



HURTIGRUTEN

Astronomy Voyage

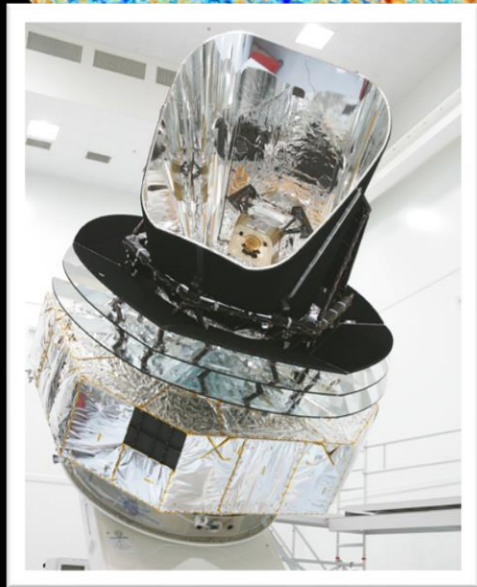
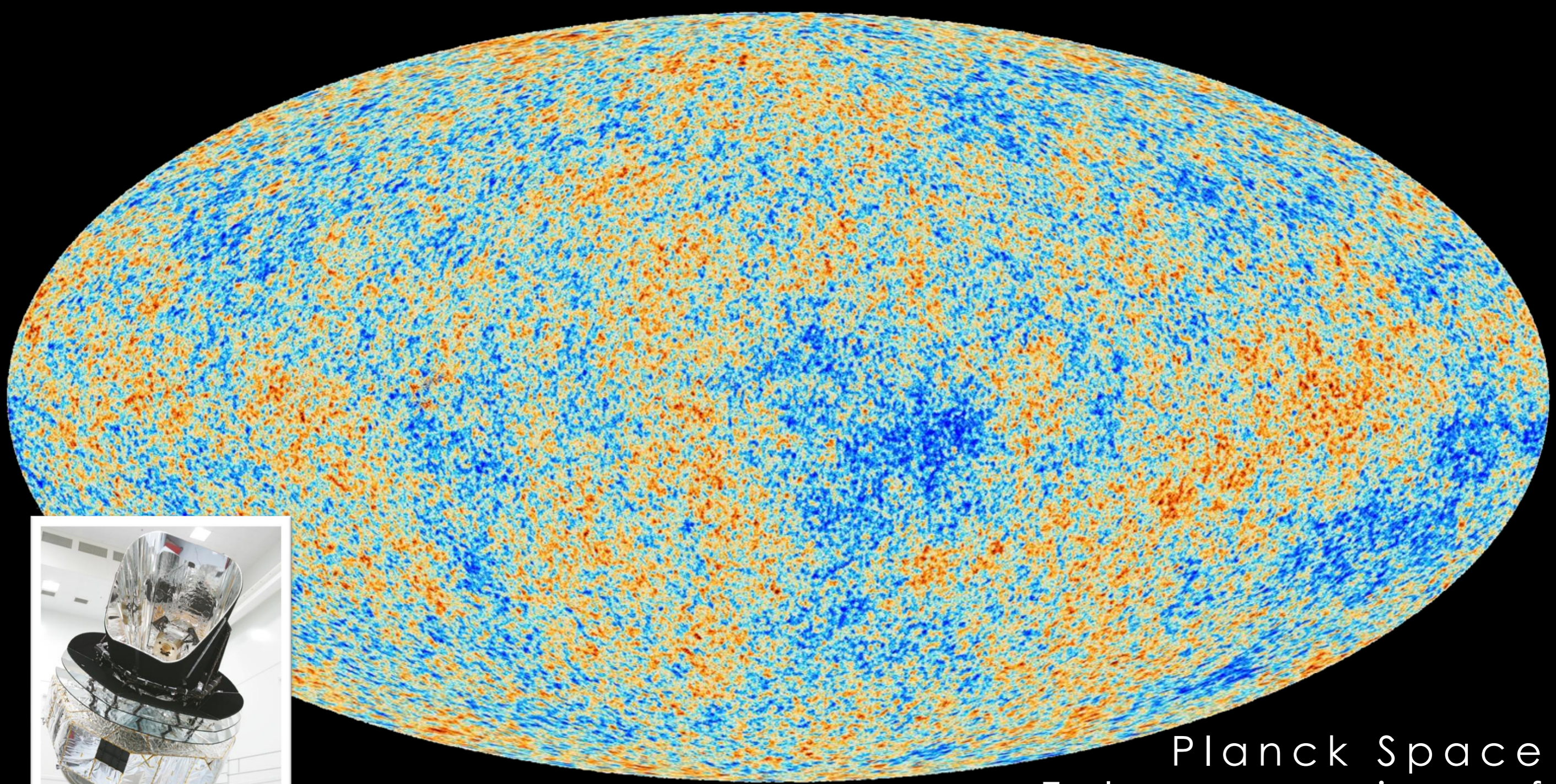
Dr Darren (Das) Baskill

Astronomer at the University of Sussex, UK

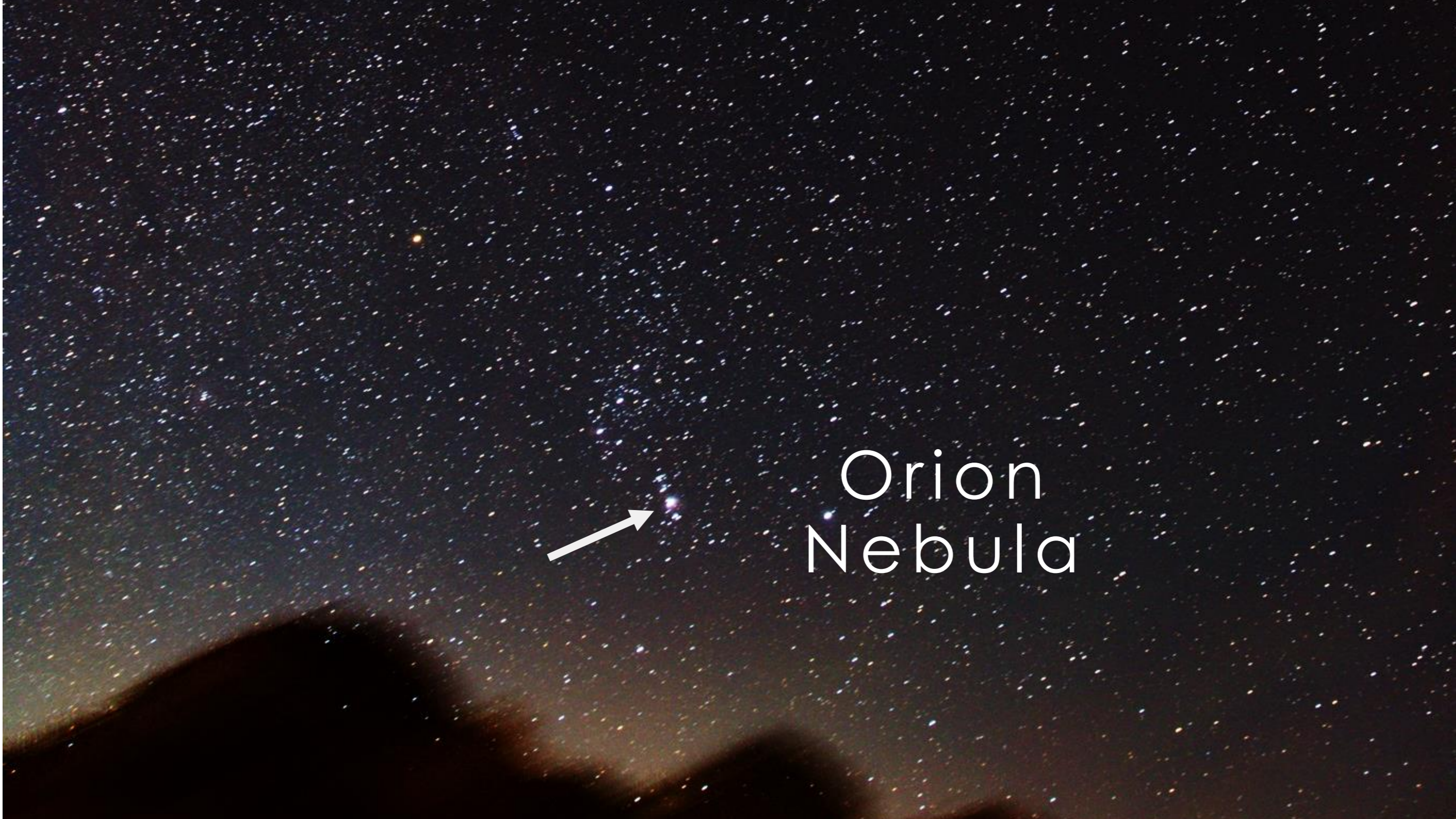
LECTURE PROGRAMME

- Tonight's Night Sky
- Astrophotography
- The Aurora
- The Scale of the Universe
- **The birth & death of stars & galaxies**
- **The violent Universe**
- **Modern Astronomy: Life as a
Astronomer & Tools of the Trade**
- **Why We Are Here: A 13.8-billion
year-old story**





