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**

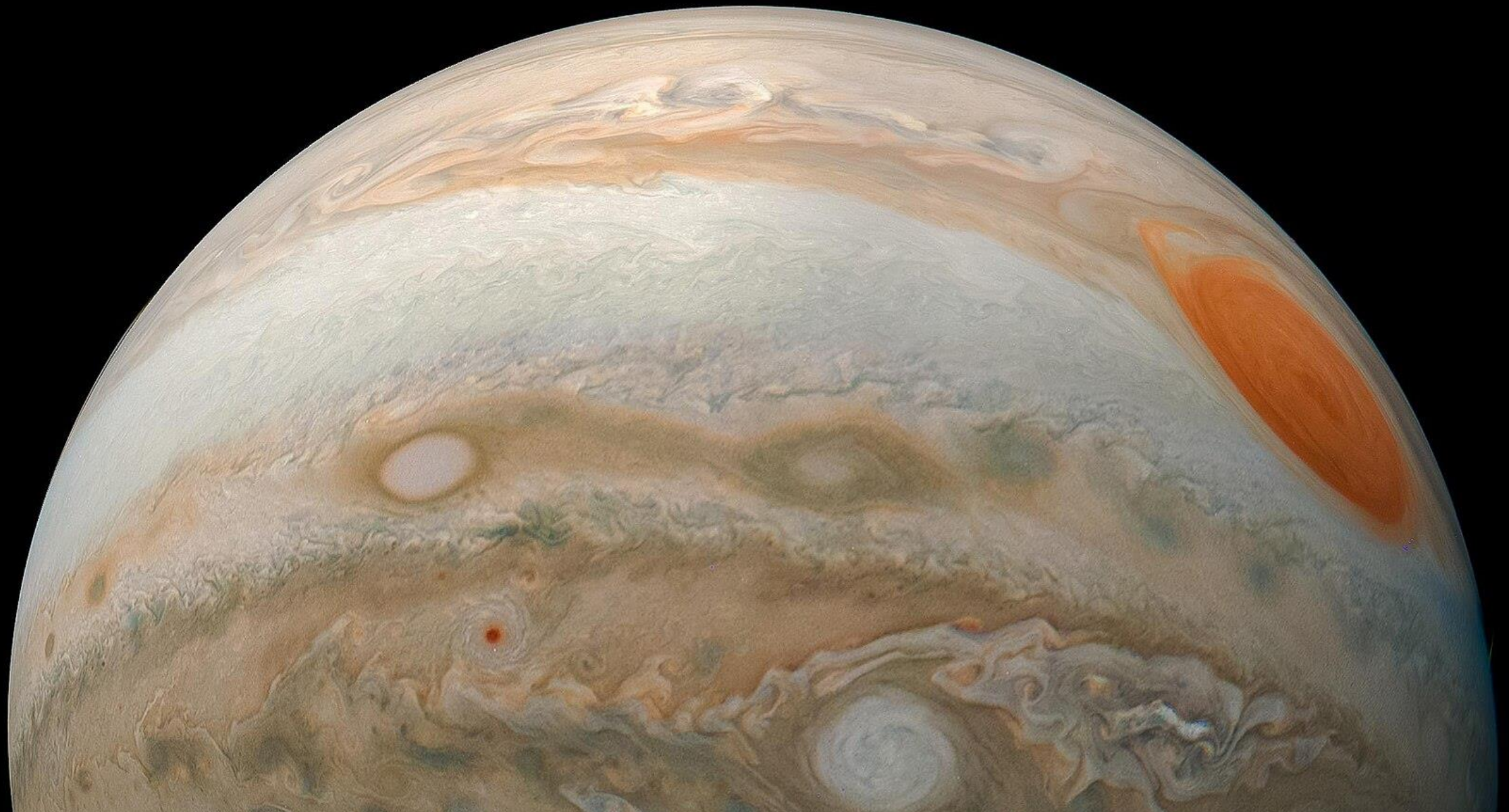
Our Milky way Galaxy over Hawai'i
- the city of stars in which we live.

Stars V Planets

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

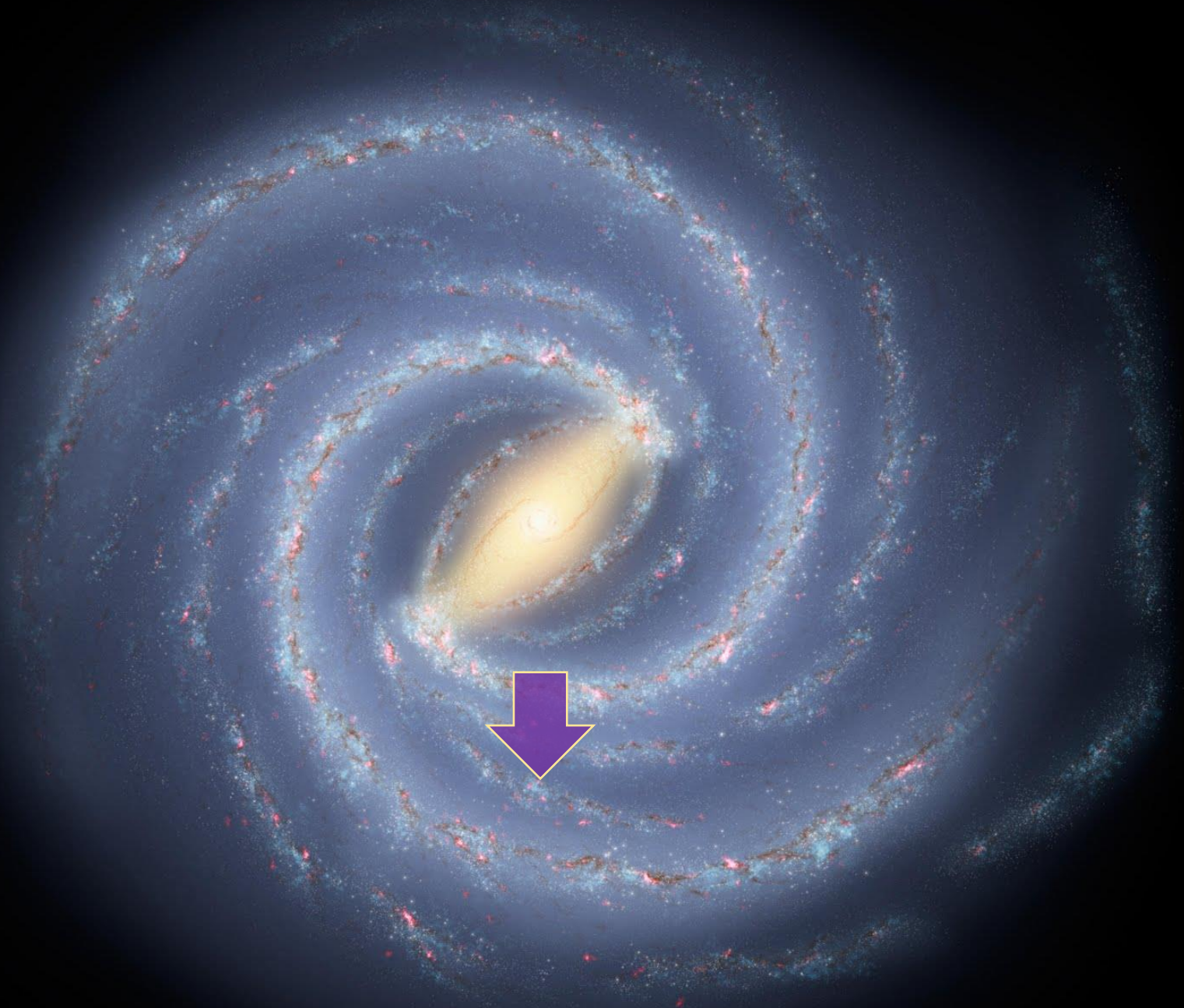
Stars V Planets

Planets are too small & cool for nuclear fusion.



Moons orbit planets.

