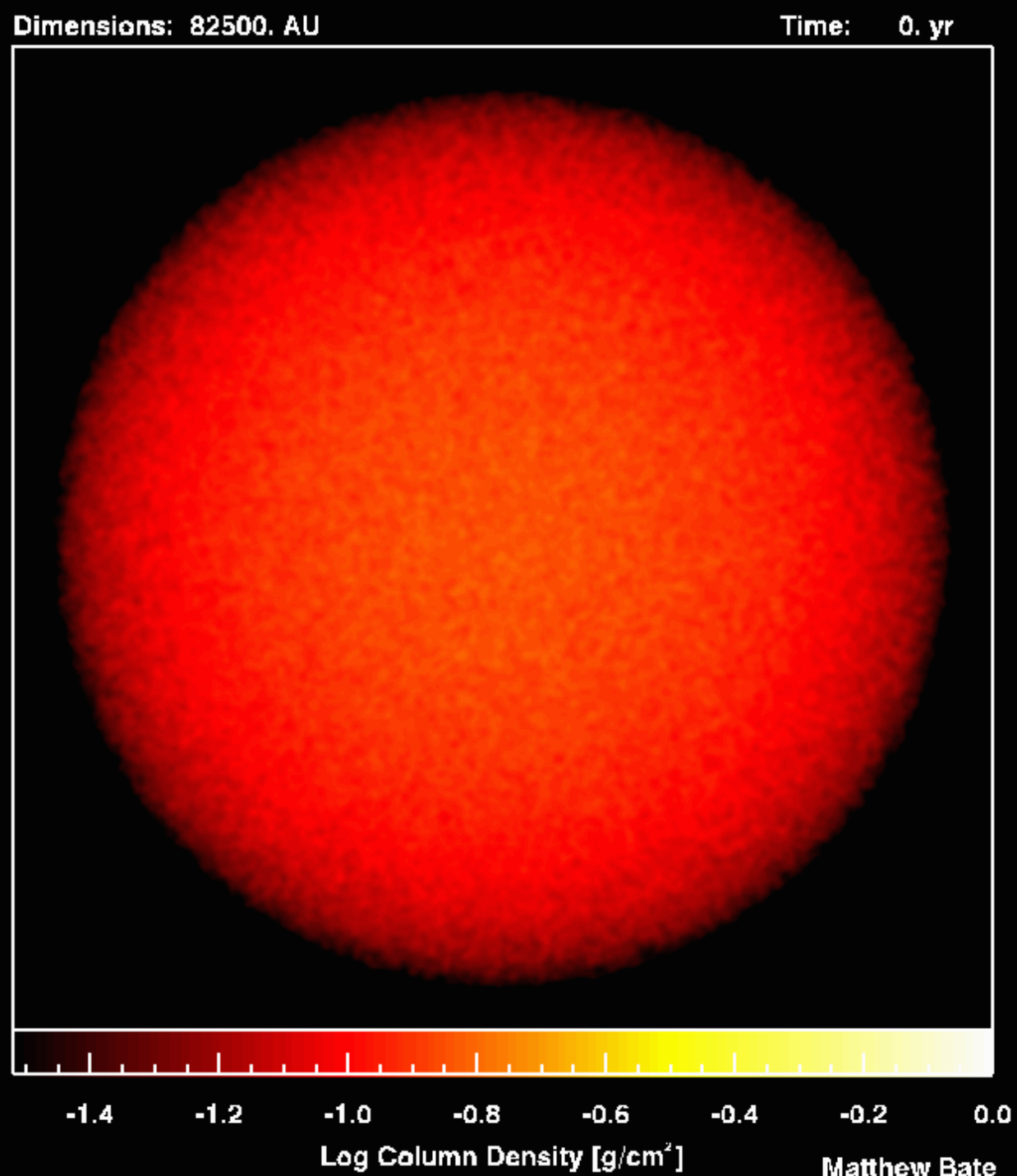


Nebulae



Artistic impression

Computer Simulations



Computer Simulations

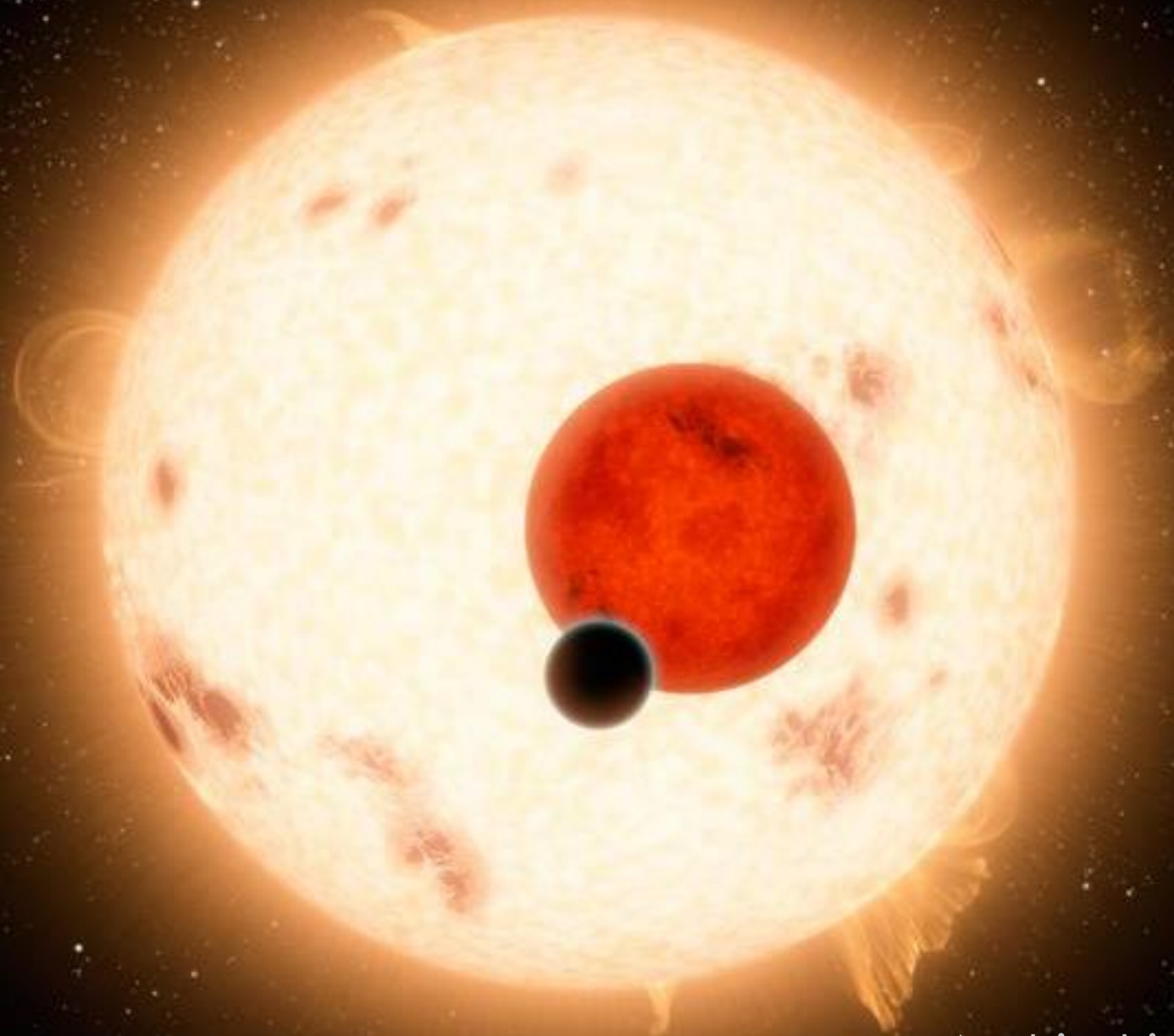


www.ukaff.ac.uk



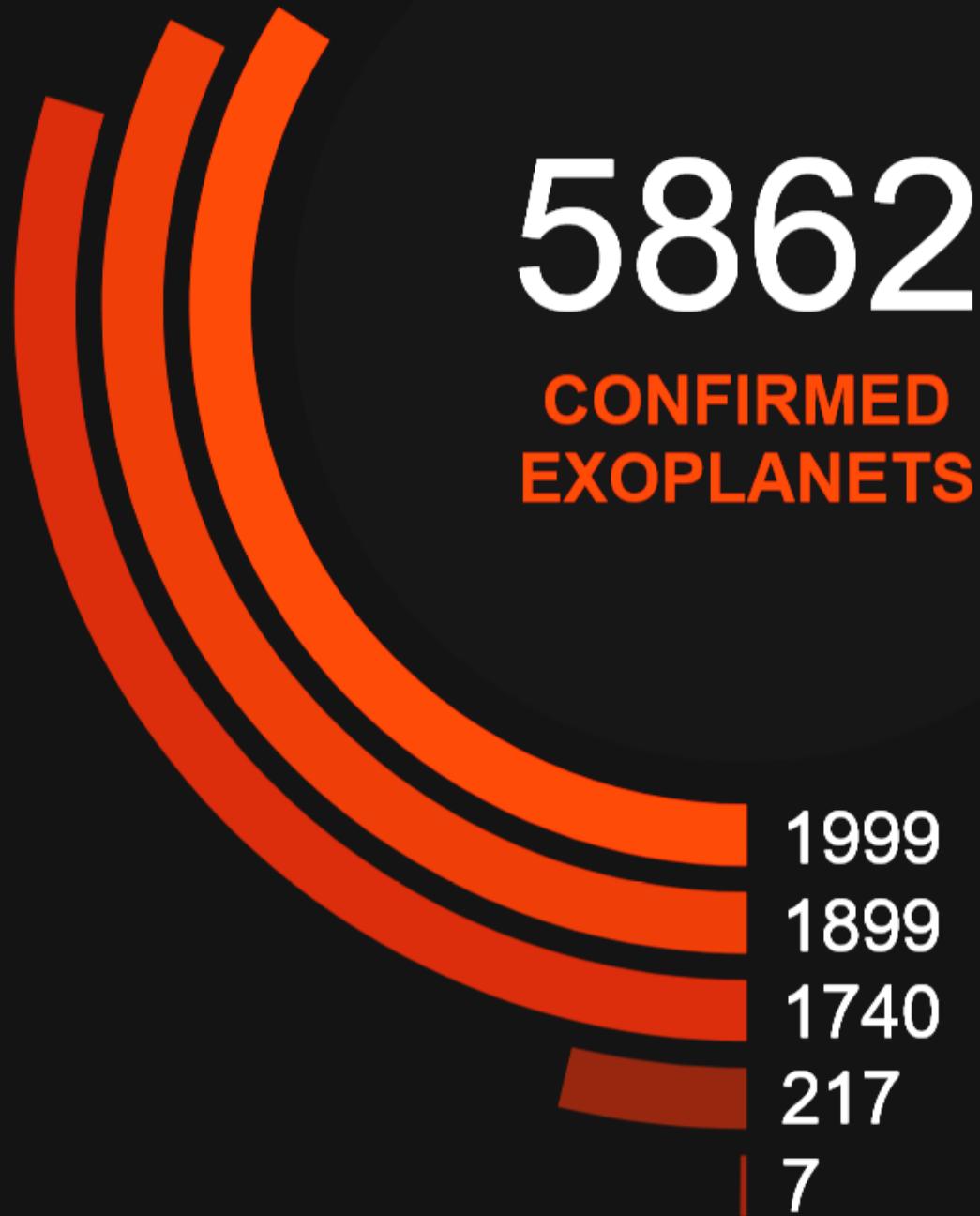
30%-50% of stars in our galaxy are pairs

Exoplanets



Artistic impression

Exoplanets



As of 20th March, 2025.

~250 exoplanets are discovered each year.

Neptune-like

Gas Giant

Super Earth

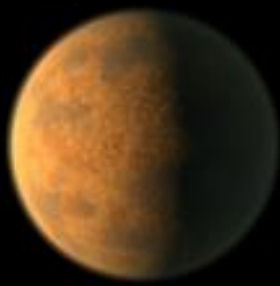
Terrestrial

Unknown

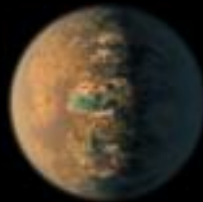
Discovered in February 2017,
Trappist-1 has 7 rocky planets



