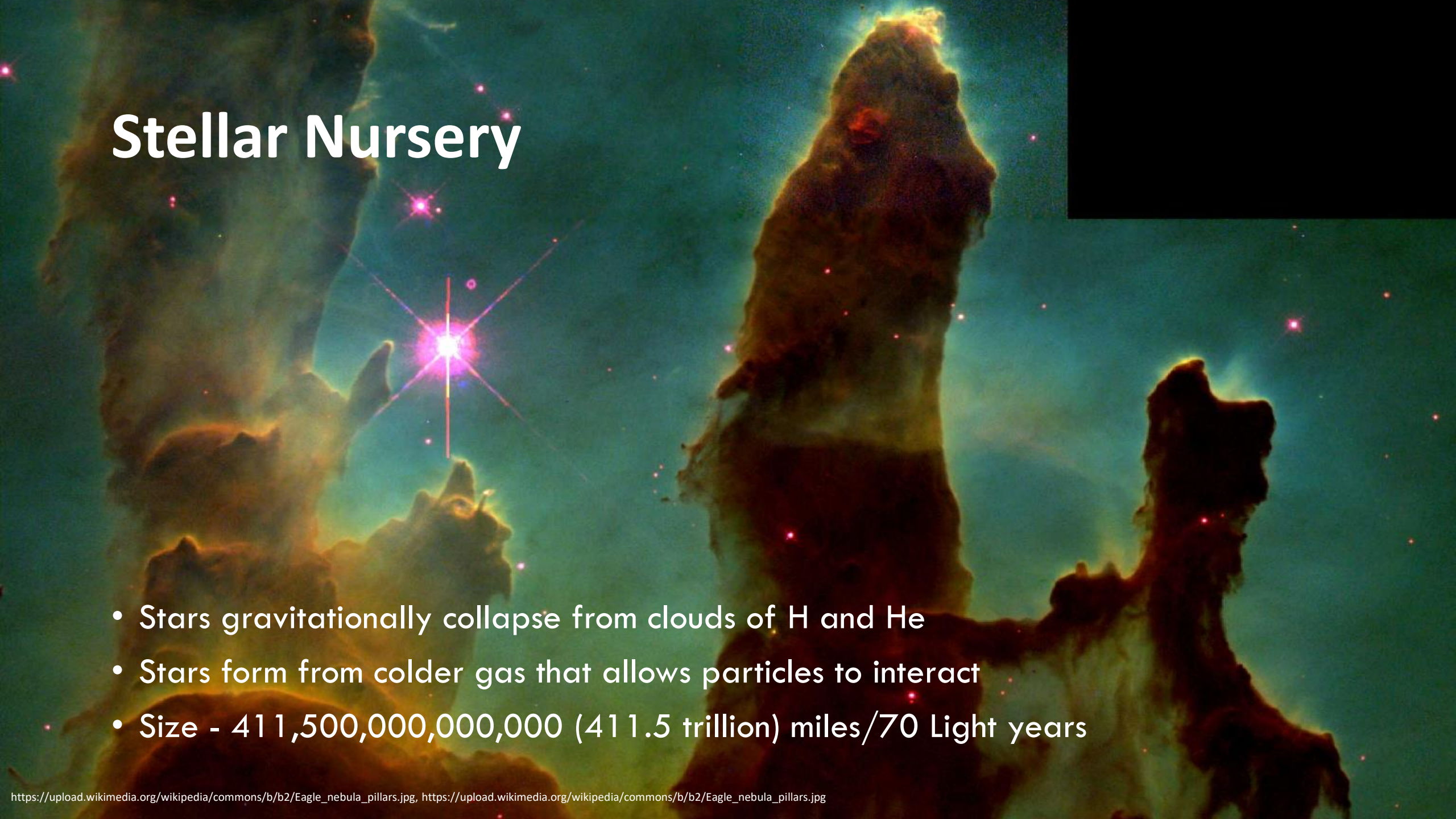

STELLAR TIMELINE
THE BIRTH AND DEATH OF A STAR

Stellar Nursery



- Stars gravitationally collapse from clouds of H and He
- Stars form from colder gas that allows particles to interact
- Size - 411,500,000,000,000 (411.5 trillion) miles/70 Light years