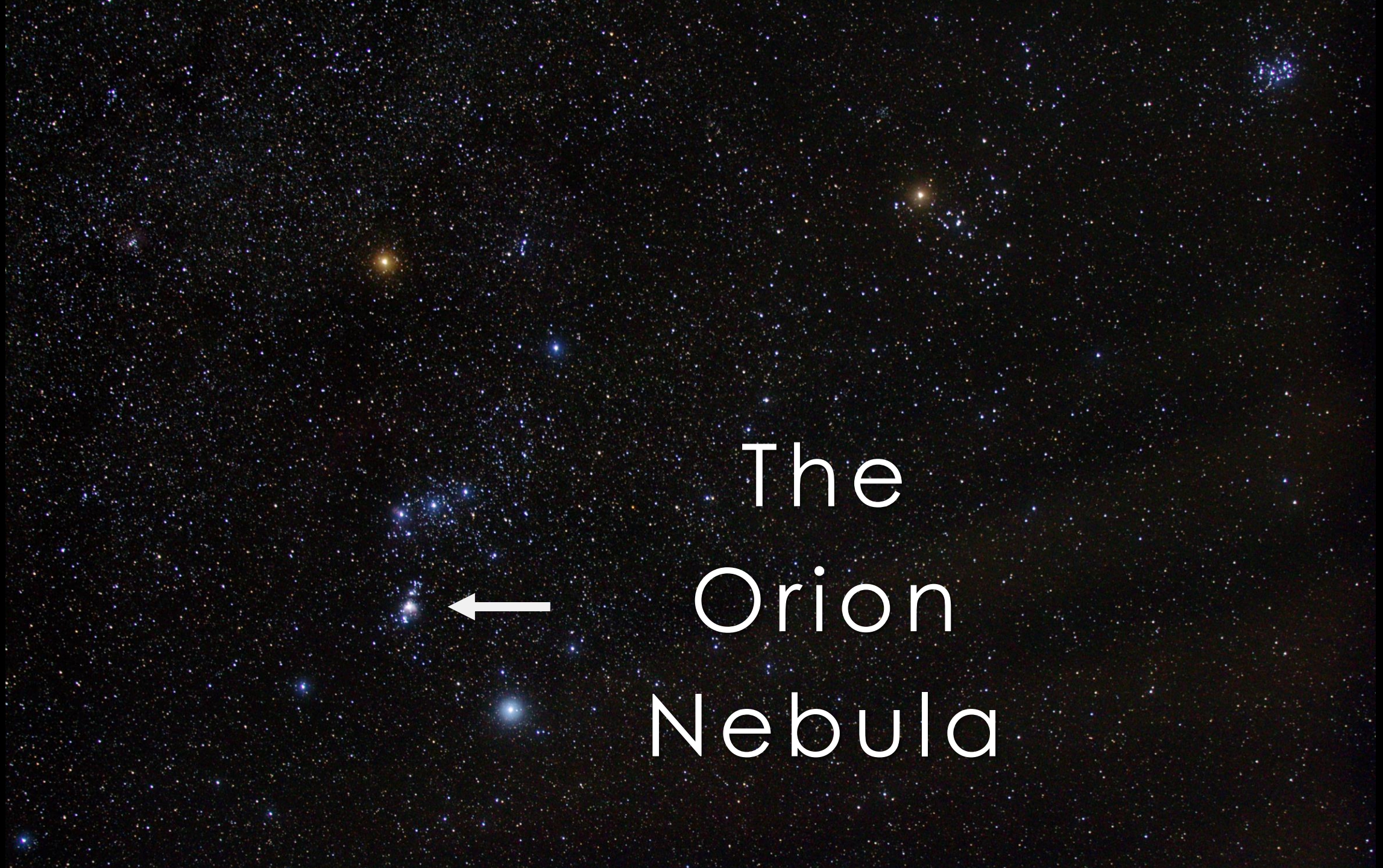
The Milky-way



Artistic impression

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

Nebulae



The Orion Nebula

Nebulae

The Orion Nebula


Nebulae

Nebulae

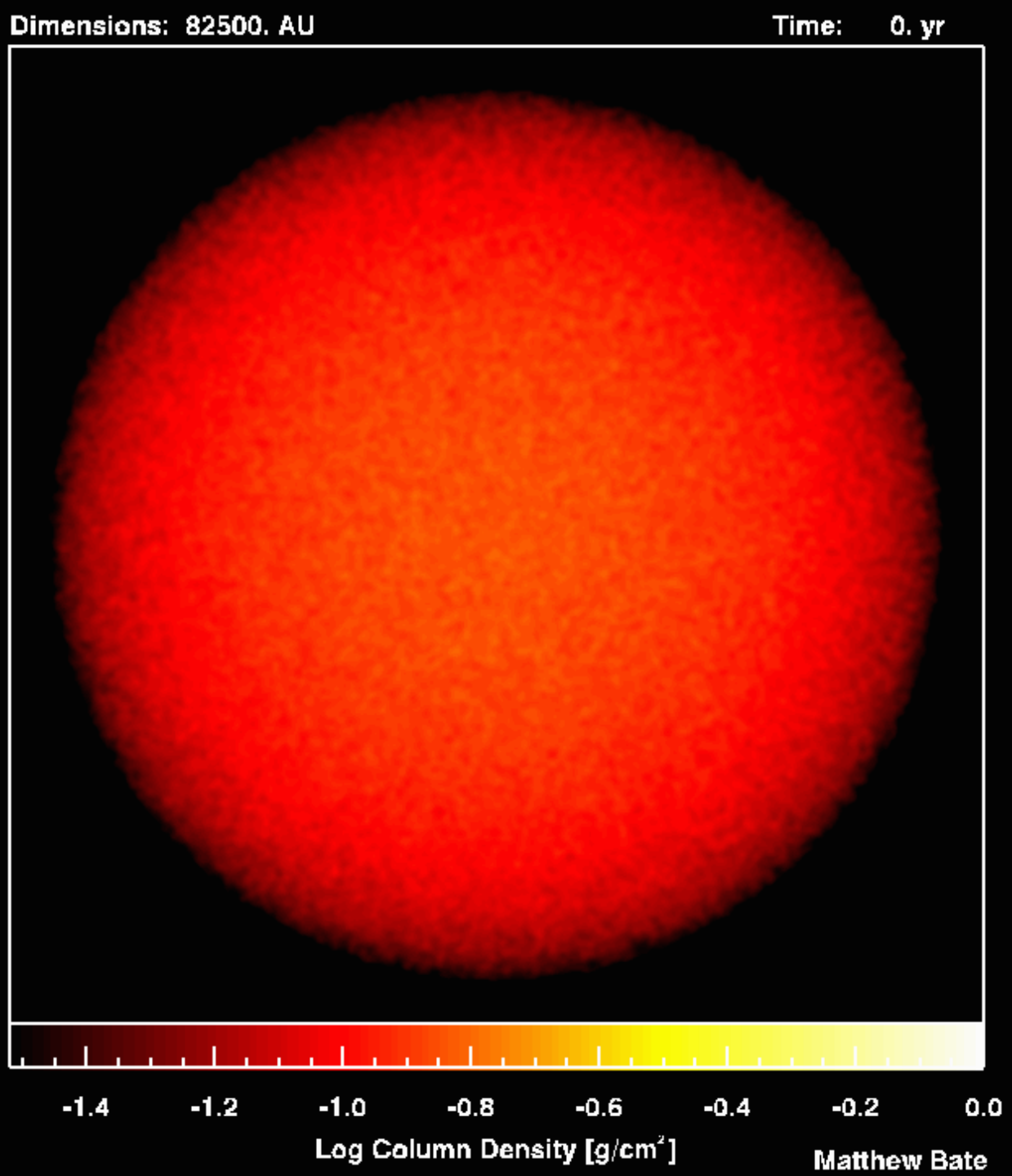
Hubble Space Telescope observation of the Orion Nebula