Planck Space
Telescope view of
the very young Universe



Orion
Nebula

The Orion nebula



The Orion nebula



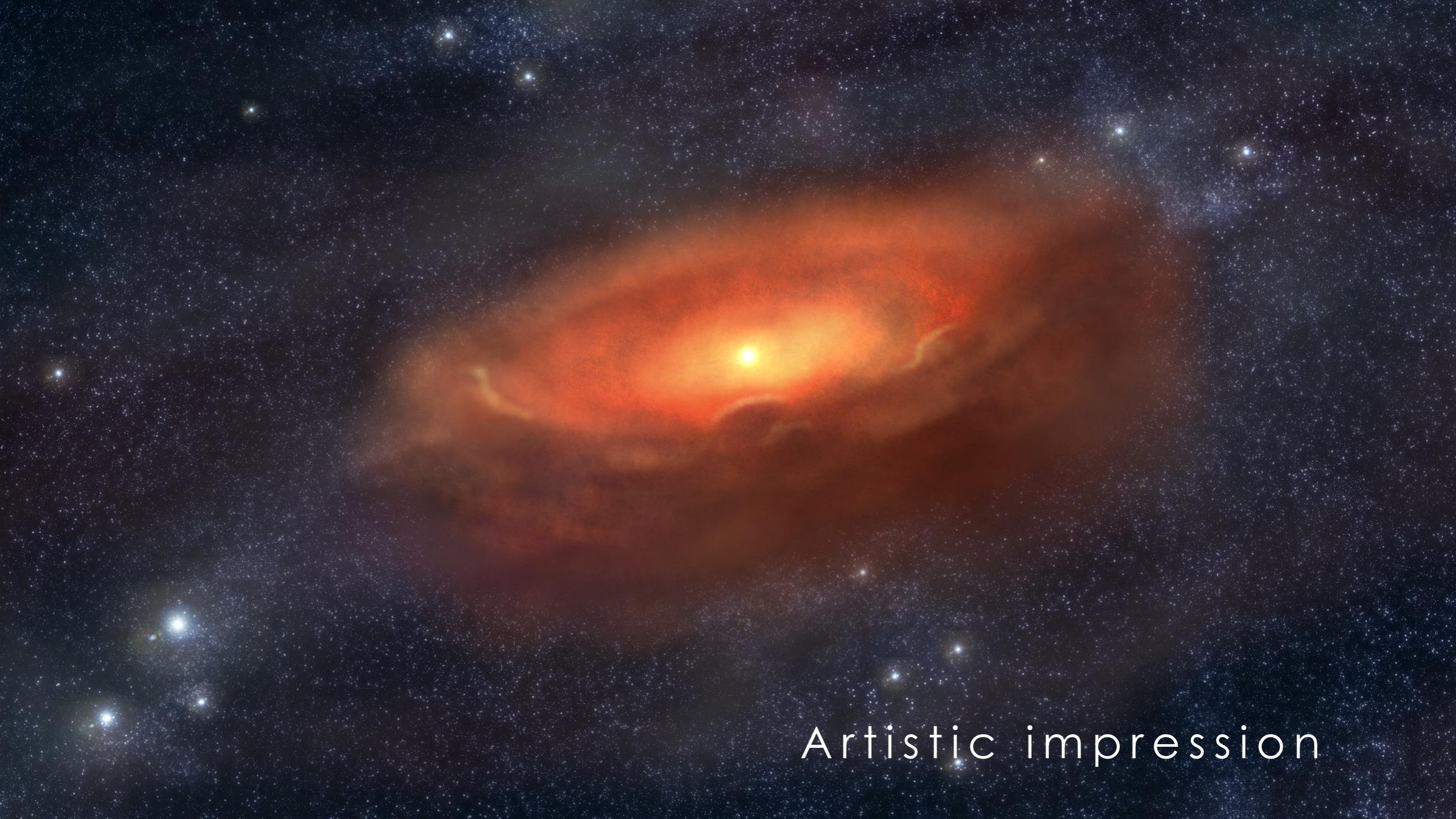
The Orion nebula





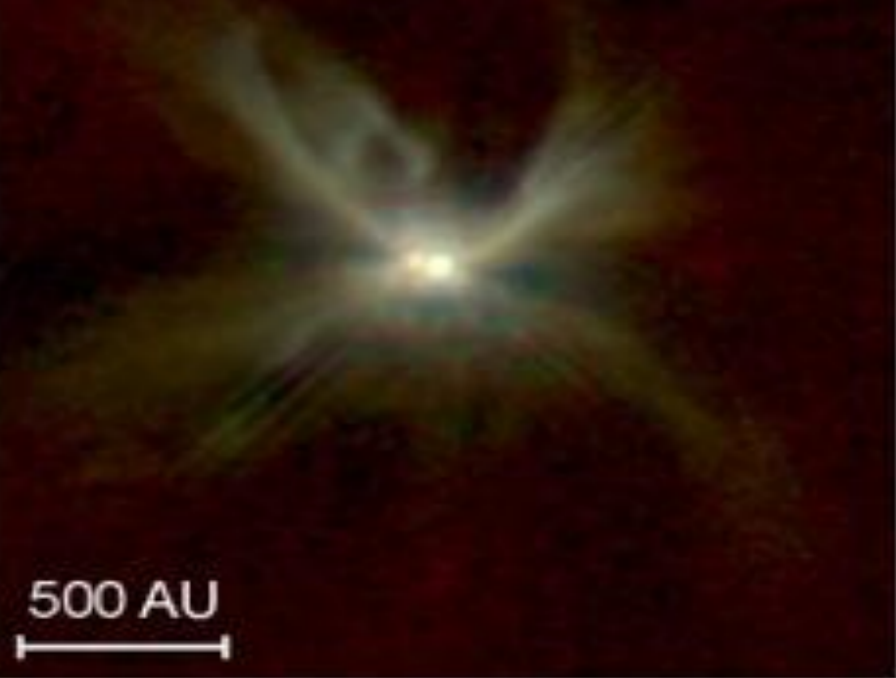




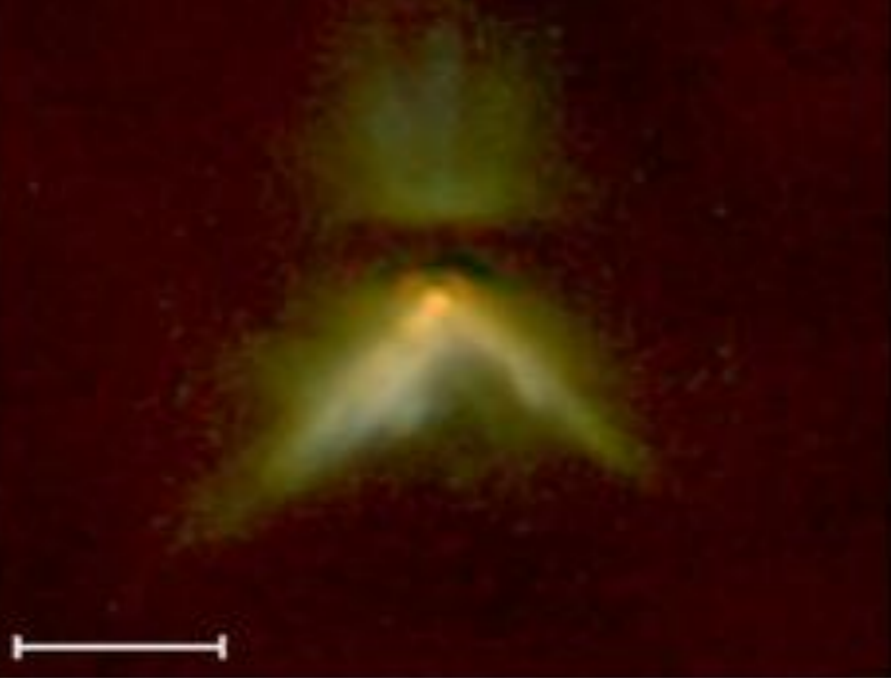