b



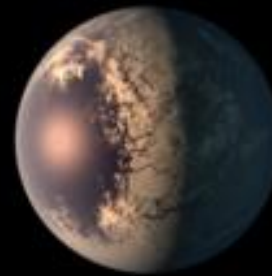
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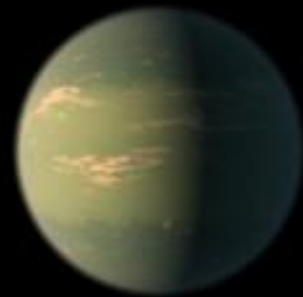
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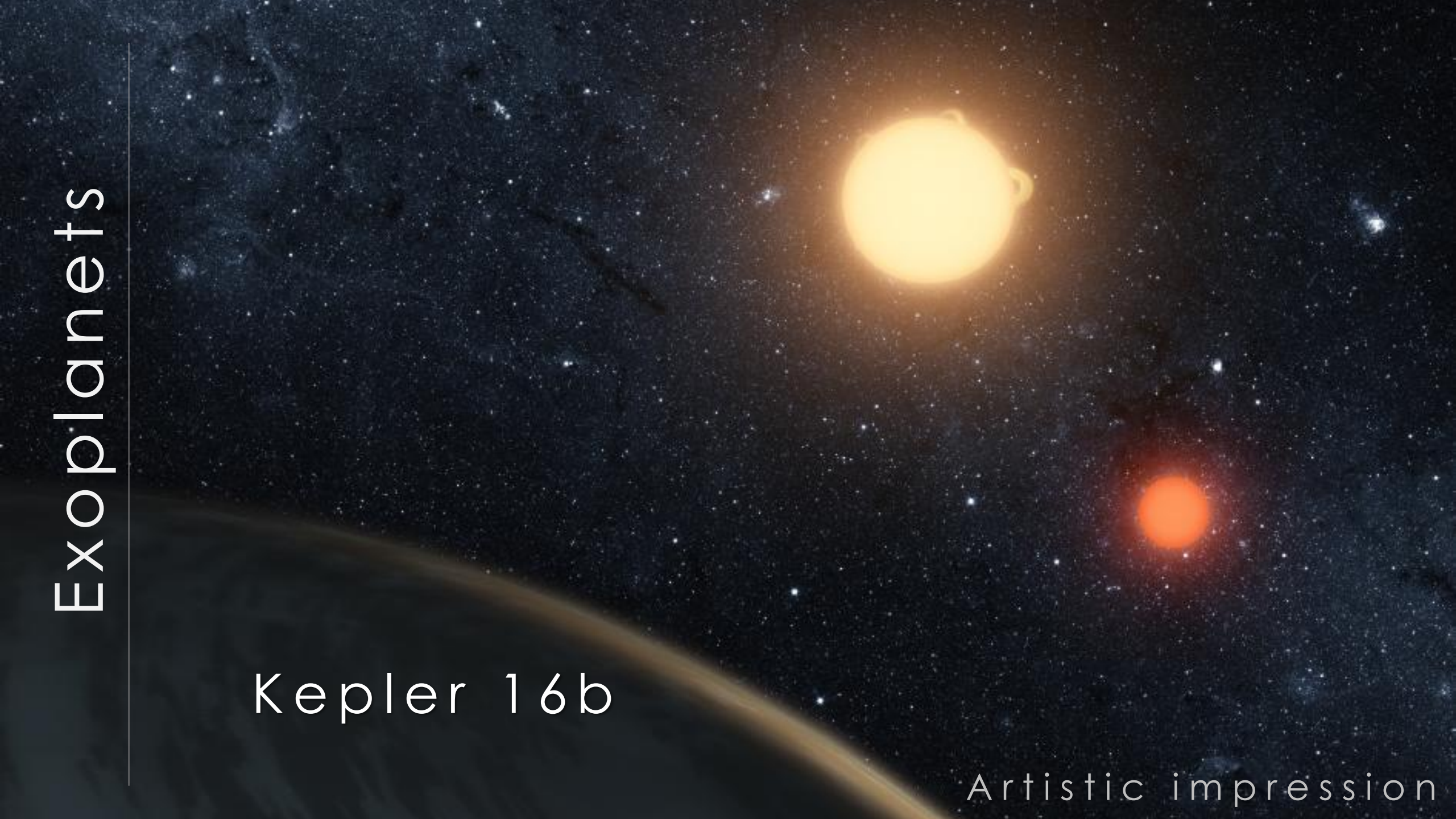
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Artistic impression