Nebulae
Hubble Space Telescope observations of the Orion Nebula

Nebulae

Artistic impression

Computer Simulations

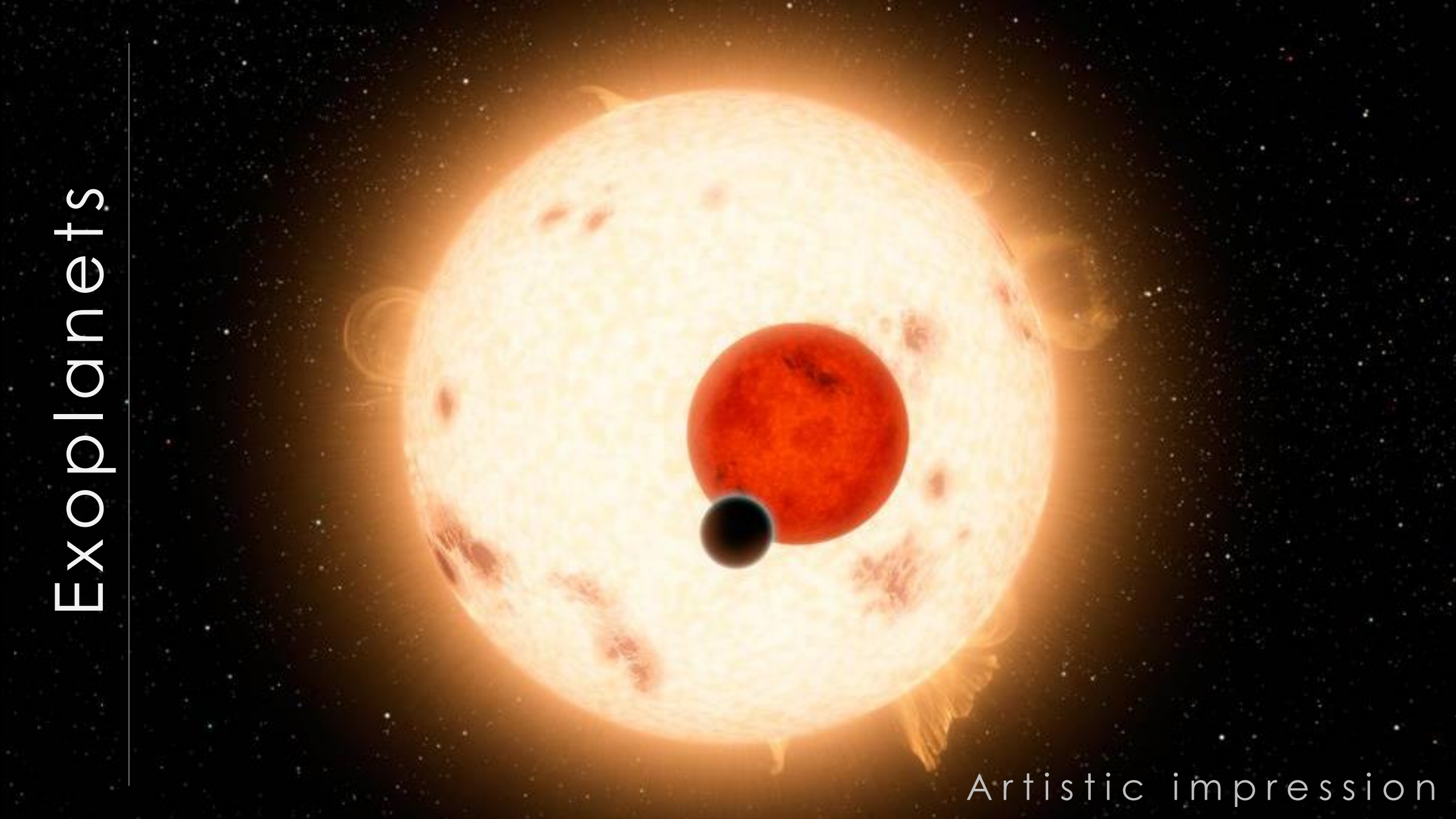


Computer Simulations

www.ukaff.ac.uk


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

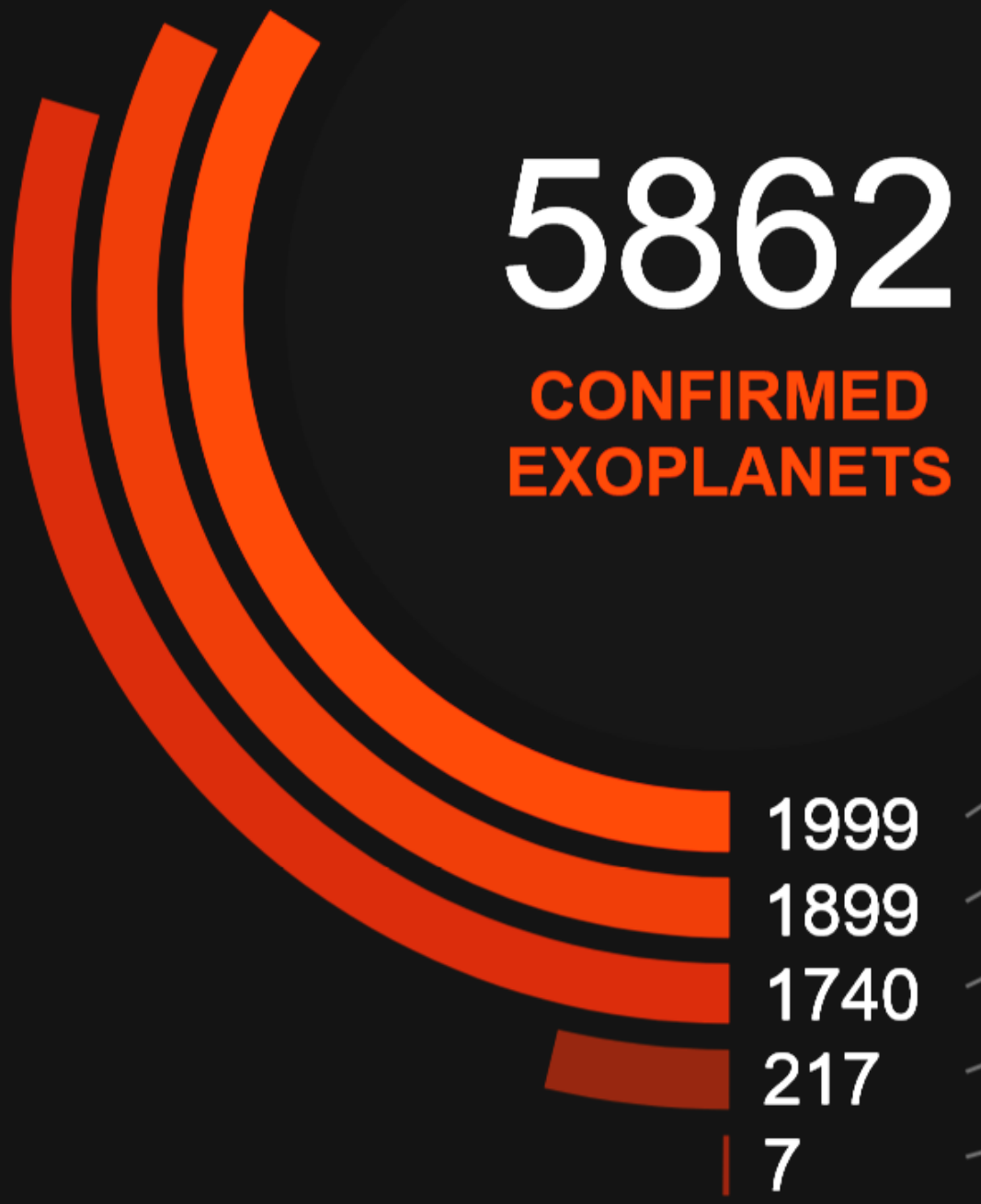
Exoplanets



Artistic impression

Exoplanets

As of 20th March, 2025.