Artistic impression

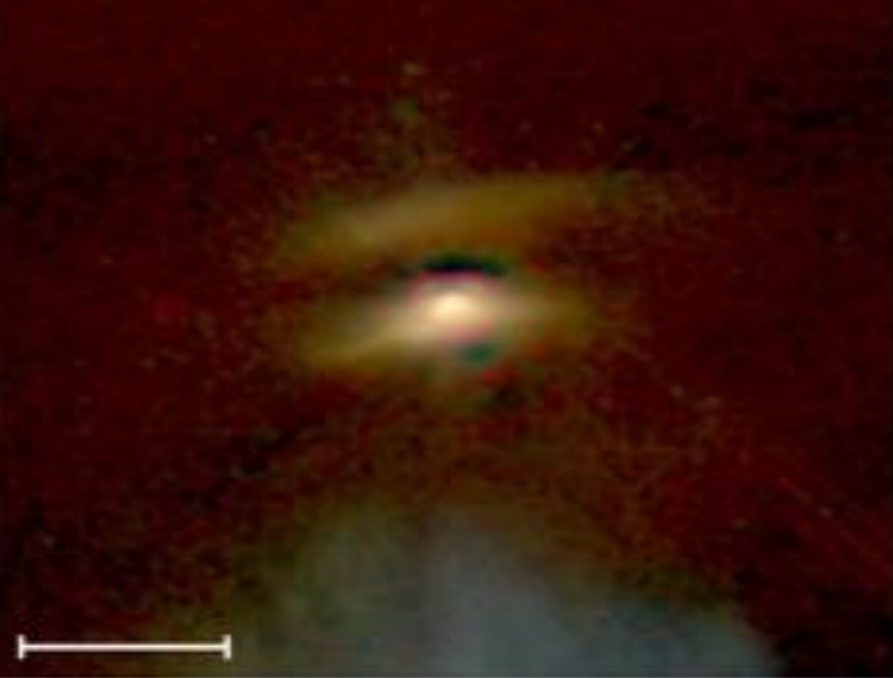
CoKu Tau1



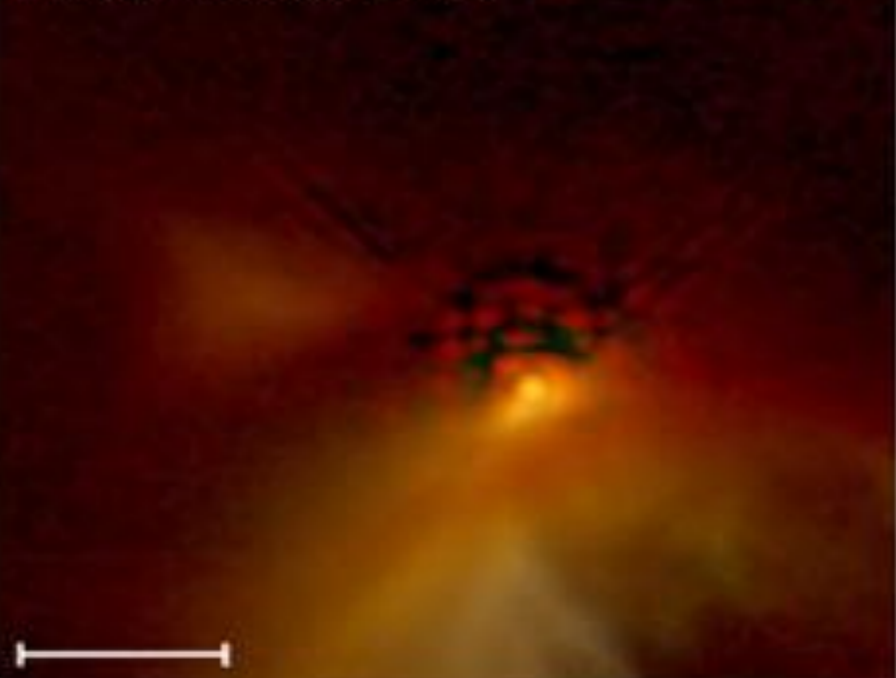
DG Tau B



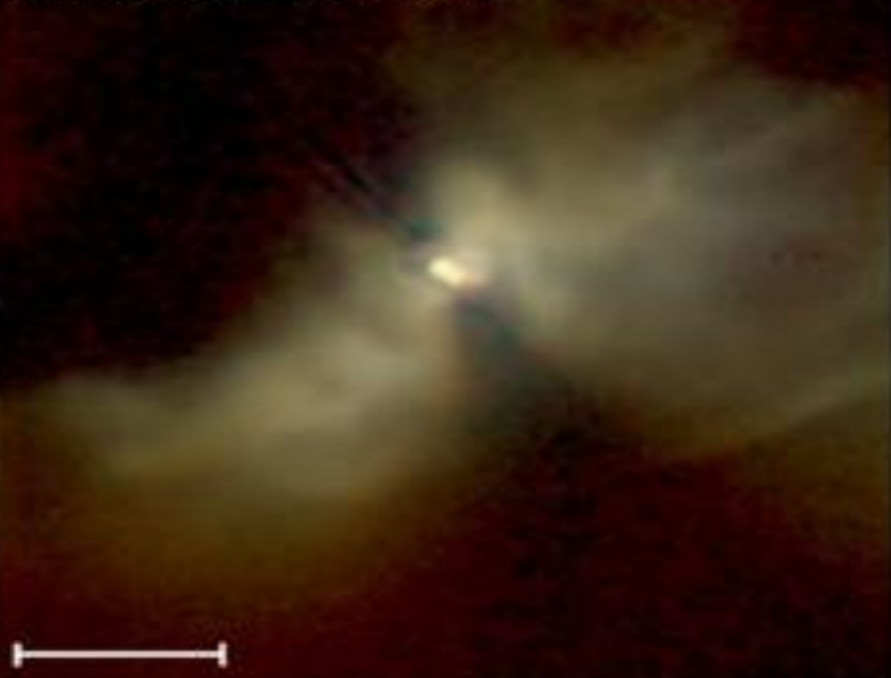
Haro 6-5B



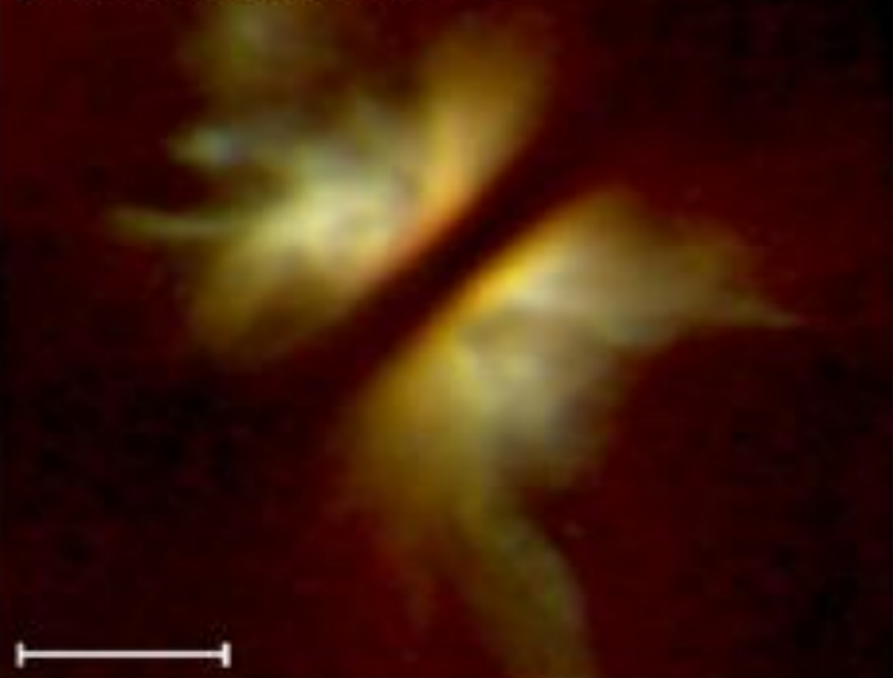
IRAS 04016+2610

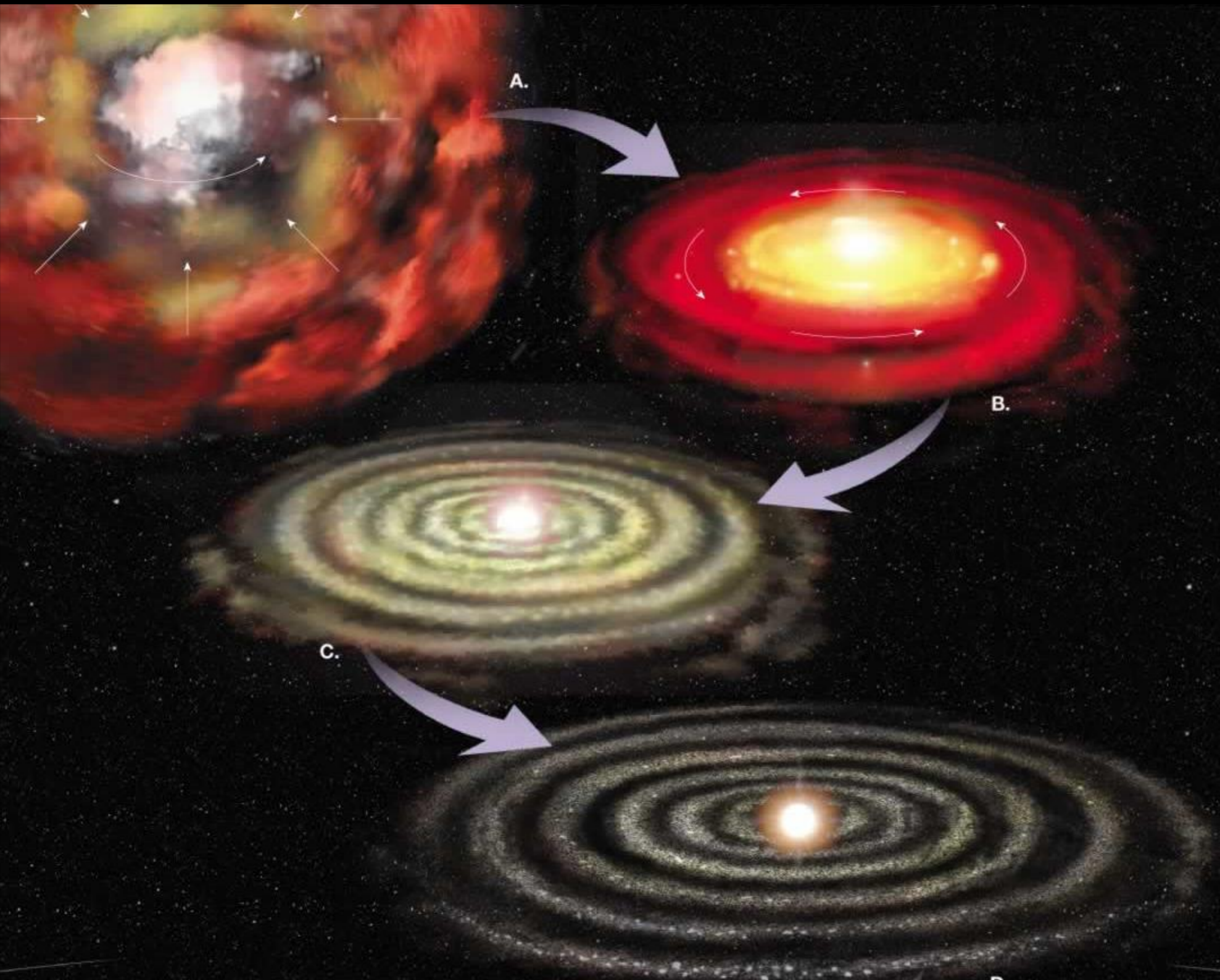