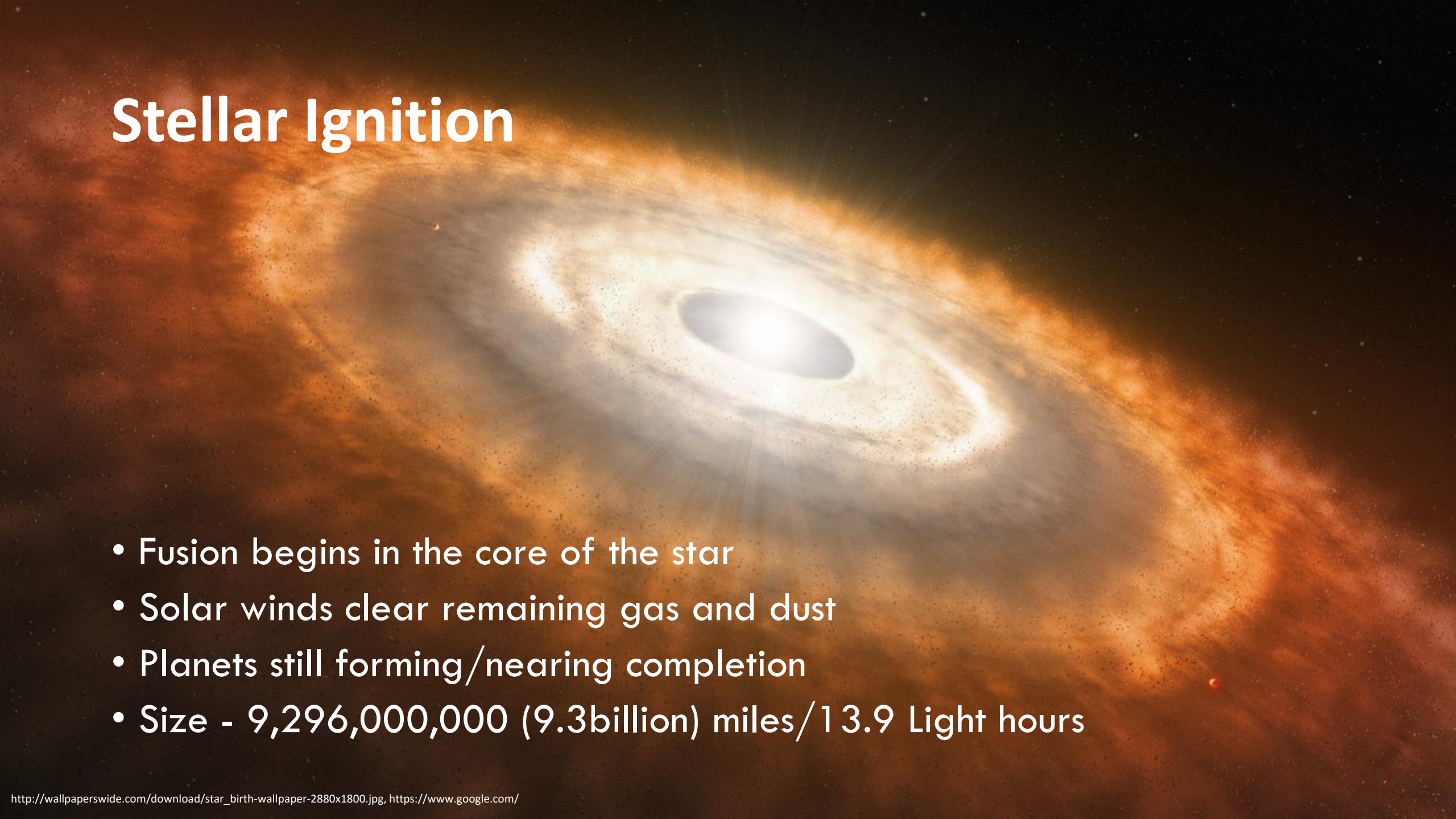
https://upload.wikimedia.org/wikipedia/commons/b/b2/Eagle_nebula_pillars.jpg, https://upload.wikimedia.org/wikipedia/commons/b/b2/Eagle_nebula_pillars.jpg

Collapsing Nebula and Planetary Formation

- Sun and planets begin to take shape from disk of gas
- Rocky planet/gas giant/ice giant locations
- Size - 13,940,000,000 (13.9billion) miles/20.8 Light hours

https://www.nasa.gov/sites/default/files/pia17849_1_0.jpg, https://www.nasa.gov/sites/default/