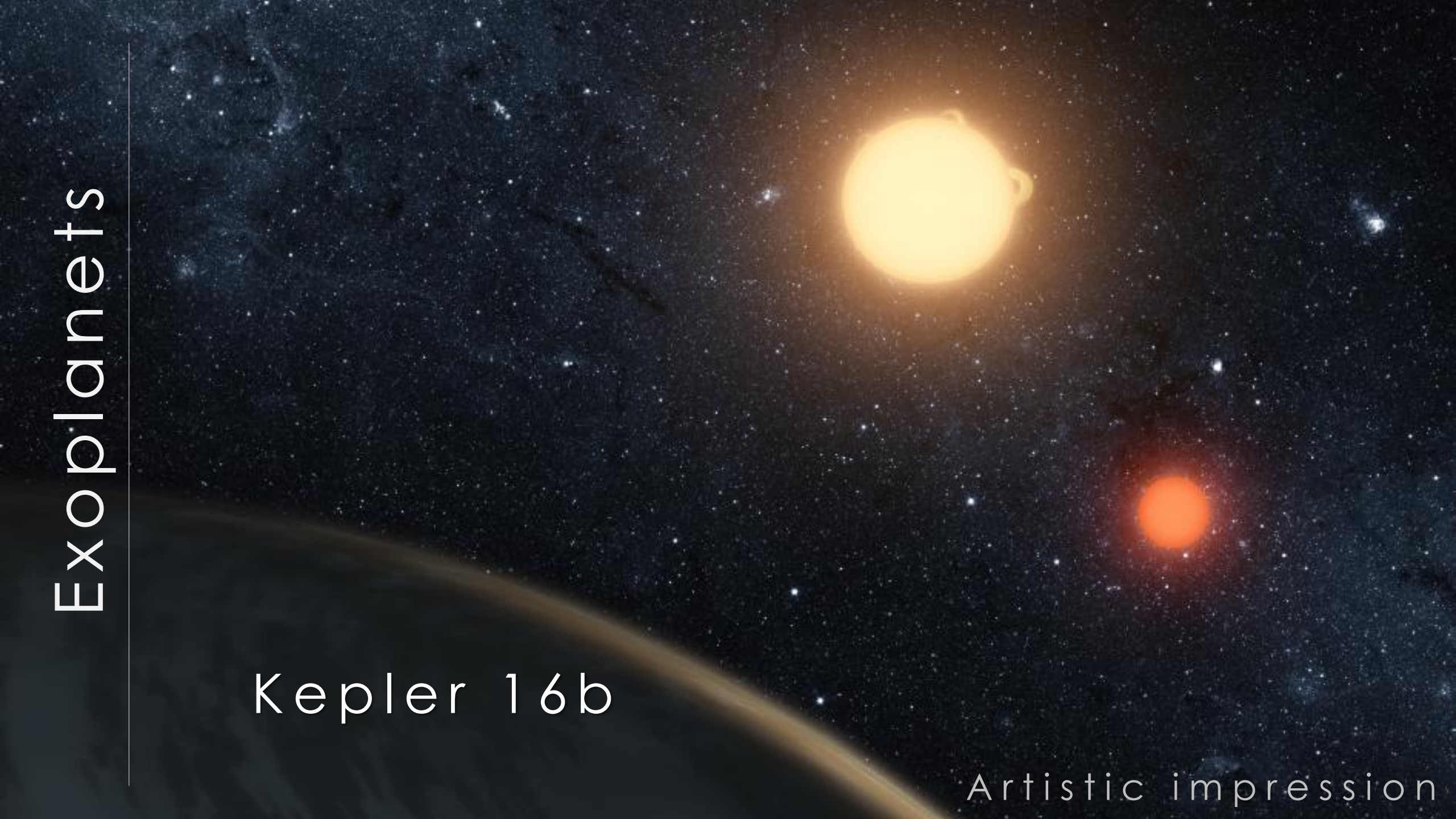


~250 exoplanets are discovered each year.