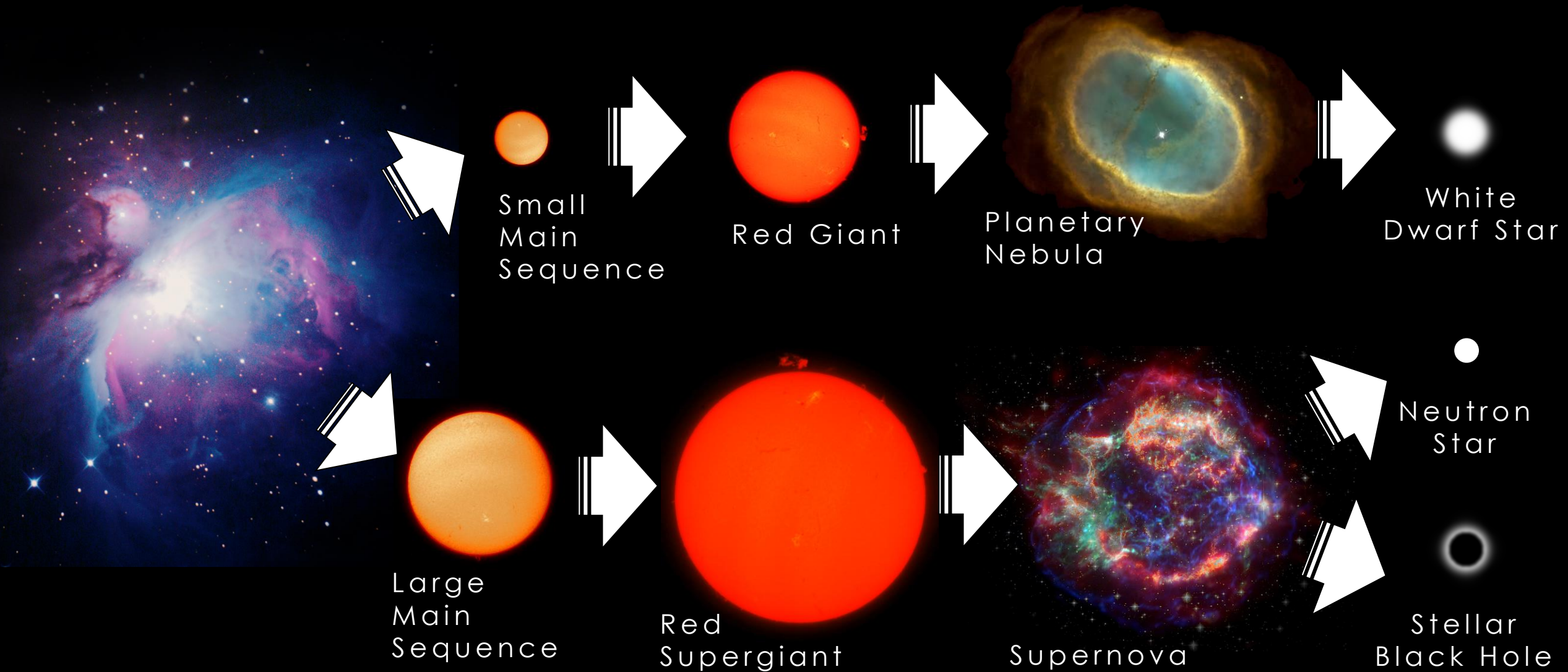
Exoplanets

Kepler 16b

Artistic impression



The Evolution of Stars



Extreme star sizes

Mass: <1.4 solar masses

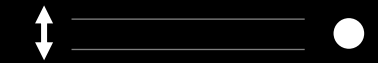
Diameter: Size of Earth



White
Dwarf Star

Mass: 1.4-2.2 solar masses

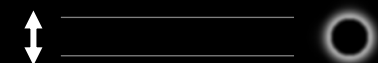
Diameter: Size of London



Neutron
Star

Mass: 3-10 solar masses

Diameter: 3km radius
per solar mass



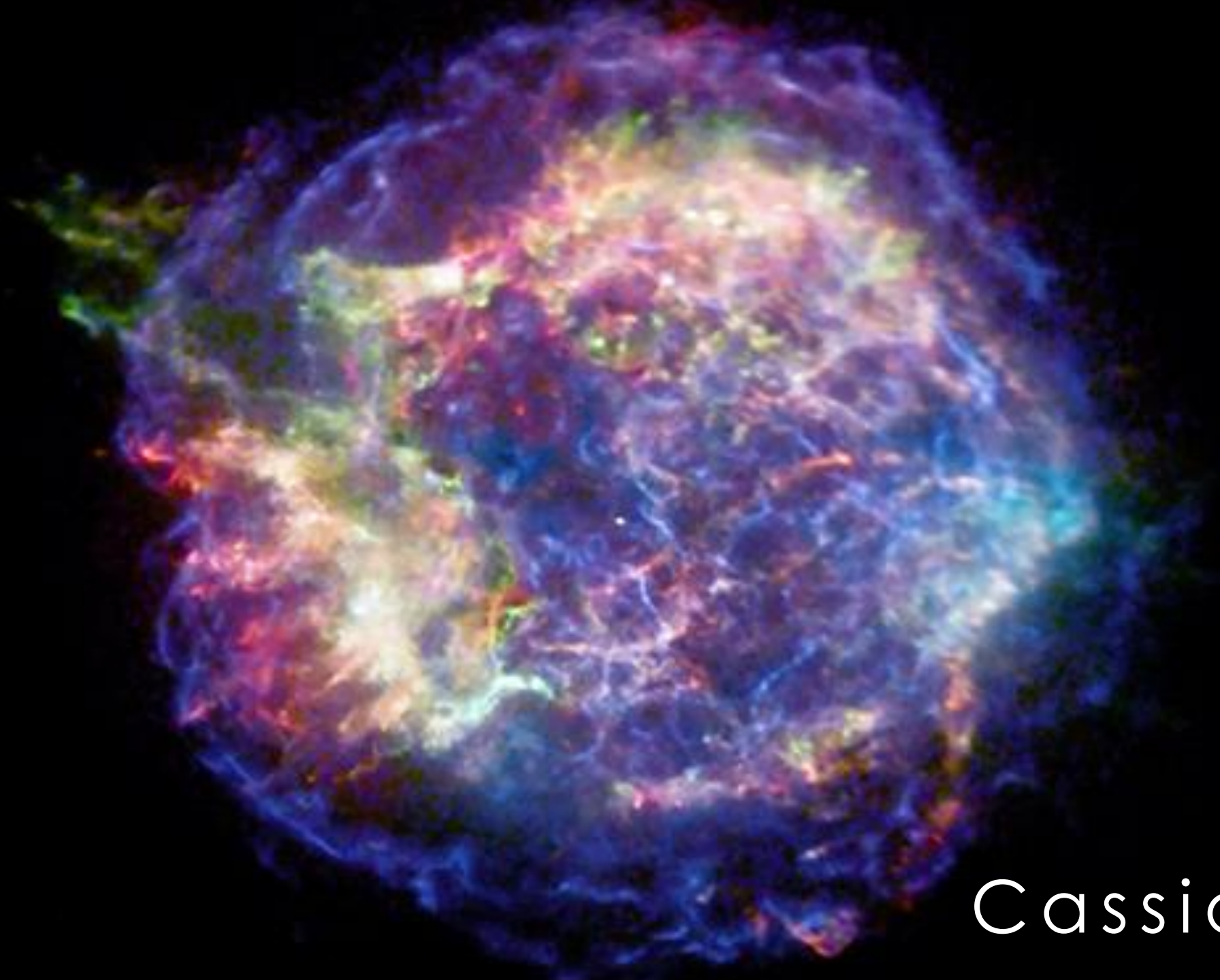
Stellar
Black Hole

White Dwarf Stars



The Ring nebula

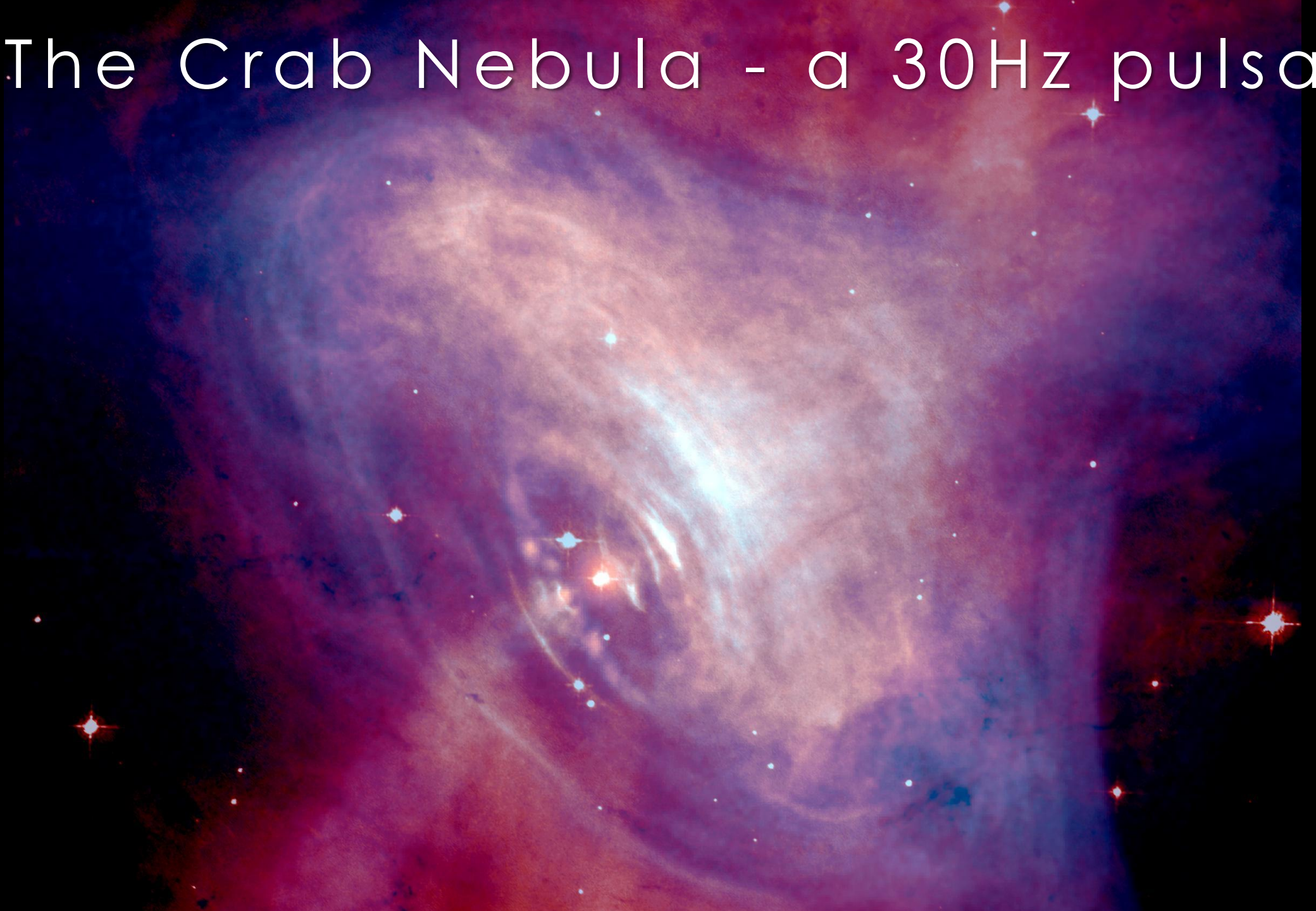
Neutron Stars



Cassiopeia A

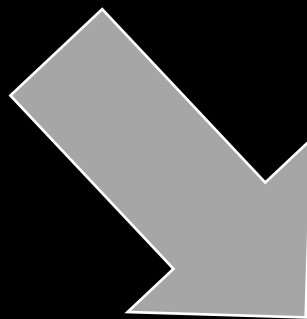
Pulsars

The Crab Nebula - a 30Hz pulsar

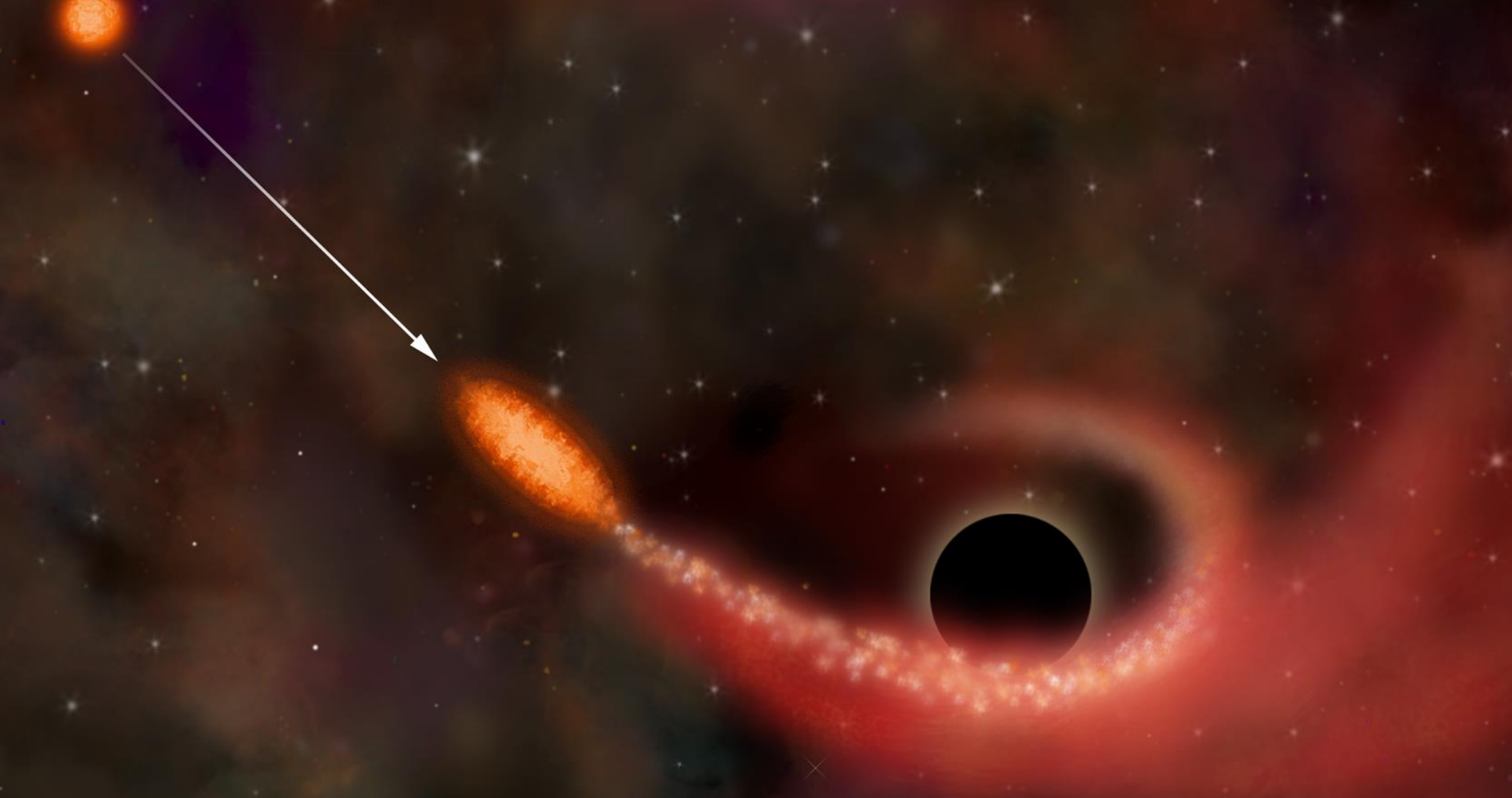


Black Holes

My artistic impression
of a black hole...



Black Holes



Artistic impression
of a star falling into a black hole.

This artistic rendering depicts a celestial event where a star is being consumed by a black hole. In the upper left, a bright orange-yellow star is shown in the process of being torn apart, with a white arrow indicating its trajectory towards the black hole. The black hole itself is represented by a solid black circle, surrounded by a glowing, multi-colored accretion disk that transitions from red and orange at the outer edges to a bright white-yellow at the innermost point just before the event horizon. The entire scene is set against a dark, star-filled cosmic background.