Stellar Ignition

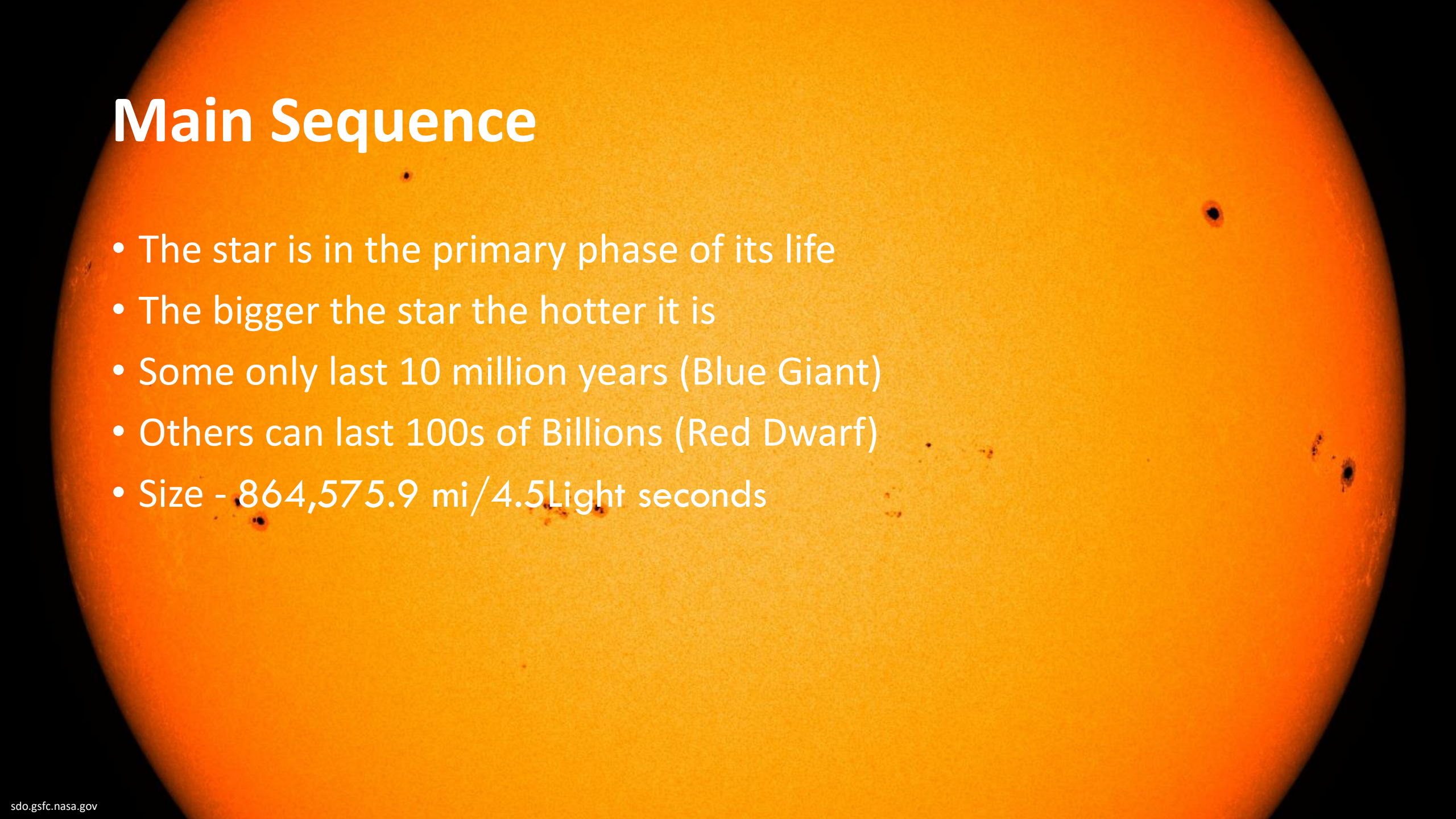


- Fusion begins in the core of the star
- Solar winds clear remaining gas and dust
- Planets still forming/nearing completion
- Size - 9,296,000,000 (9.3billion) miles/13.9 Light hours

http://wallpaperswide.com/download/star_birth-wallpaper-2880x1800.jpg, https://www.google.com/