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

Artistic impression

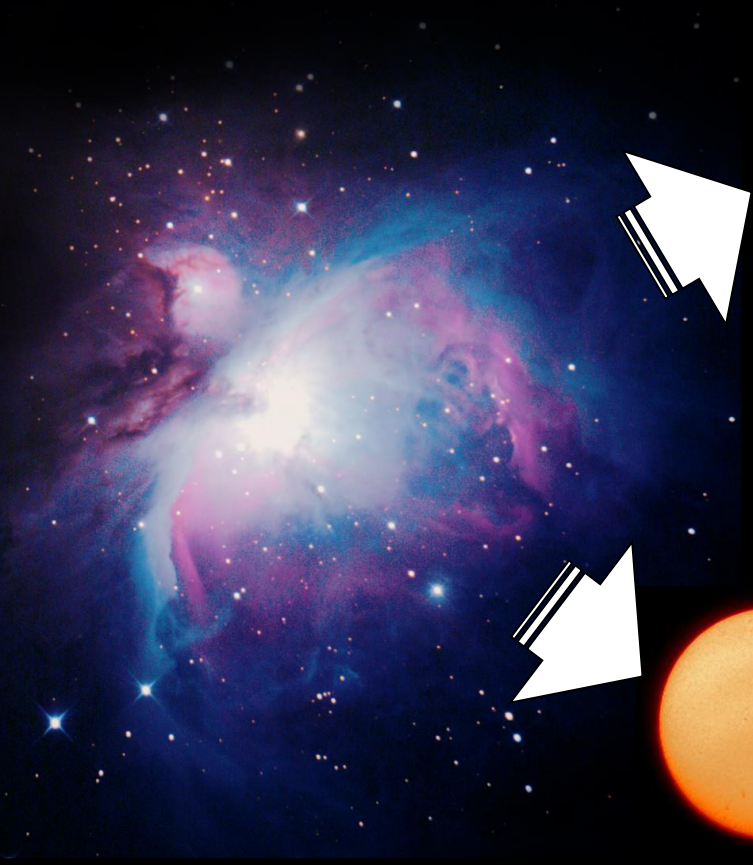
Exoplanets



Kepler 16b

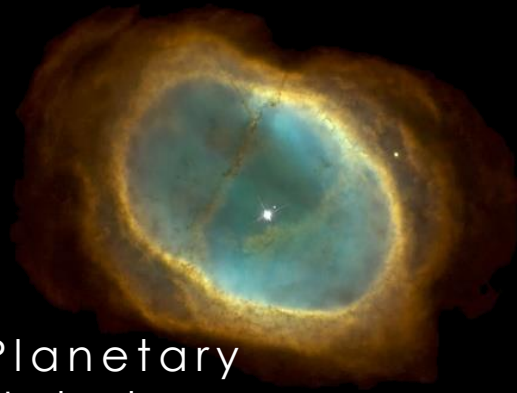
Artistic impression

The Evolution of Stars



Small Main Sequence

Red Giant

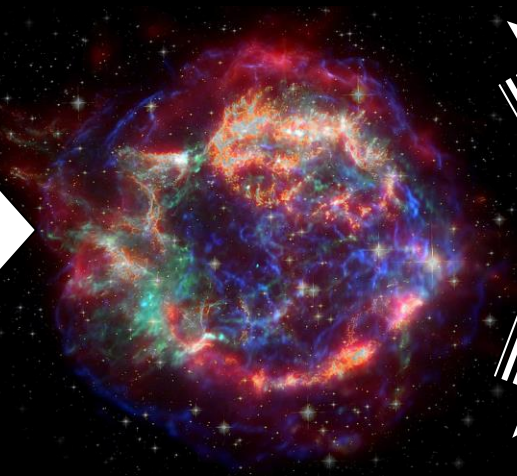


Planetary Nebula

White Dwarf Star

Large Main Sequence

Red Supergiant



Supernova

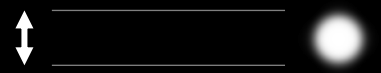
Neutron Star

Stellar Black Hole

Extreme star sizes

Mass: <1.4 solar masses

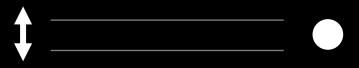
Diameter: Size of Earth