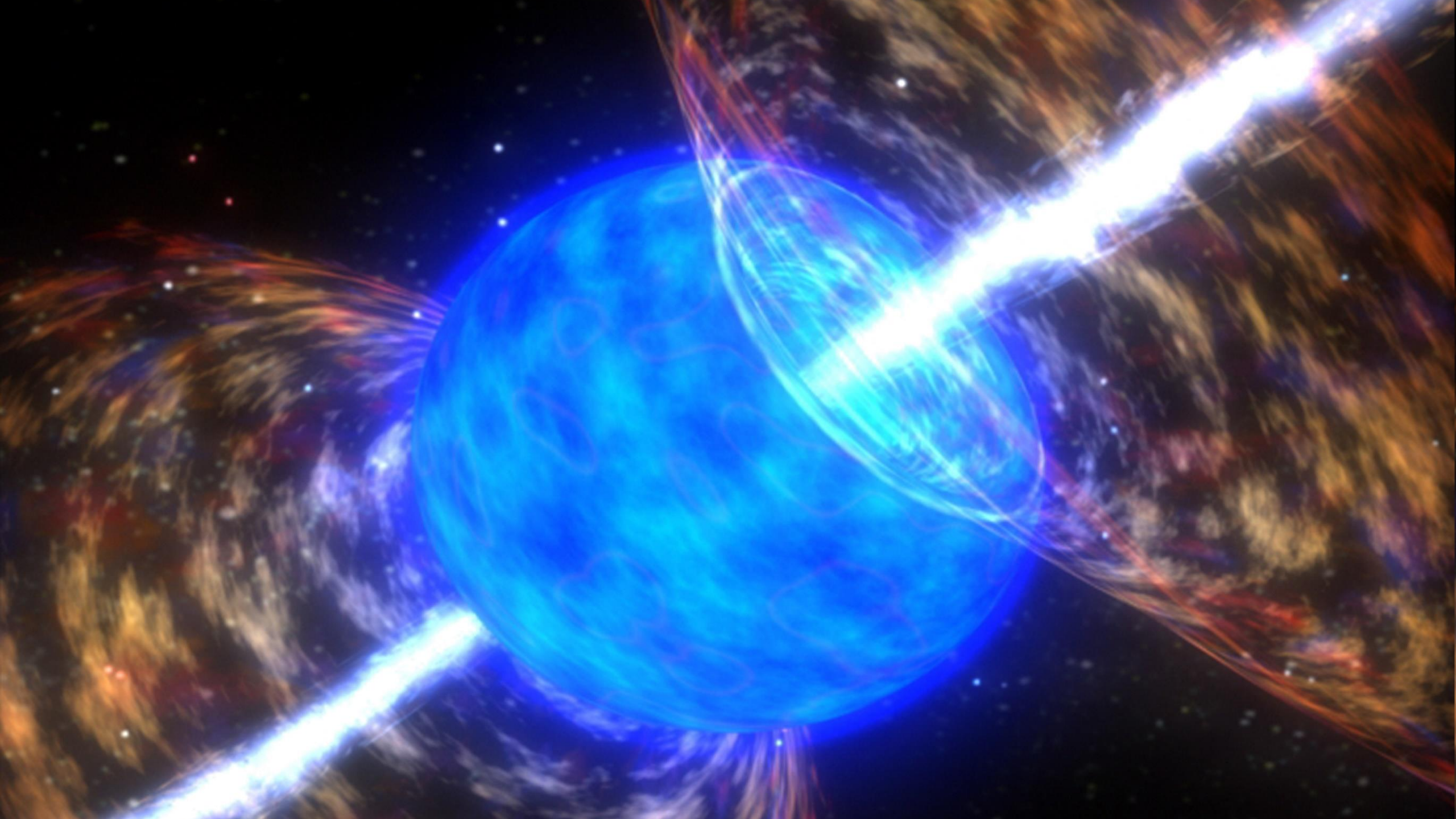
Artistic impression of Cygnus X-1

Most probable nearby
black hole ~6,000ly away

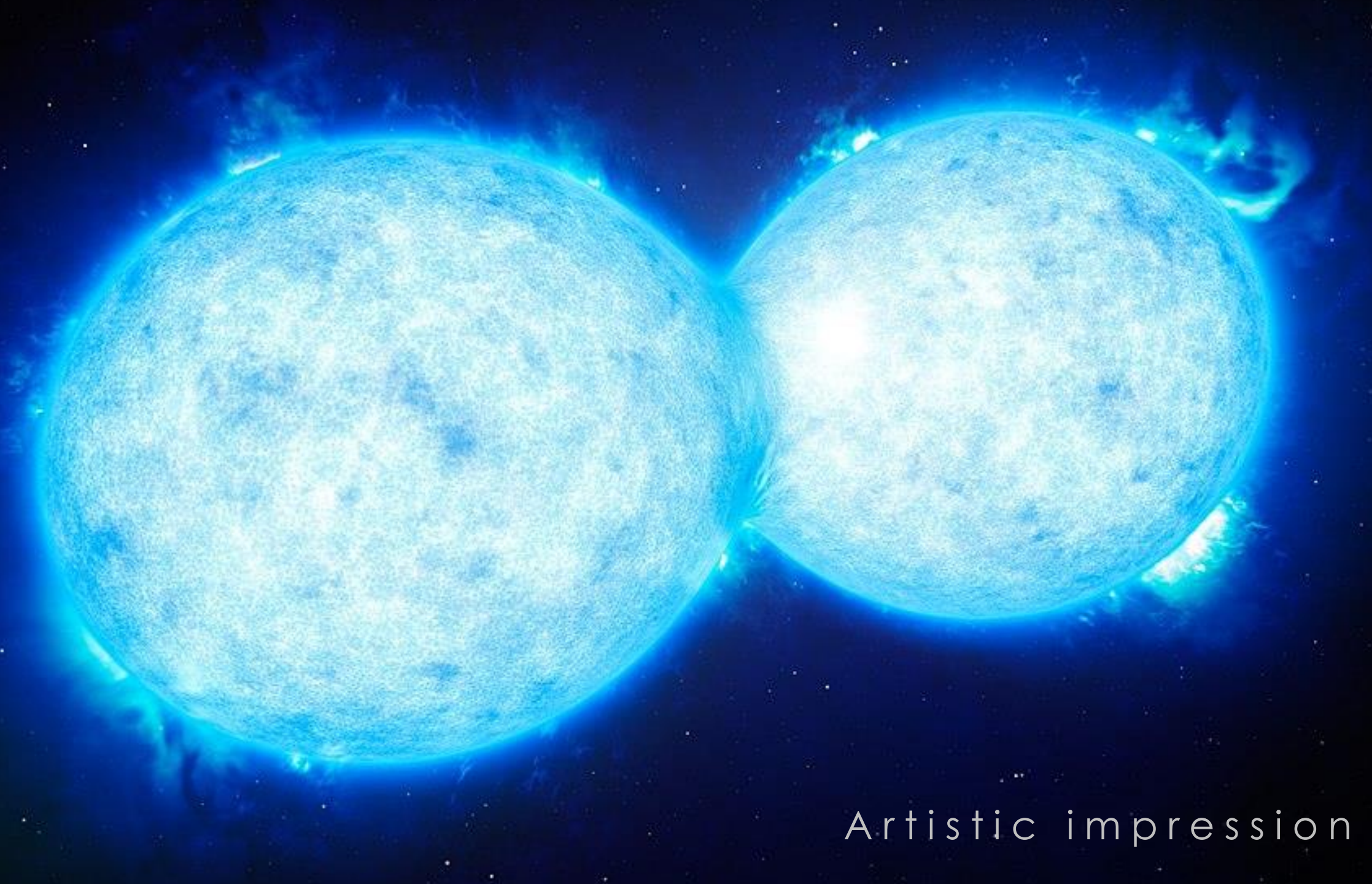


Gamma Ray Bursts





Extreme binaries



Artistic impression

Neutron Stars



UK Astrophysical
Fluids Facility