Main Sequence

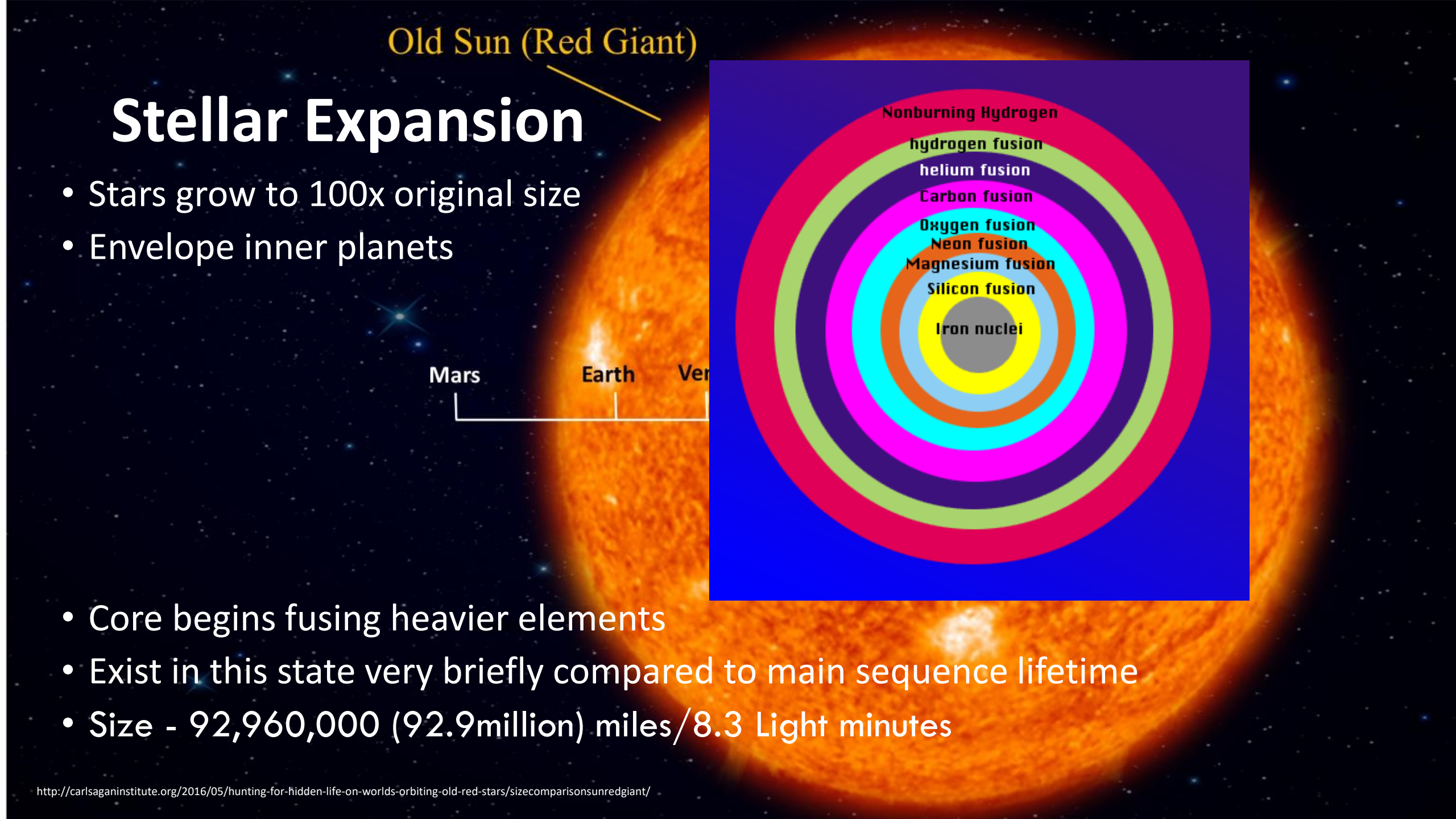
- The star is in the primary phase of its life
- The bigger the star the hotter it is
- Some only last 10 million years (Blue Giant)
- Others can last 100s of Billions (Red Dwarf)
- Size - 864,575.9 mi/4.5Light seconds