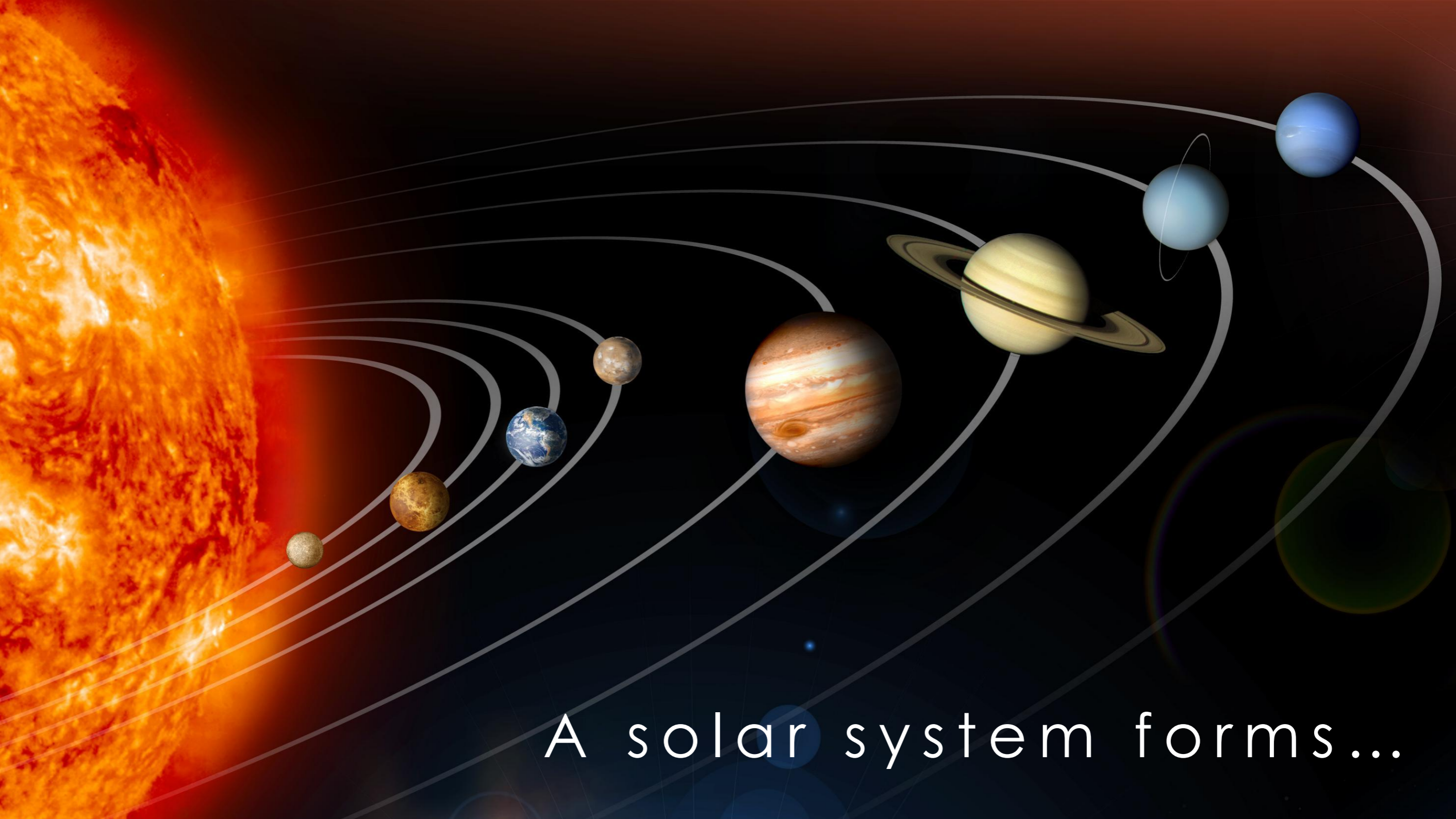
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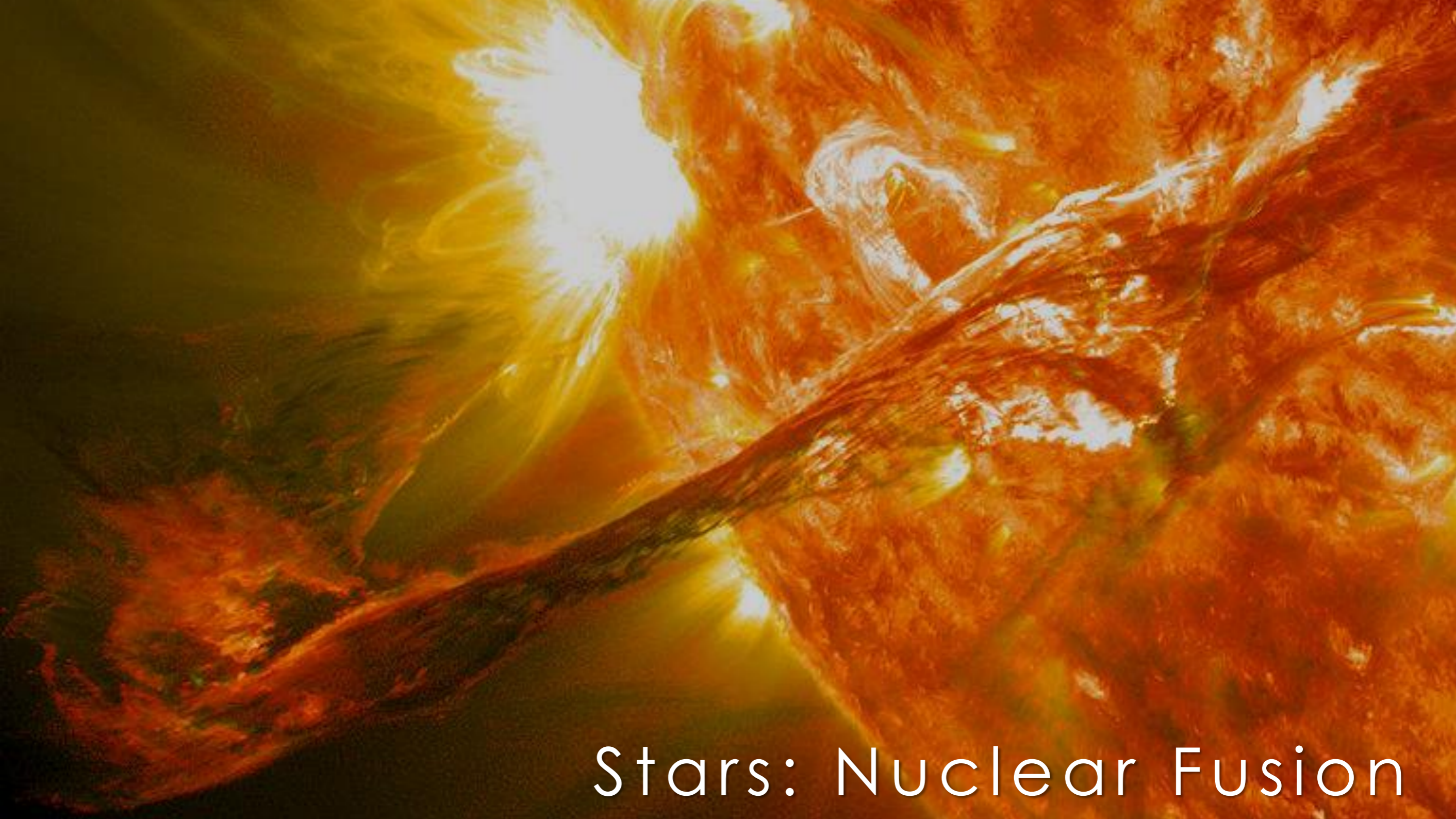
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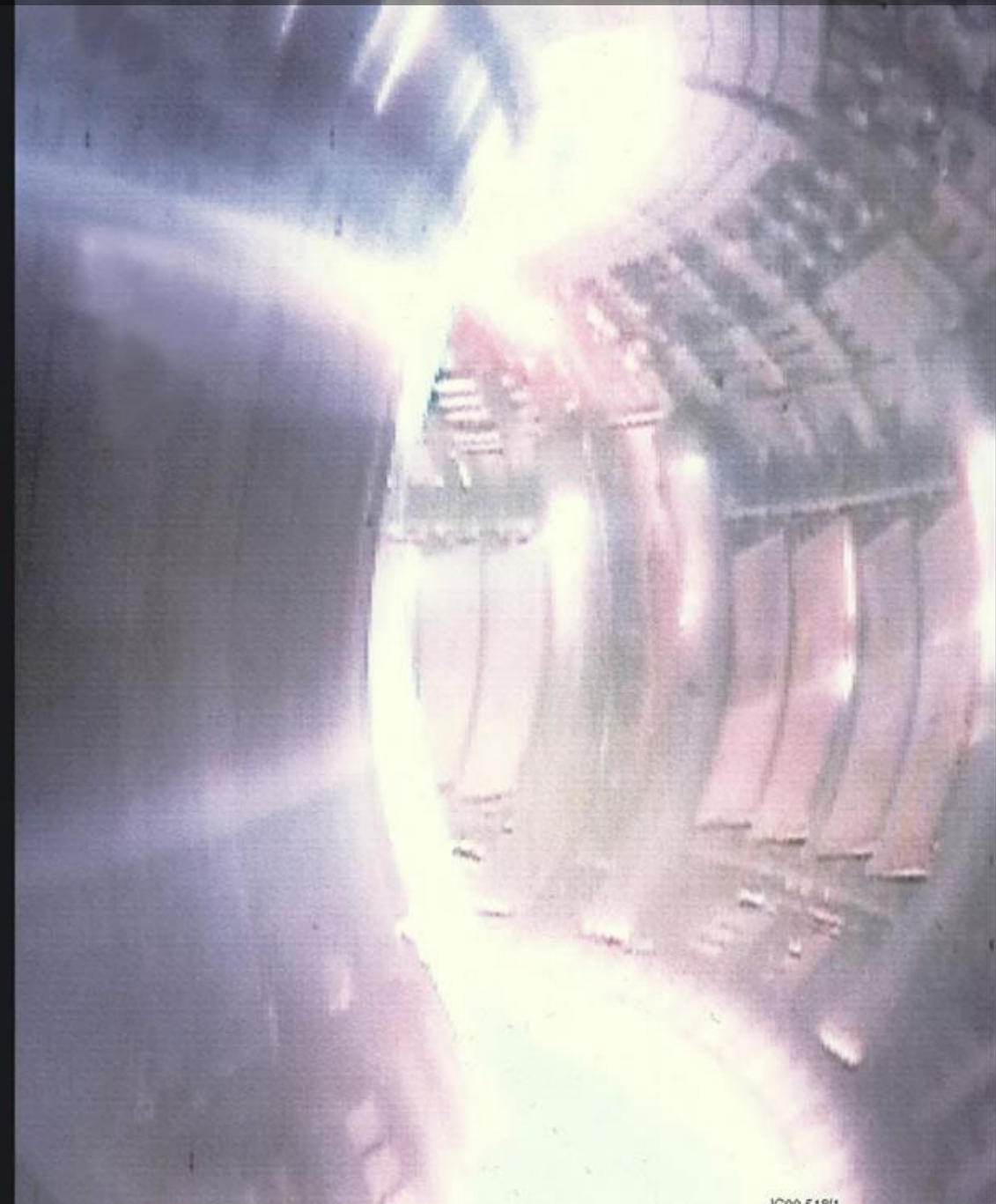
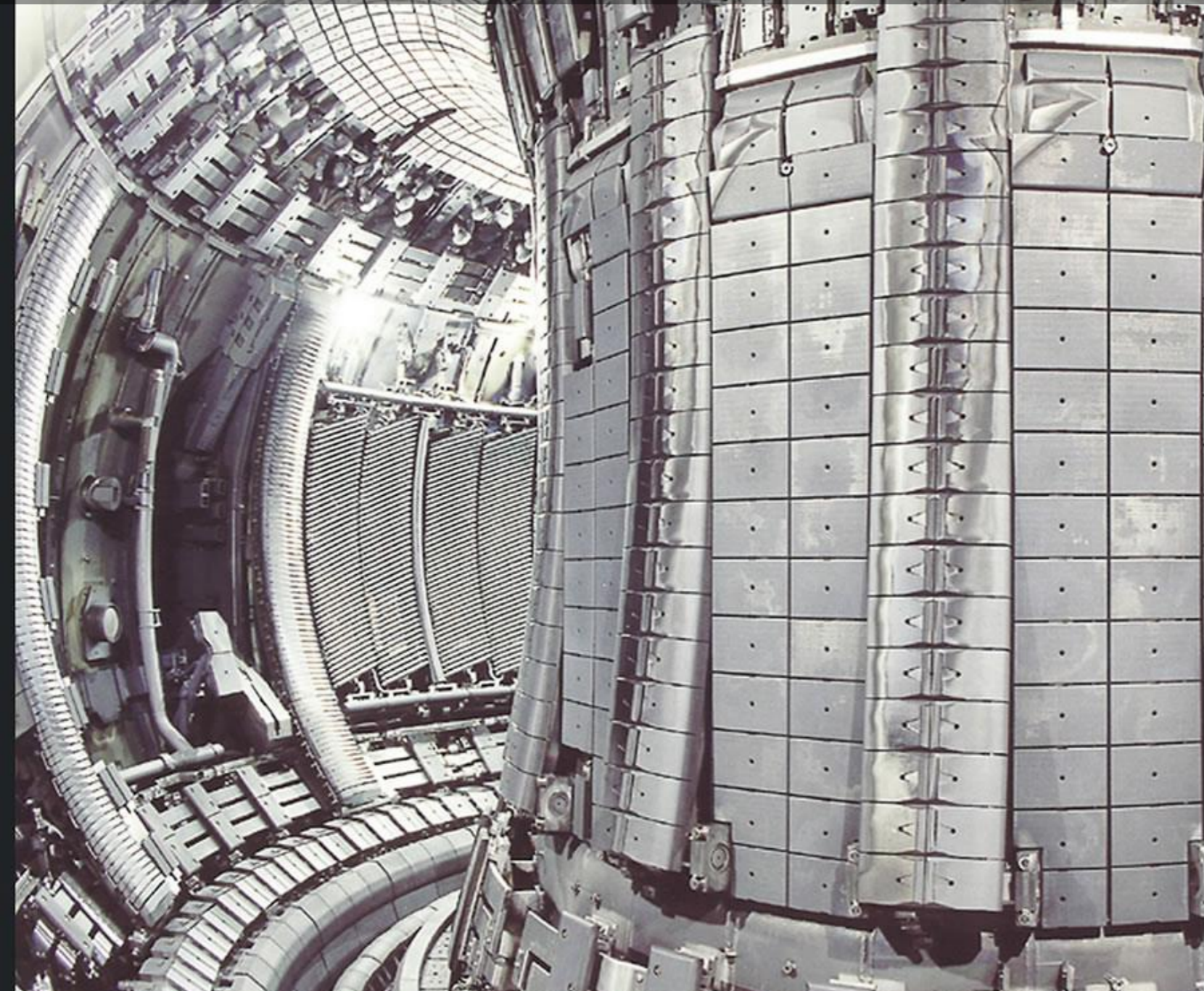