Supercomputer simulation

Time 2.150 msec



Neutron Stars



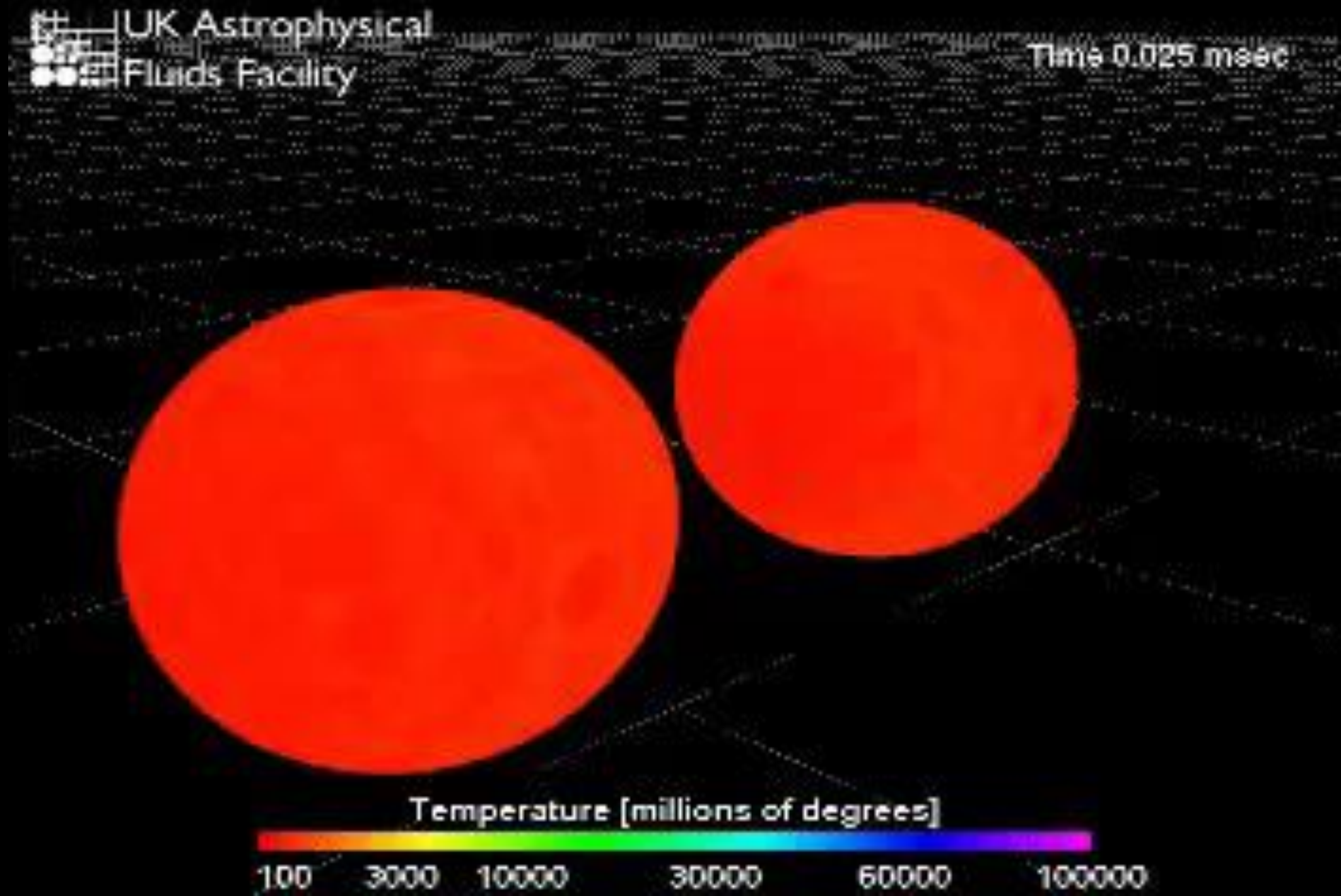
UK Astrophysical
Fluids Facility

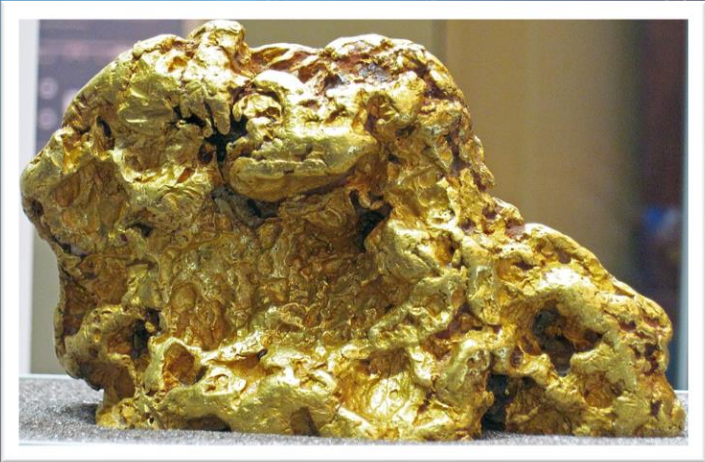
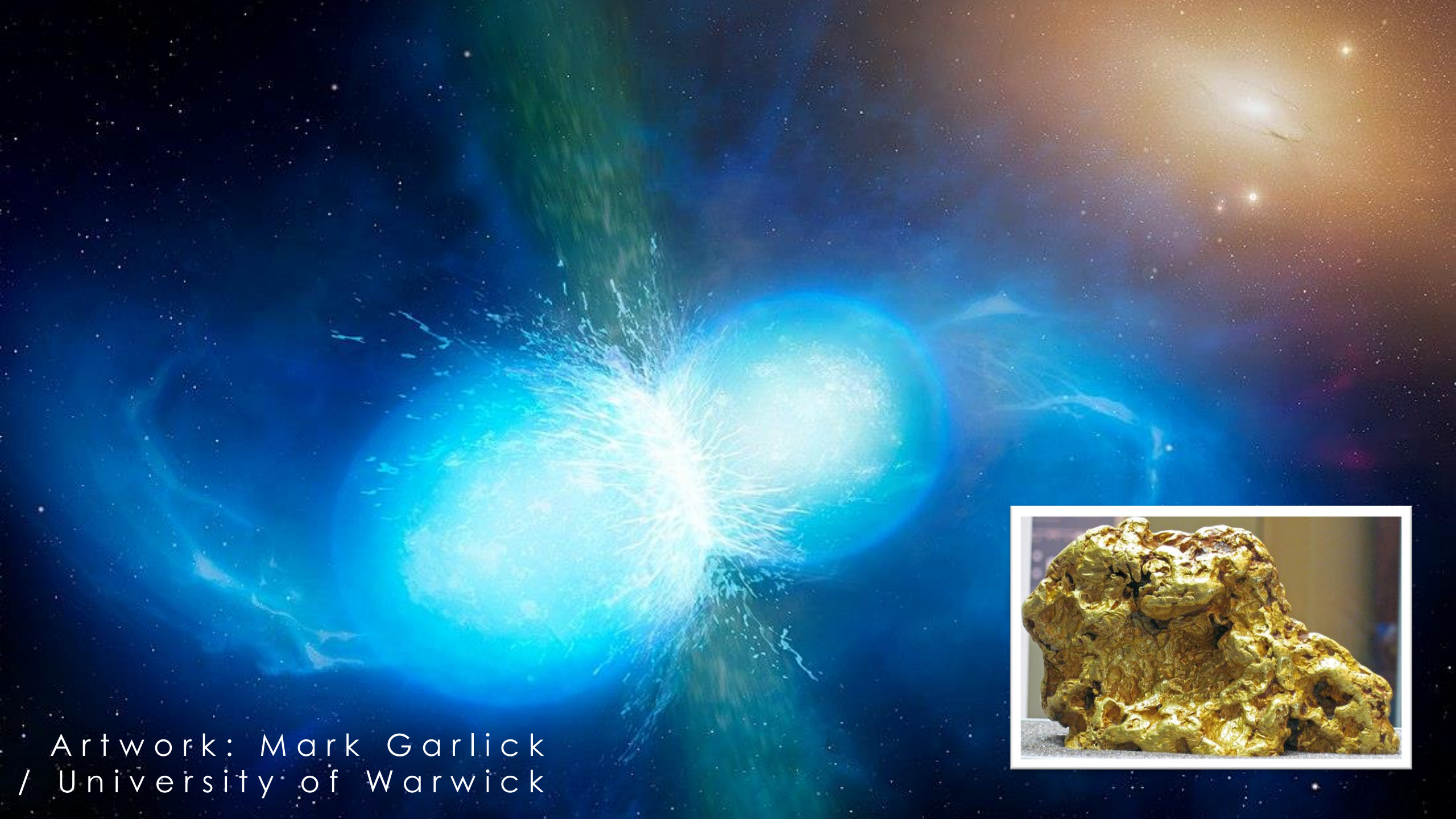
Supercomputer simulation

Time 4.625 msec



Neutron Stars