sdo.gsfc.nasa.gov

Stellar Expansion

- Stars grow to 100x original size
- Envelope inner planets

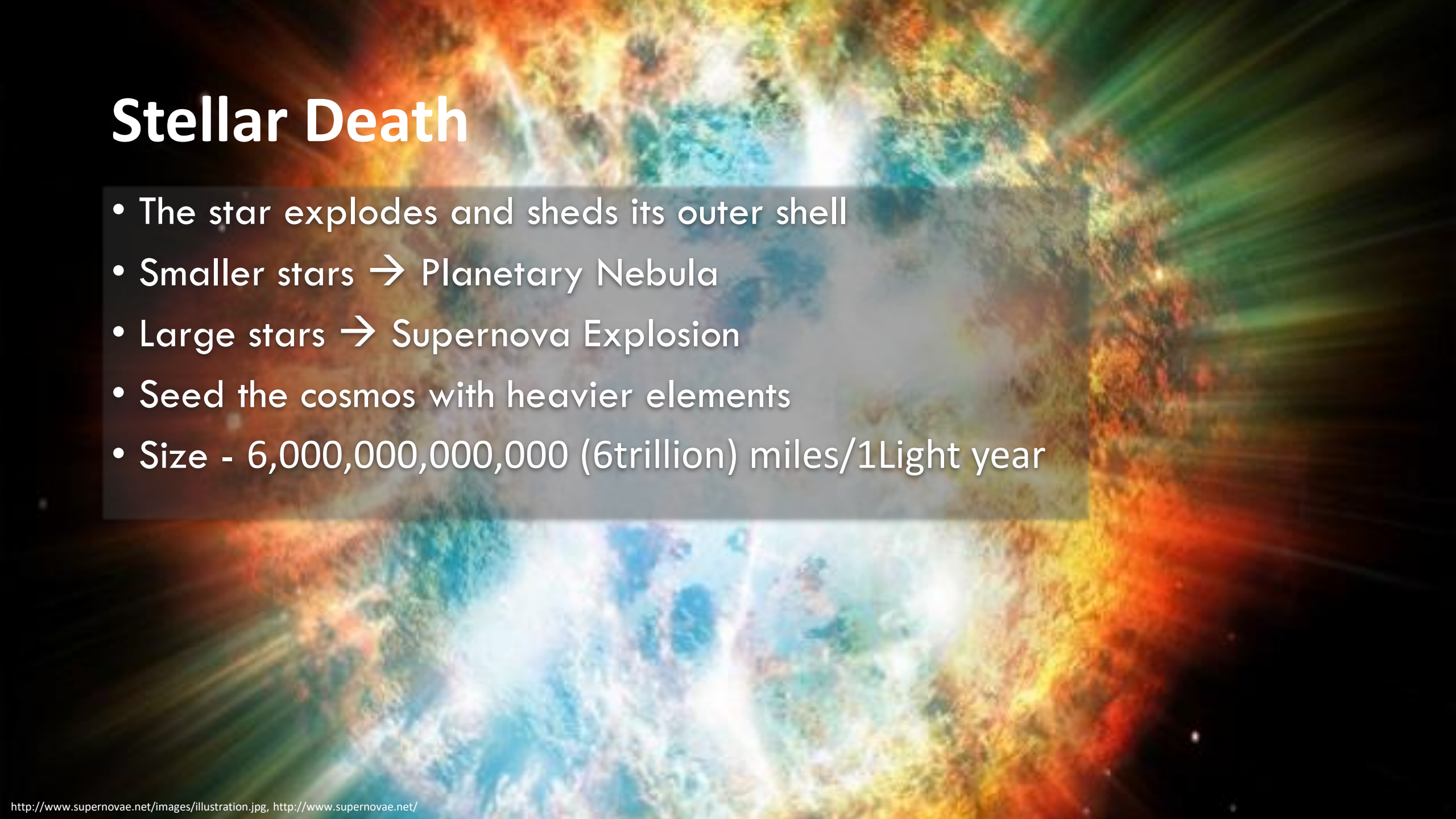


- Core begins fusing heavier elements
- Exist in this state very briefly compared to main sequence lifetime
- Size - 92,960,000 (92.9million) miles/8.3 Light minutes

http://carlsaganinstitute.org/2016/05/hunting-for-hidden-life-on-worlds-orbiting-old-red-stars/sizecomparisonsunredgiant/