White Dwarf Star

Mass: 1.4-2.2 solar masses

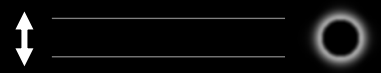
Diameter: Size of London



Neutron Star

Mass: 3-10 solar masses

Diameter: 3km radius per solar mass



Stellar Black Hole

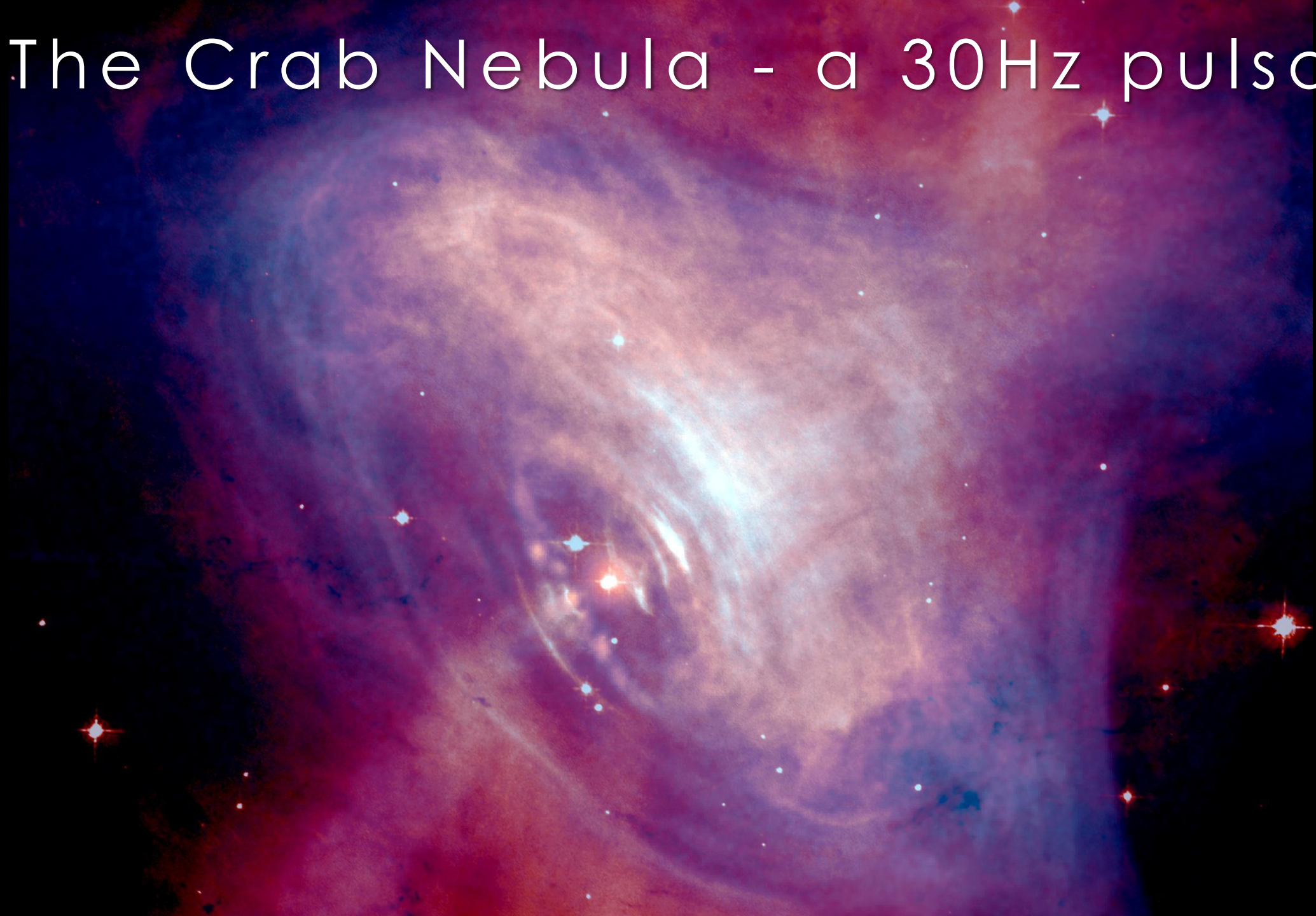
White Dwarf Stars

The Ring nebula

Neutron Stars

Cassiopeia A

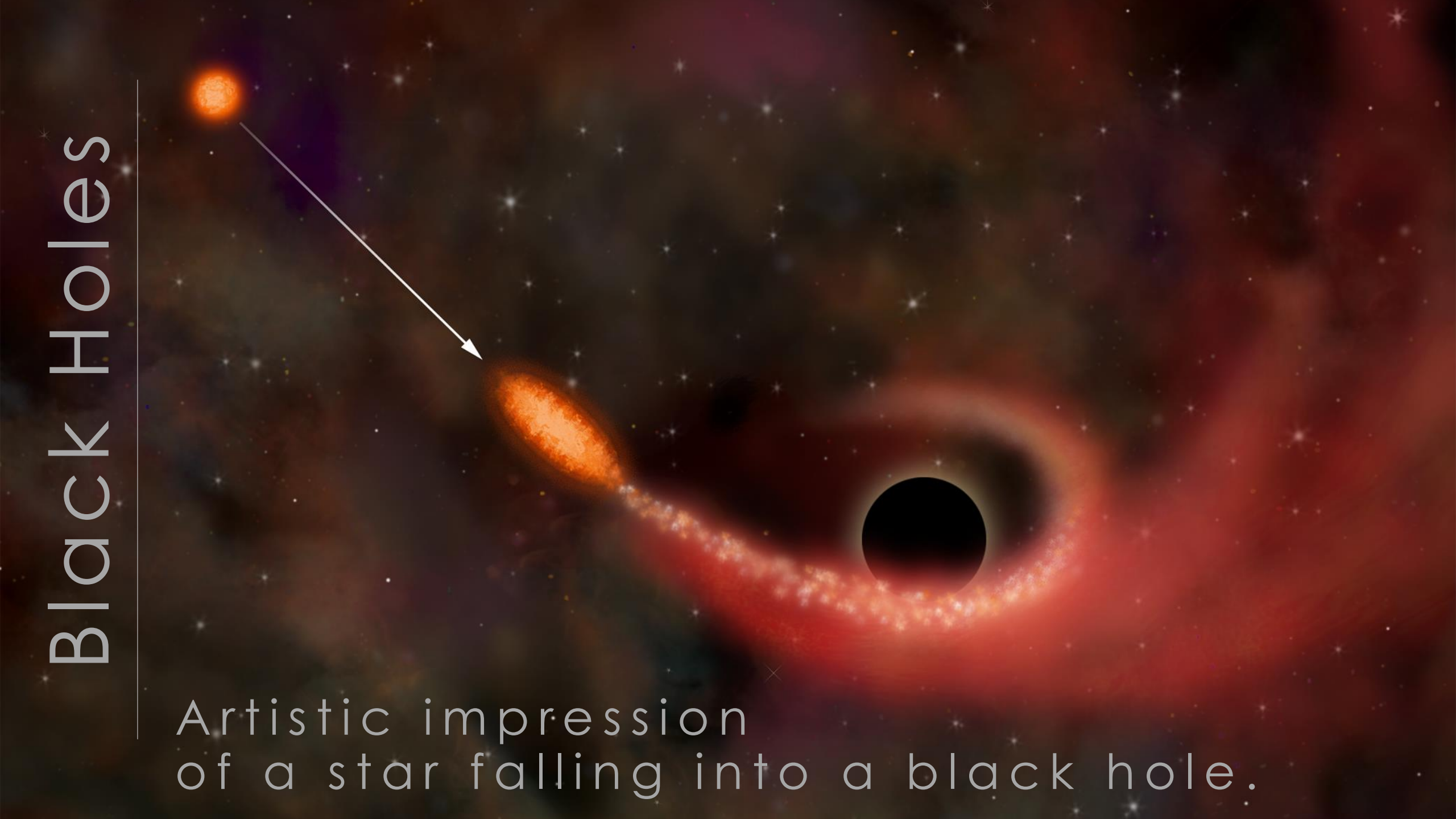
The Crab Nebula - a 30Hz pulsar



Pulsars

My artistic impression of a black hole…

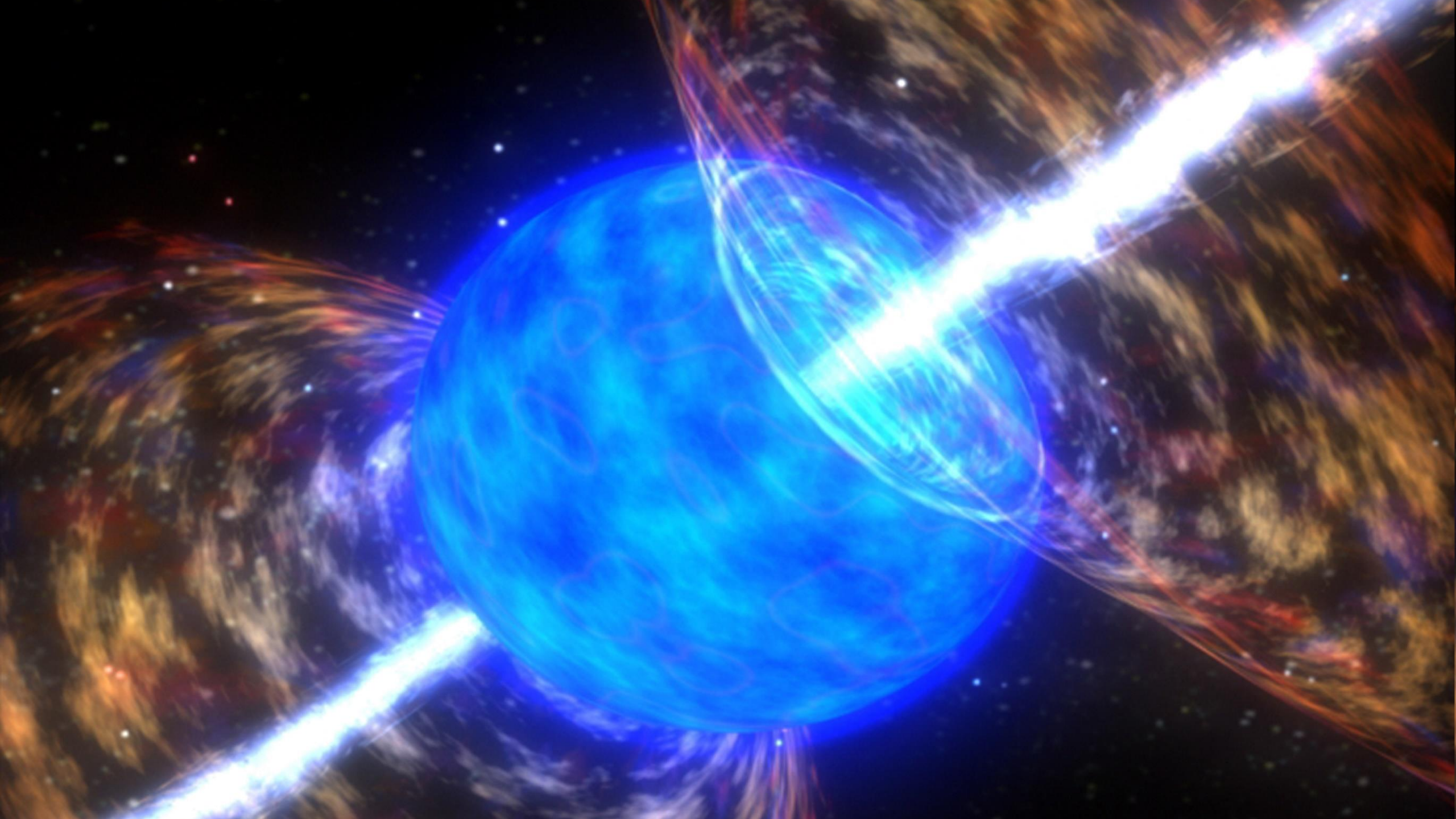
Black Holes



Artistic impression
of a star falling into a black hole.