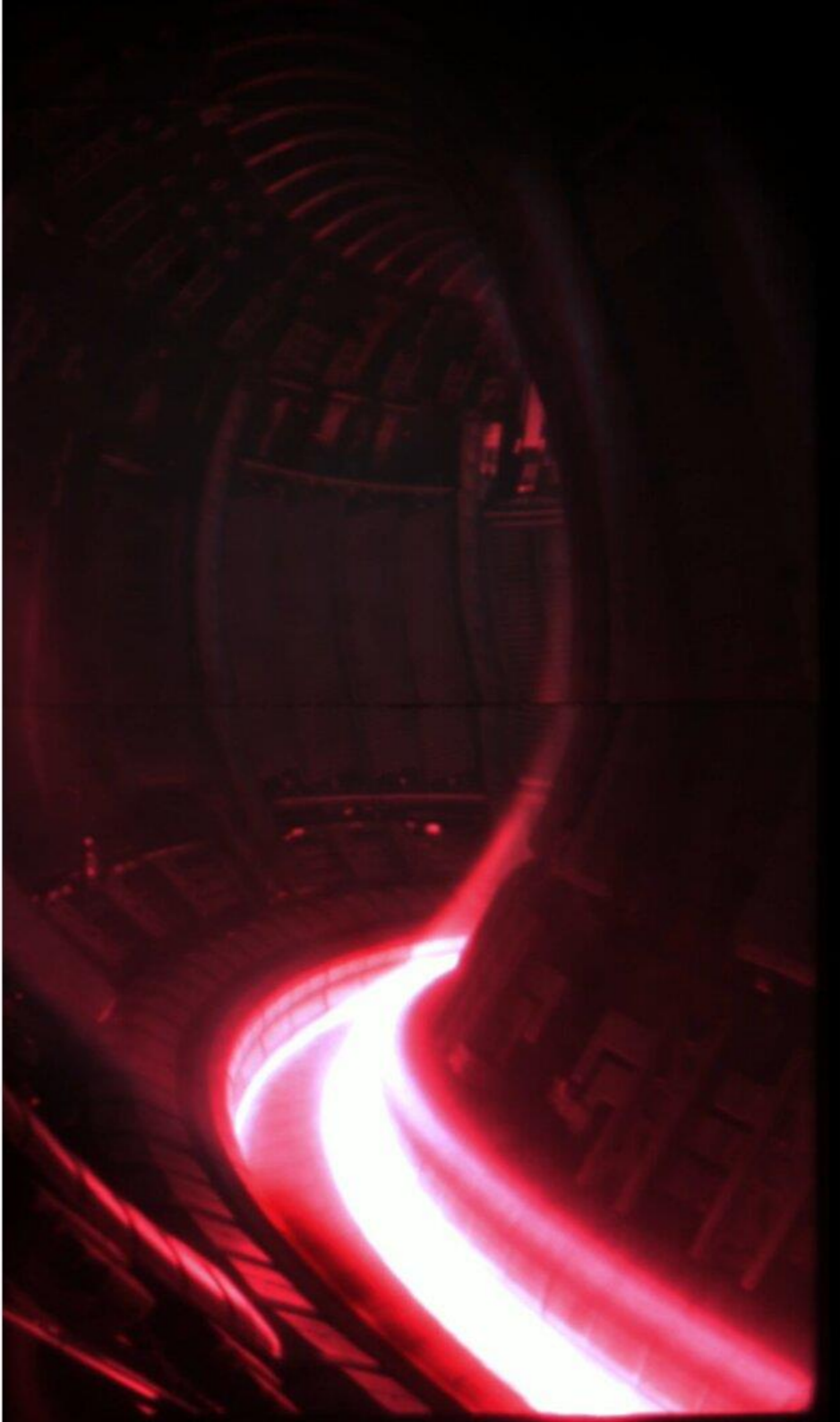
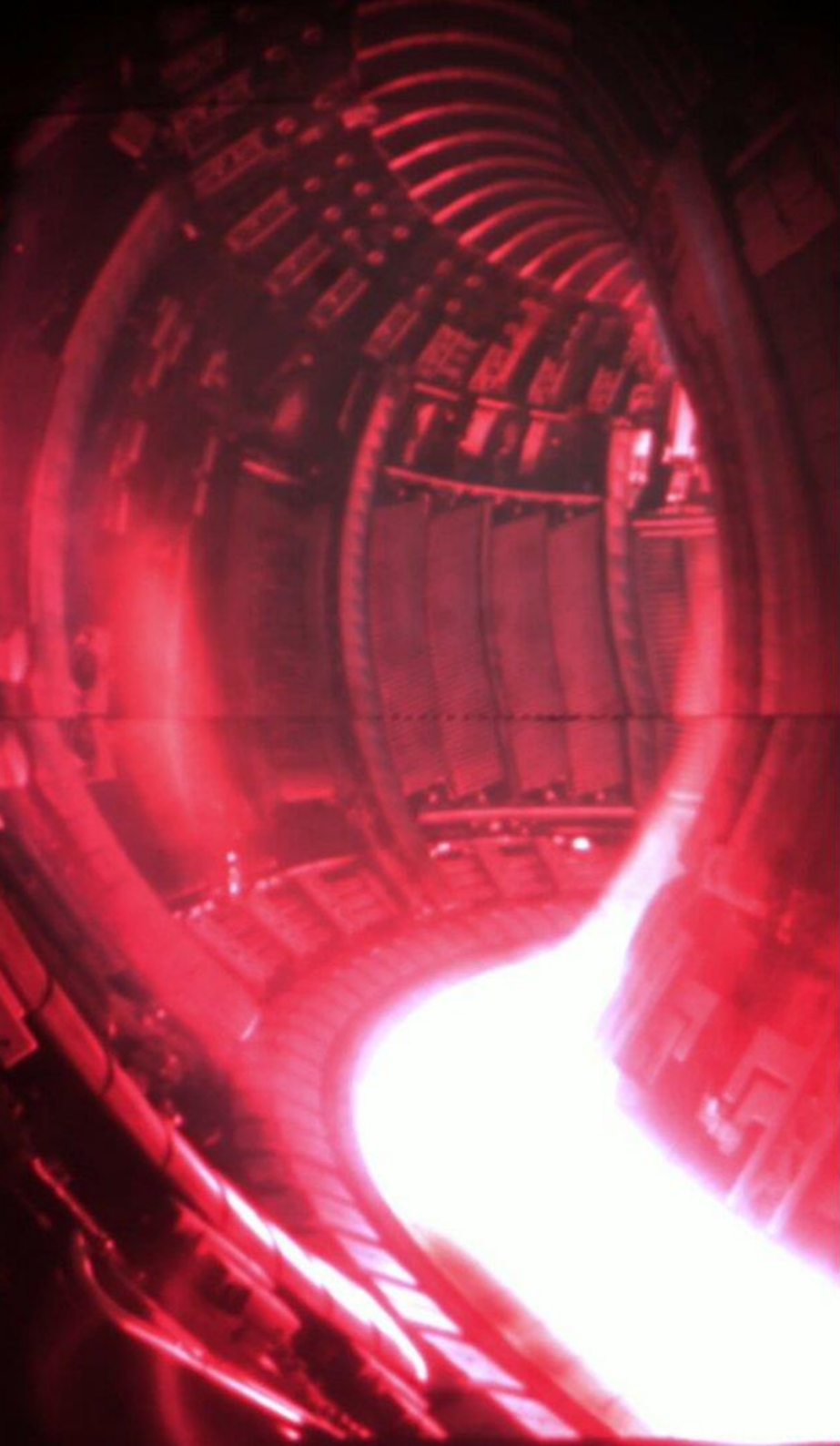
A solar system forms...



Stars: Nuclear Fusion

JET nuclear fusion reactor, Culham Centre for Fusion Energy (CCFE), Oxfordshire, UK AEA