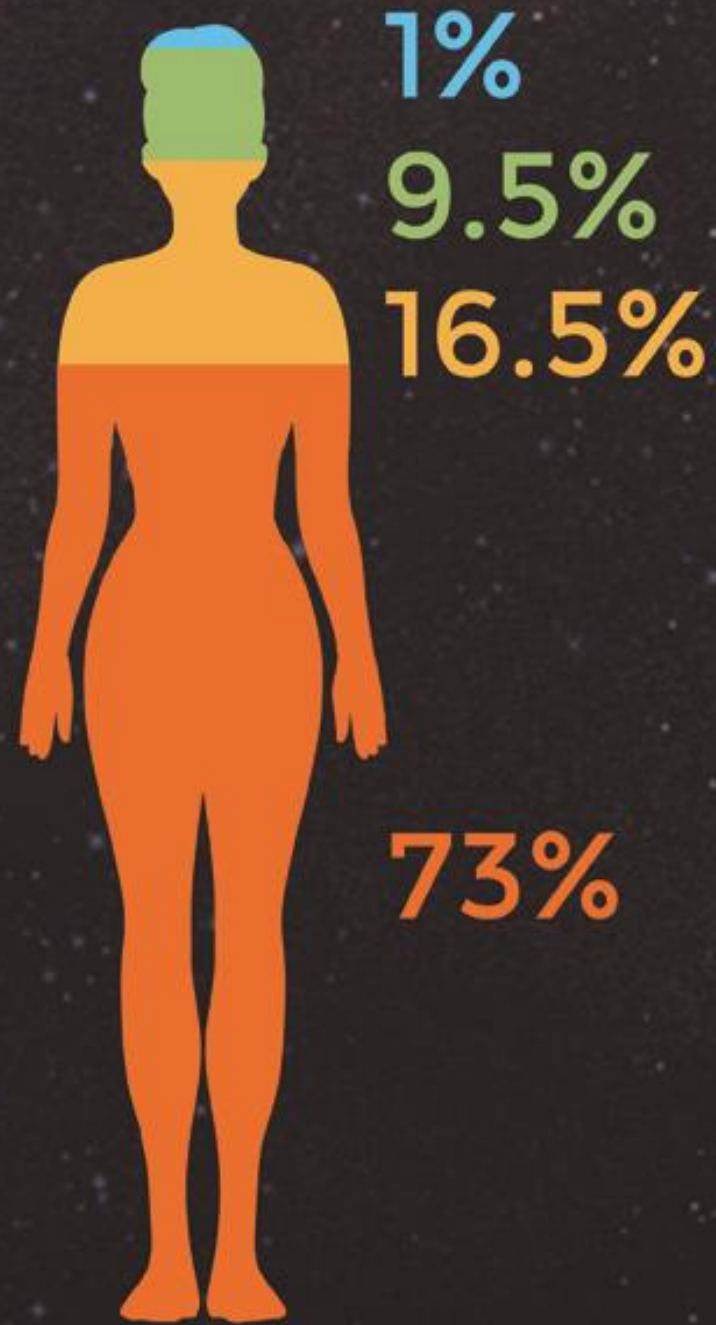




Artwork: Mark Garlick
/ University of Warwick

The Elements

You are made out of elements created in these astrophysical processes.





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Astronomy Voyage



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