Artistic impression of Cygnus X-1
Most probable nearby
black hole ~6,000ly away

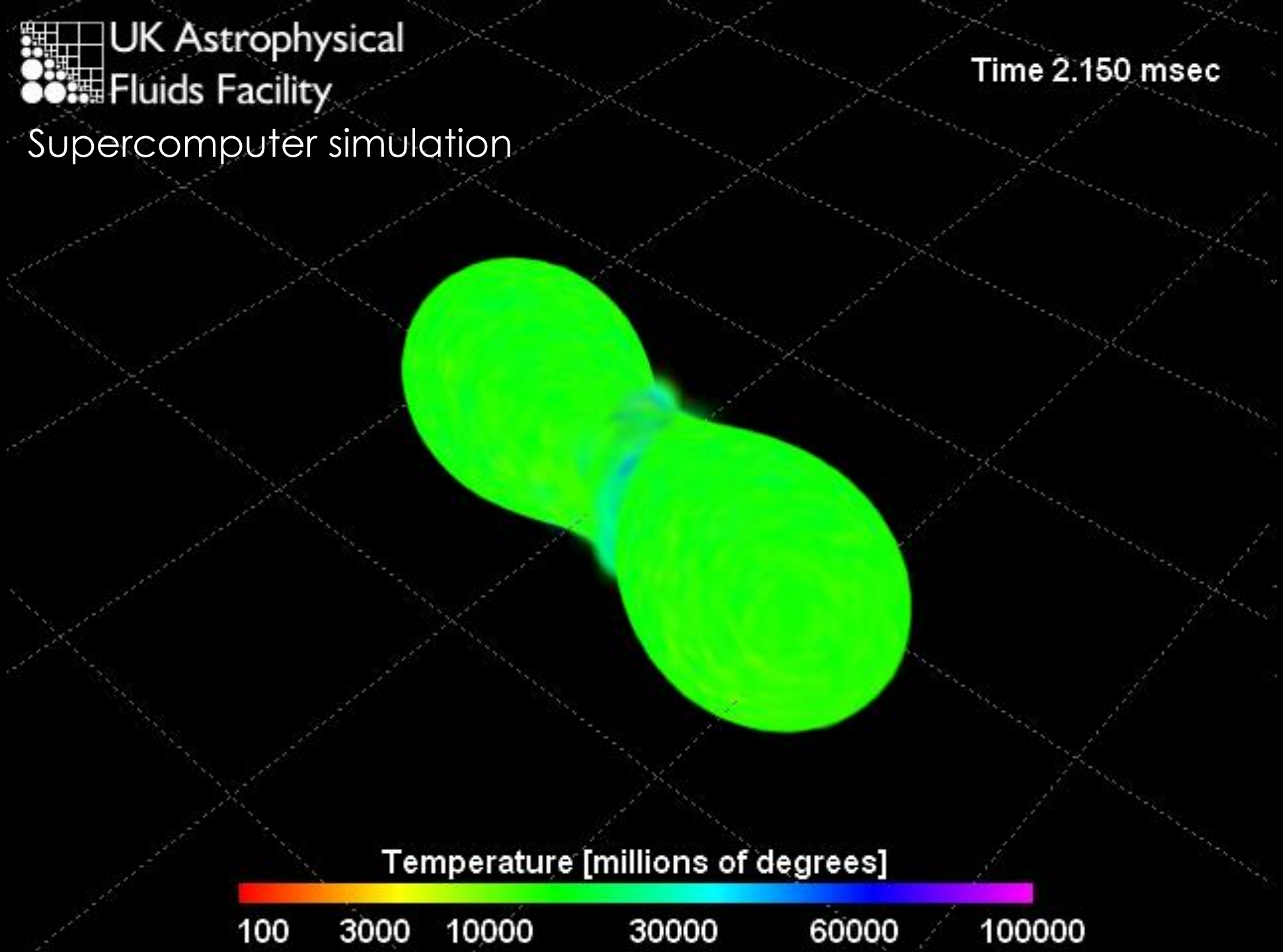
Gamma Ray Bursts



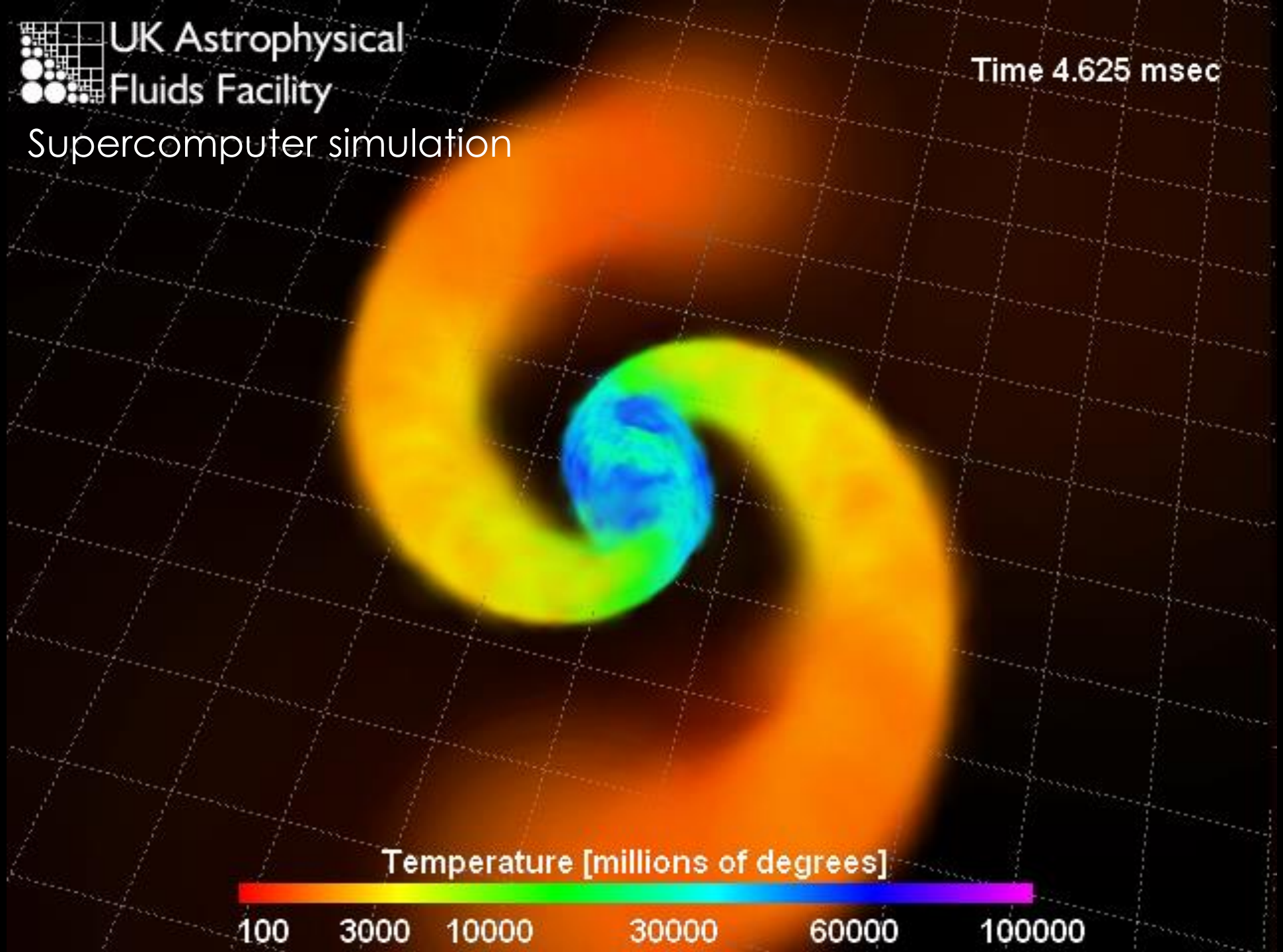
Extreme binaries

Artistic impression

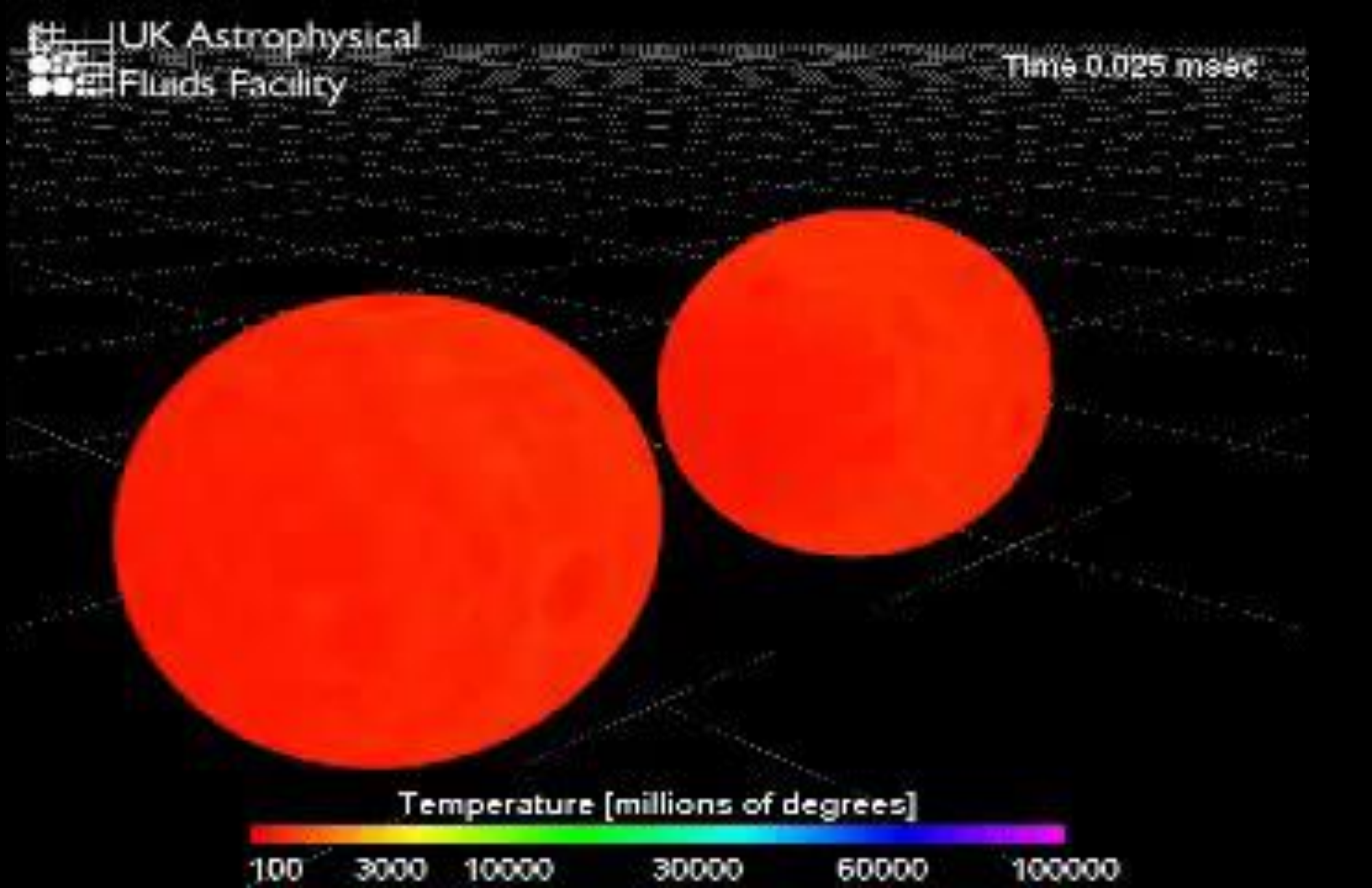
Neutron Stars