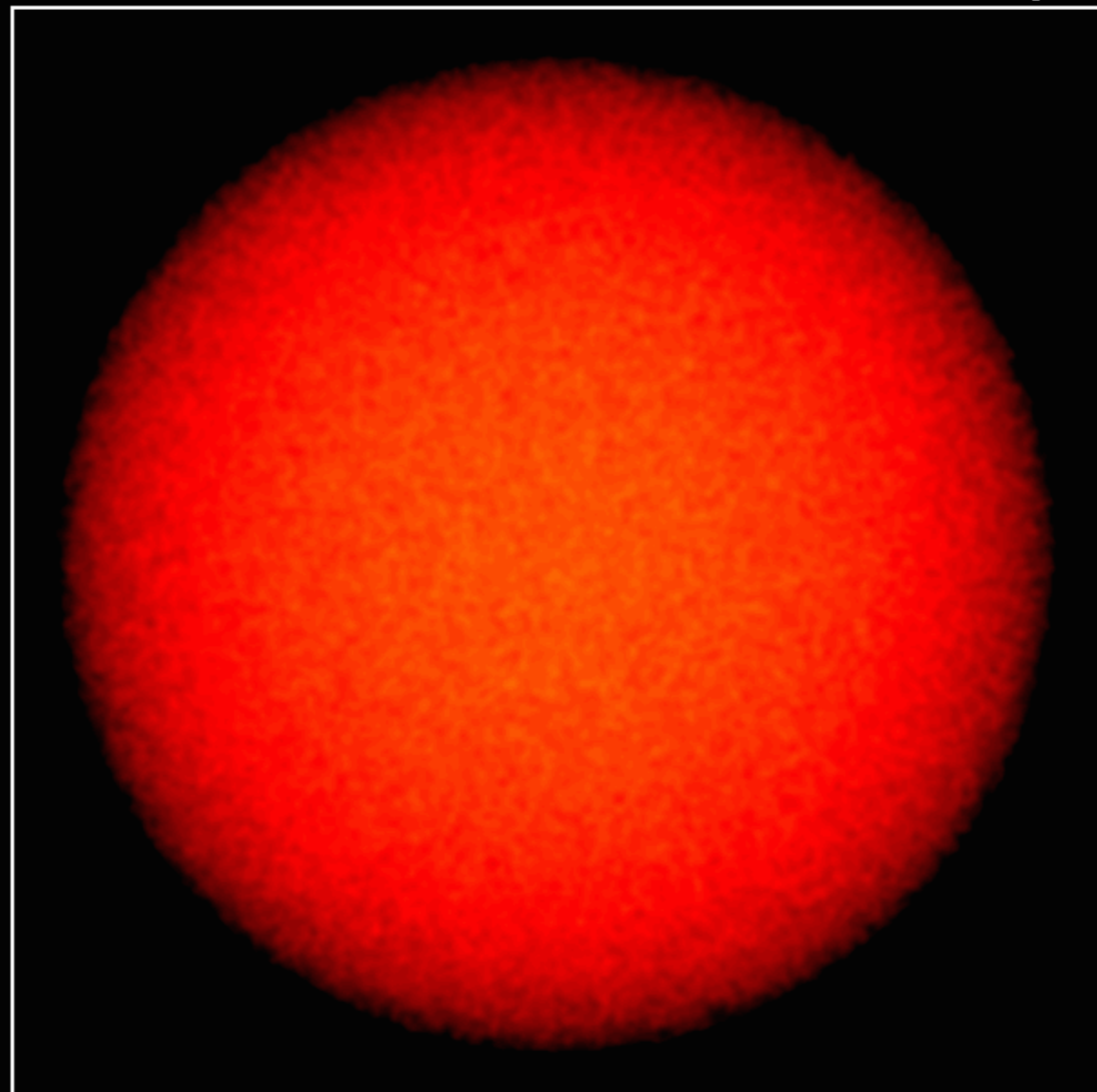




The size of
Earth to scale

Dimensions: 82500. AU

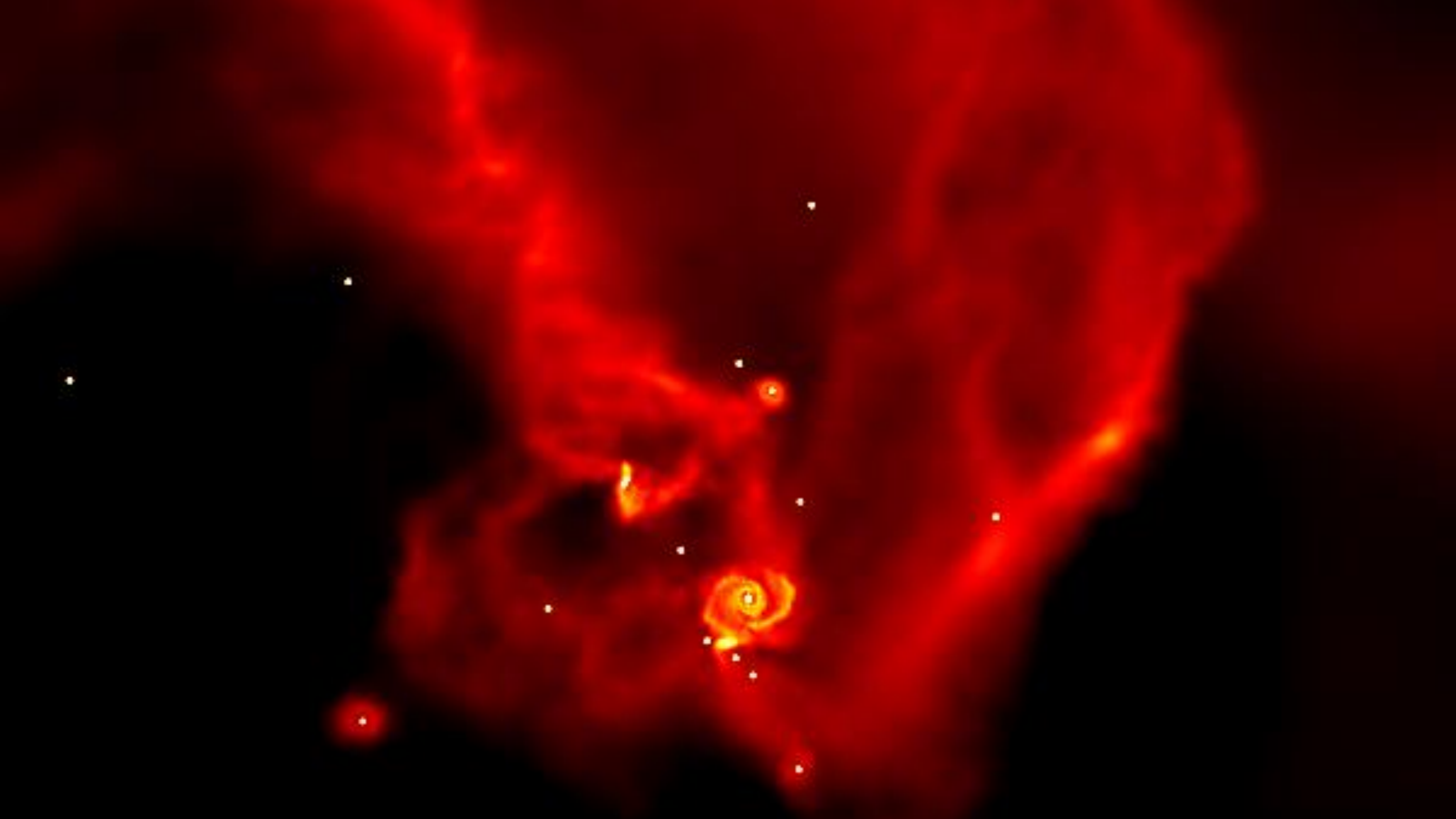
Time: 0. yr



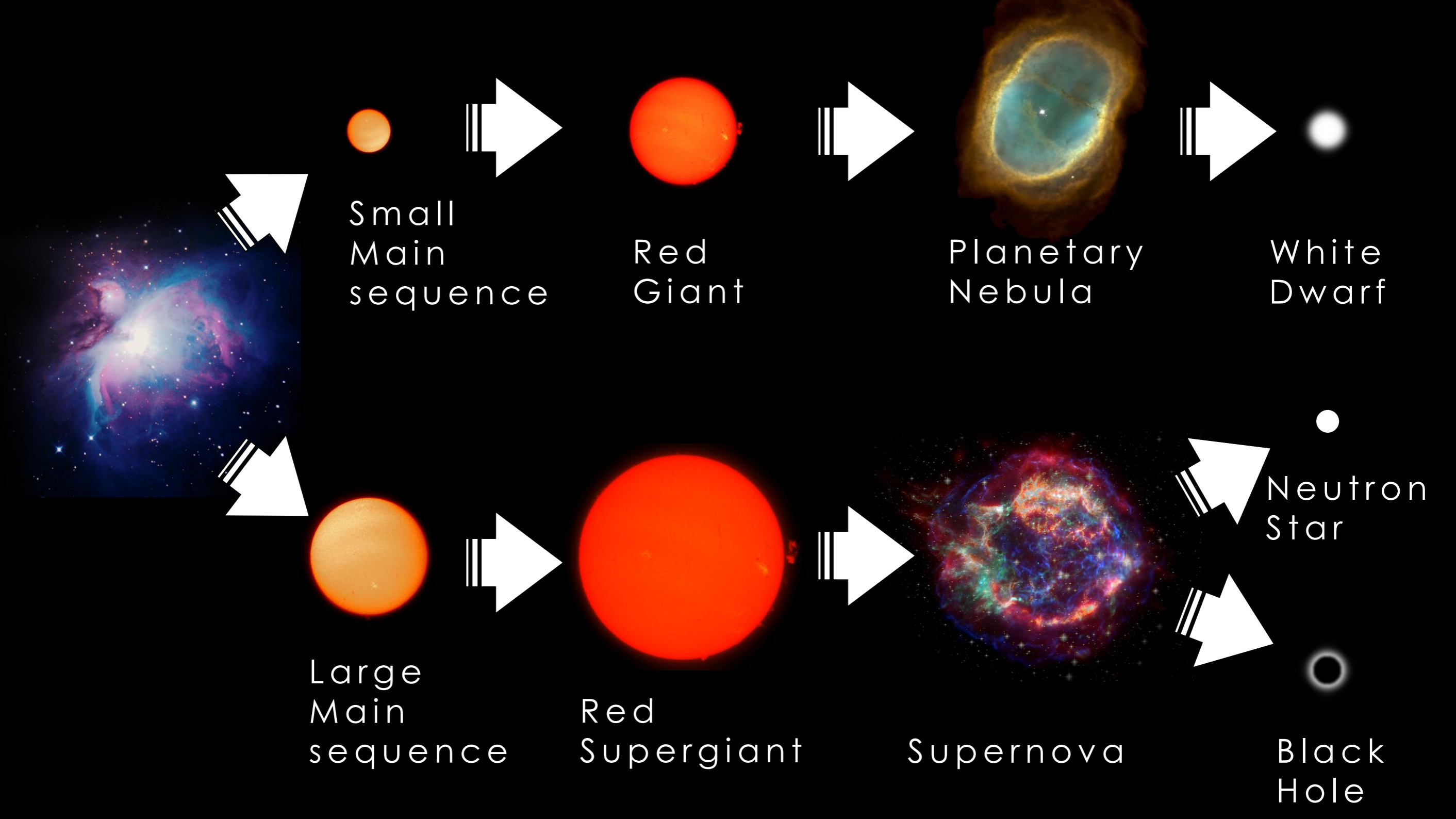
-1.4 -1.2 -1.0 -0.8 -0.6 -0.4 -0.2 0.0

Log Column Density [g/cm^2]

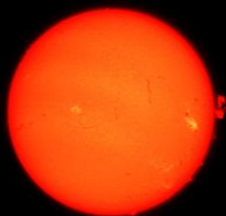
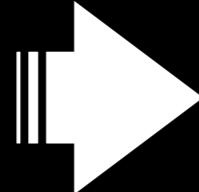
Matthew Bate



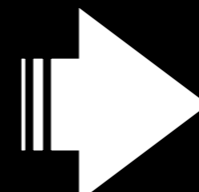




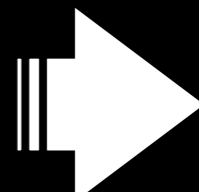
Small
Main
sequence



Red
Giant



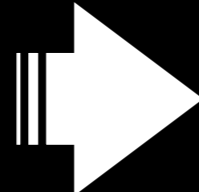
Planetary
Nebula



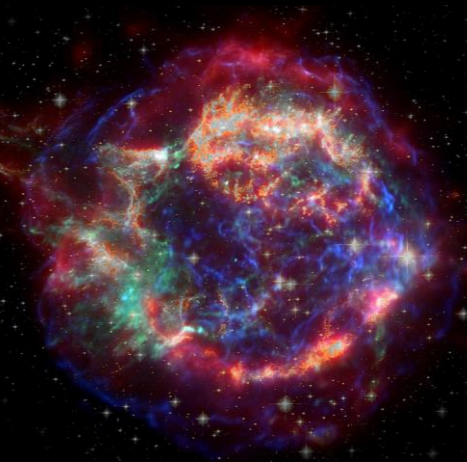
White
Dwarf



Large
Main
sequence



Red
Supergiant



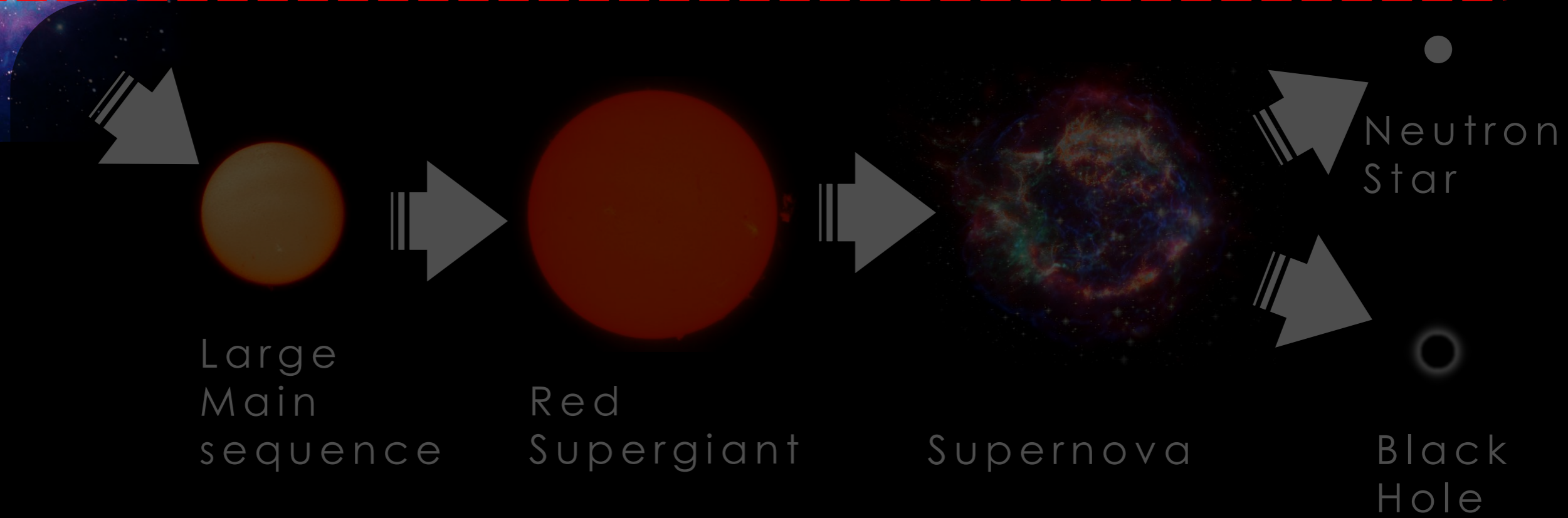
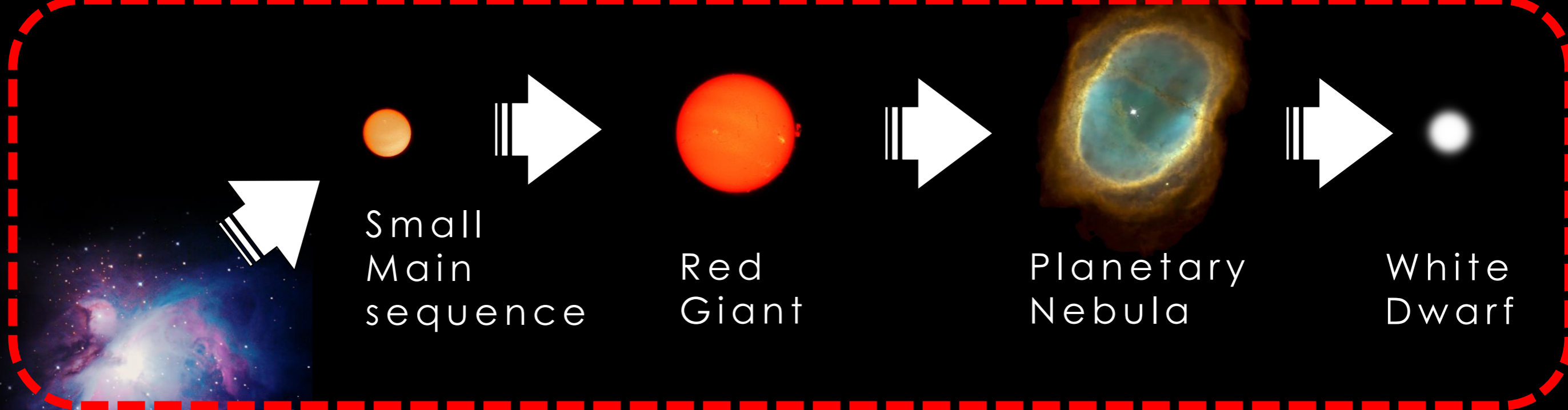
Supernova



Neutron
Star



Black
Hole



Red Giants stars
are 100-1,000 times
the diameter
of the Sun!