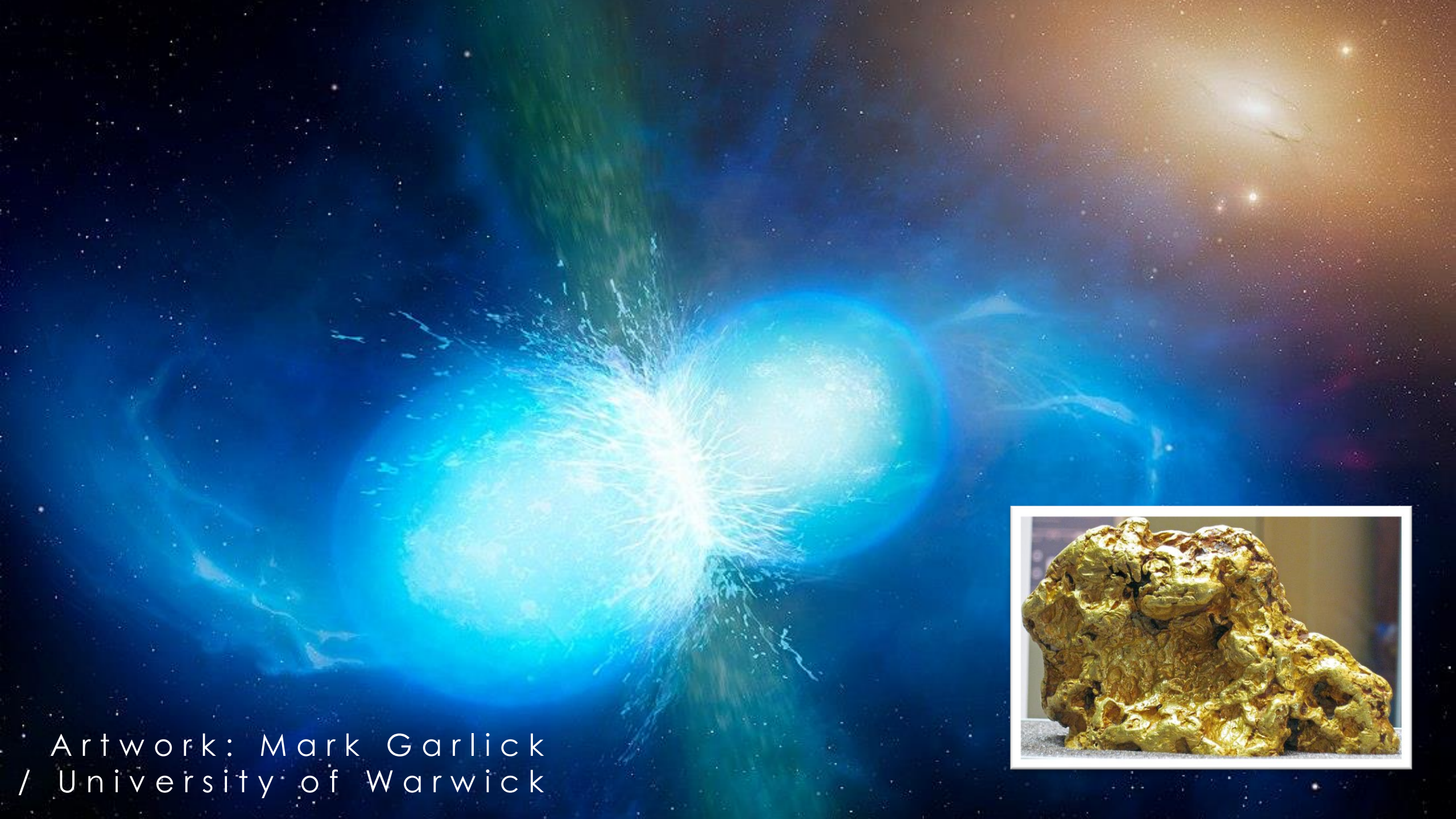


Neutron Stars



Neutron Stars

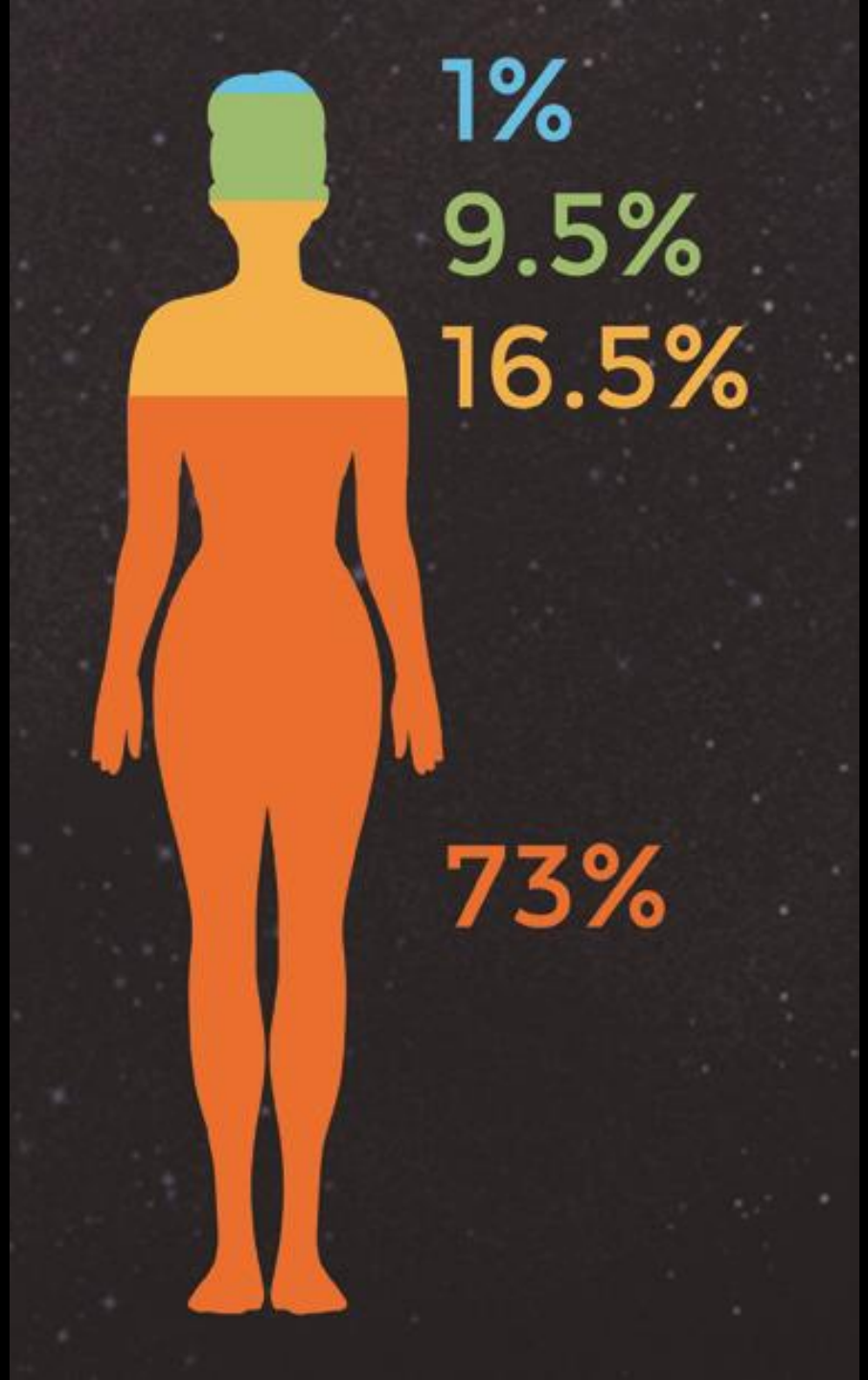




Artwork: Mark Garlick / University of Warwick

The Elements

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



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