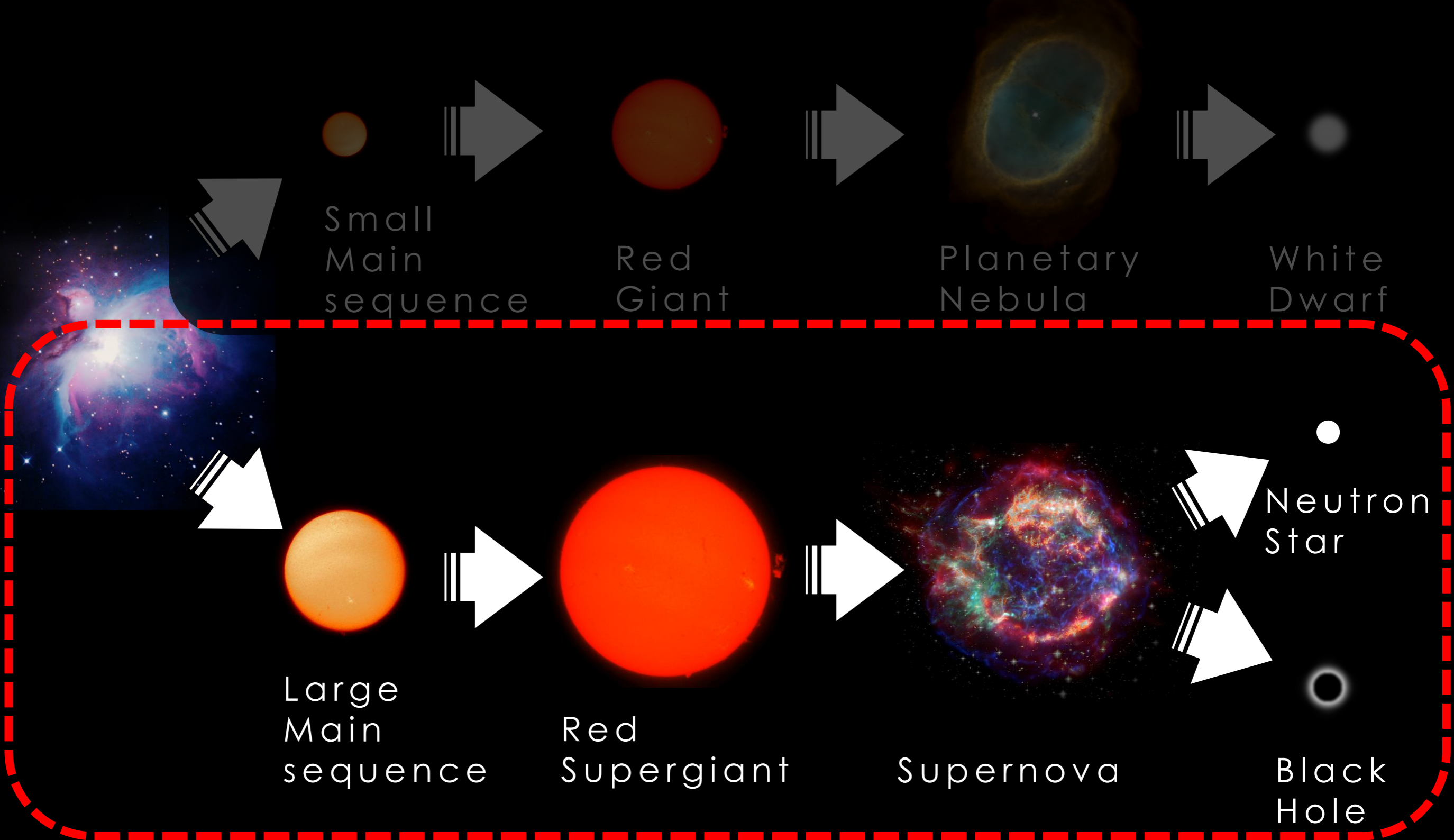
The Sun as a red giant
(diameter ≈ 2 AU)

The Sun as a main-sequence star
(diameter ≈ 0.01 AU)



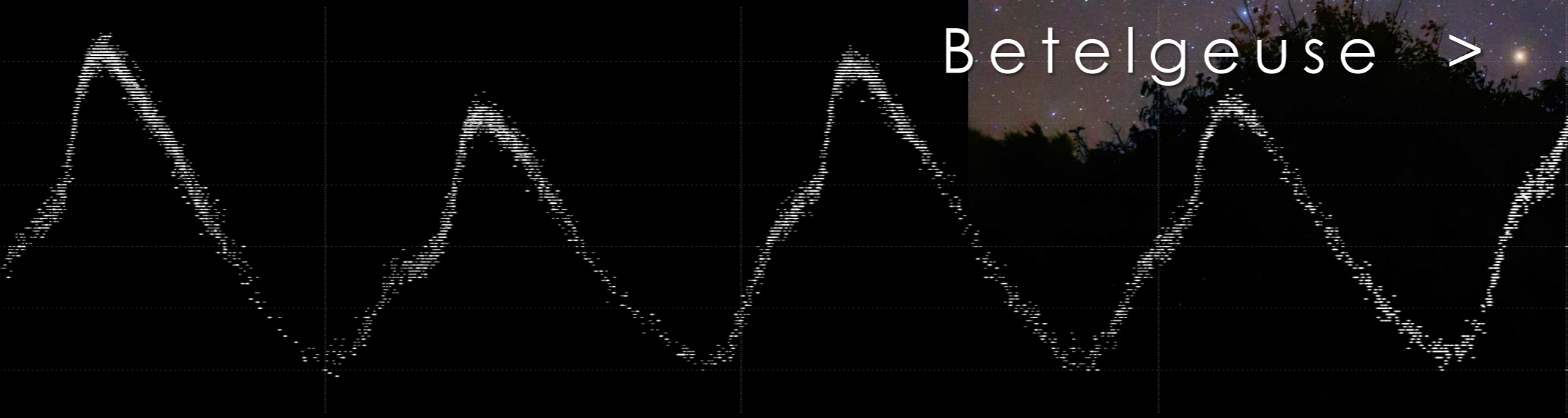
The Ring Nebula

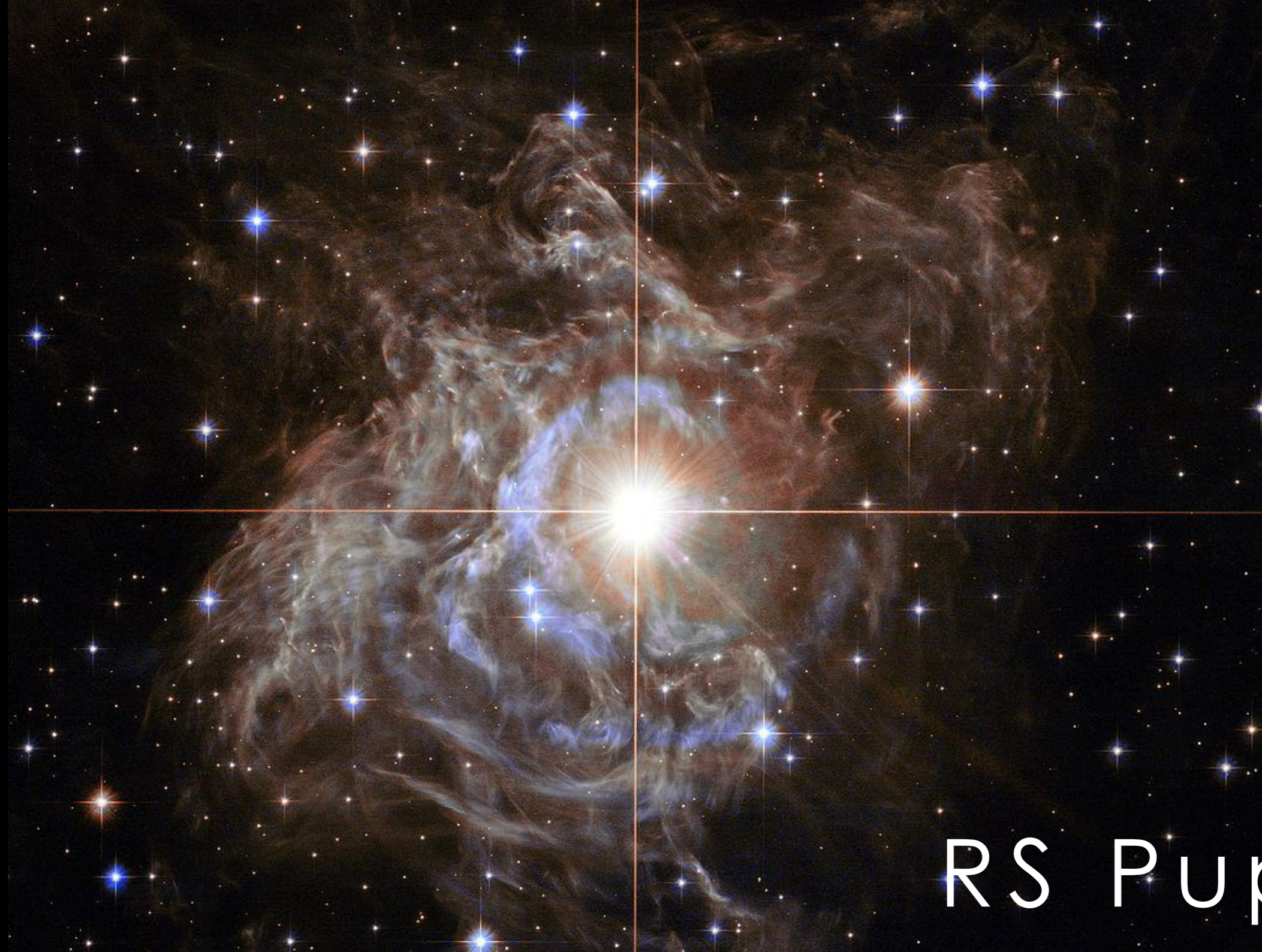




At this stage, some
massive stars
become unstable,
and they pulsate.

Betelgeuse >

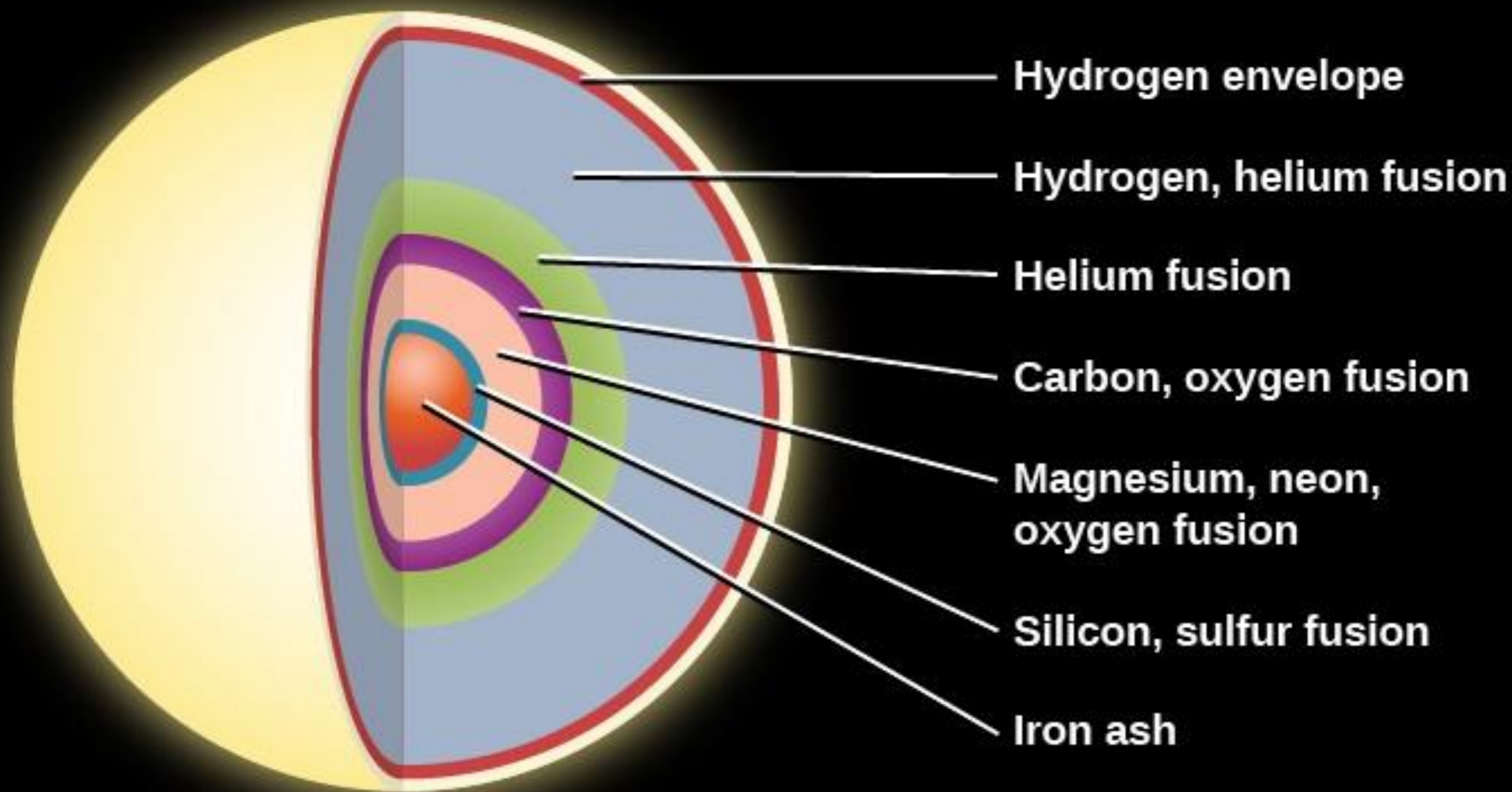




RS Puppis



Eta Carinae



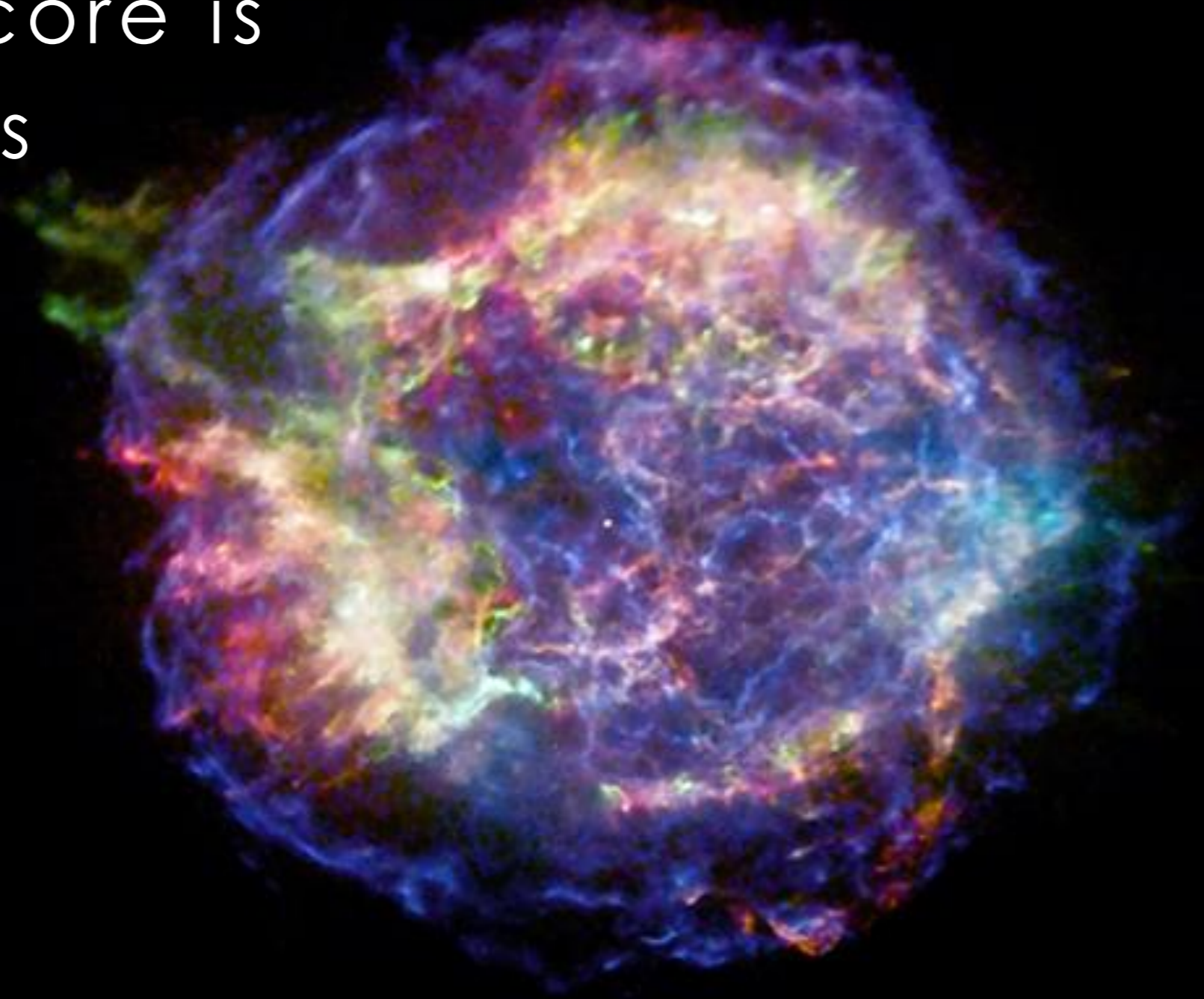


Supernova in the Whirlpool Galaxy





If the remaining core is
< $3 M_{\odot}$ it becomes
a *neutron star*.



More massive
cores collapse *into black holes*.



Binary neutron stars

Gamma Ray Bursts

A burst of gamma rays indicates a
black hole has formed...



The Swift Space Telescope

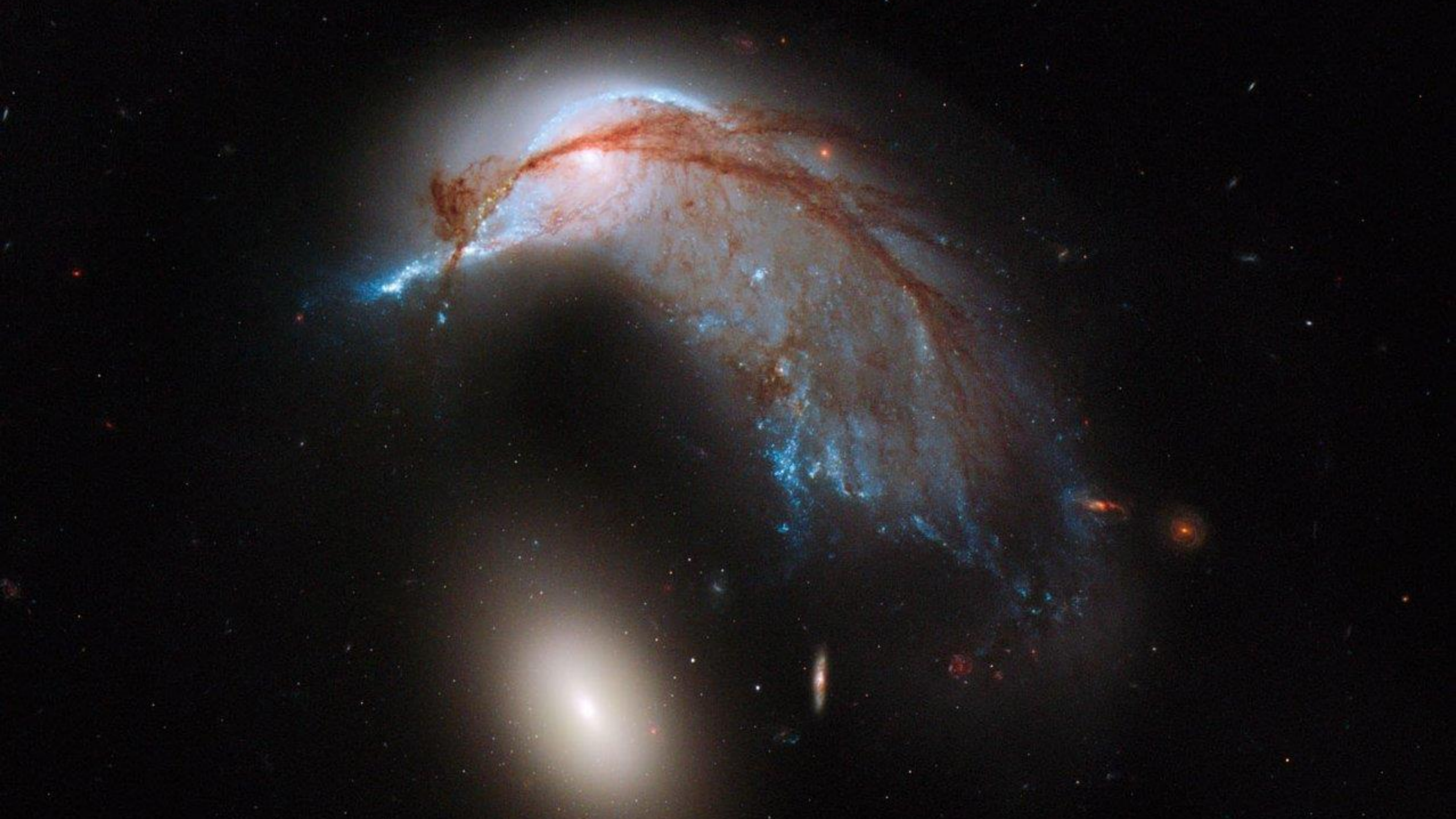
detects a GRB every ~3-7 days



Galaxies Collide









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Astronomy Voyage

Dr Darren (Das) Baskill

Astronomer at the University of Sussex, UK