Stellar Death

- The star explodes and sheds its outer shell
- Smaller stars → Planetary Nebula
- Large stars → Supernova Explosion
- Seed the cosmos with heavier elements
- Size - 6,000,000,000,000 (6trillion) miles/1Light year

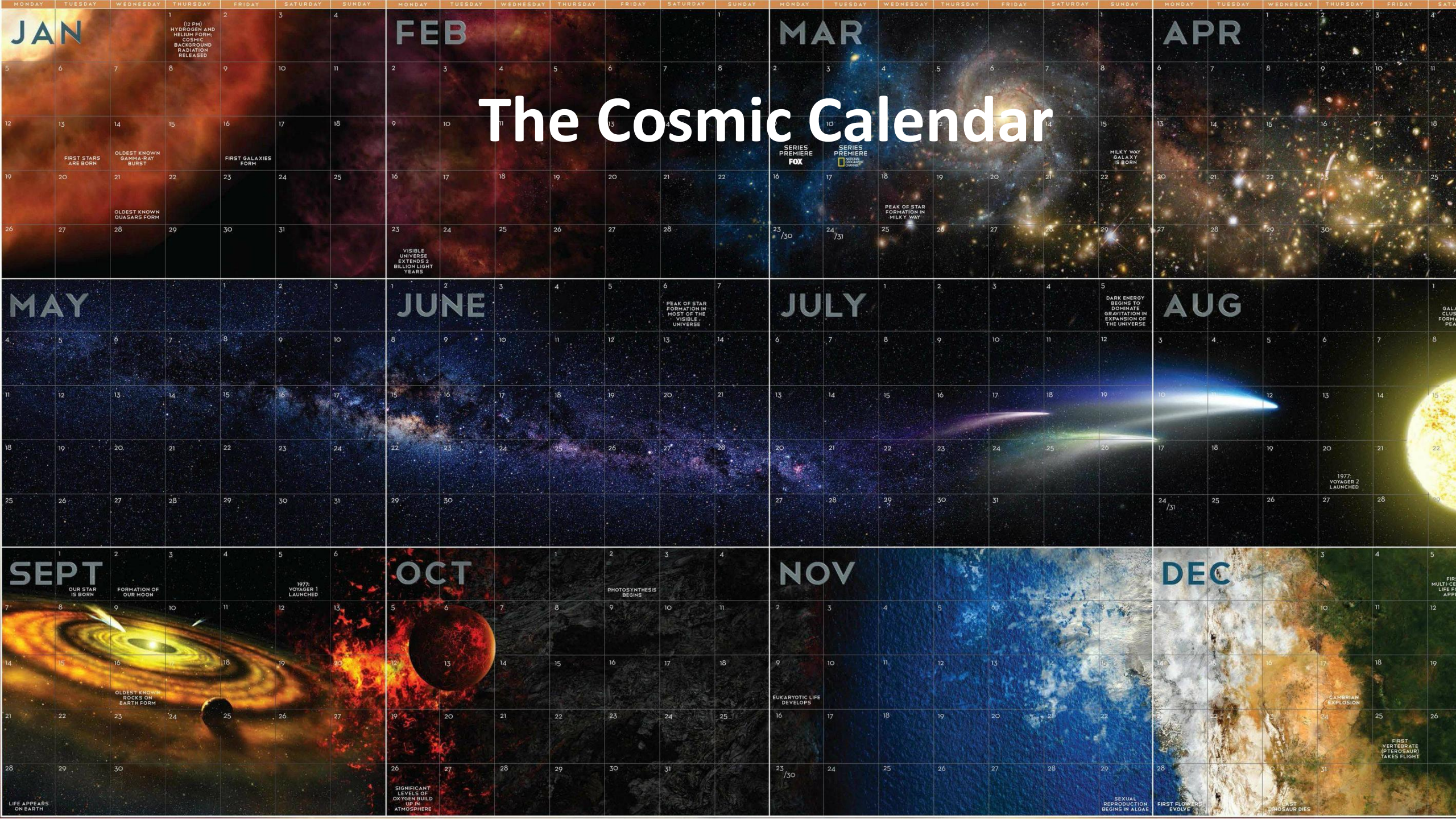


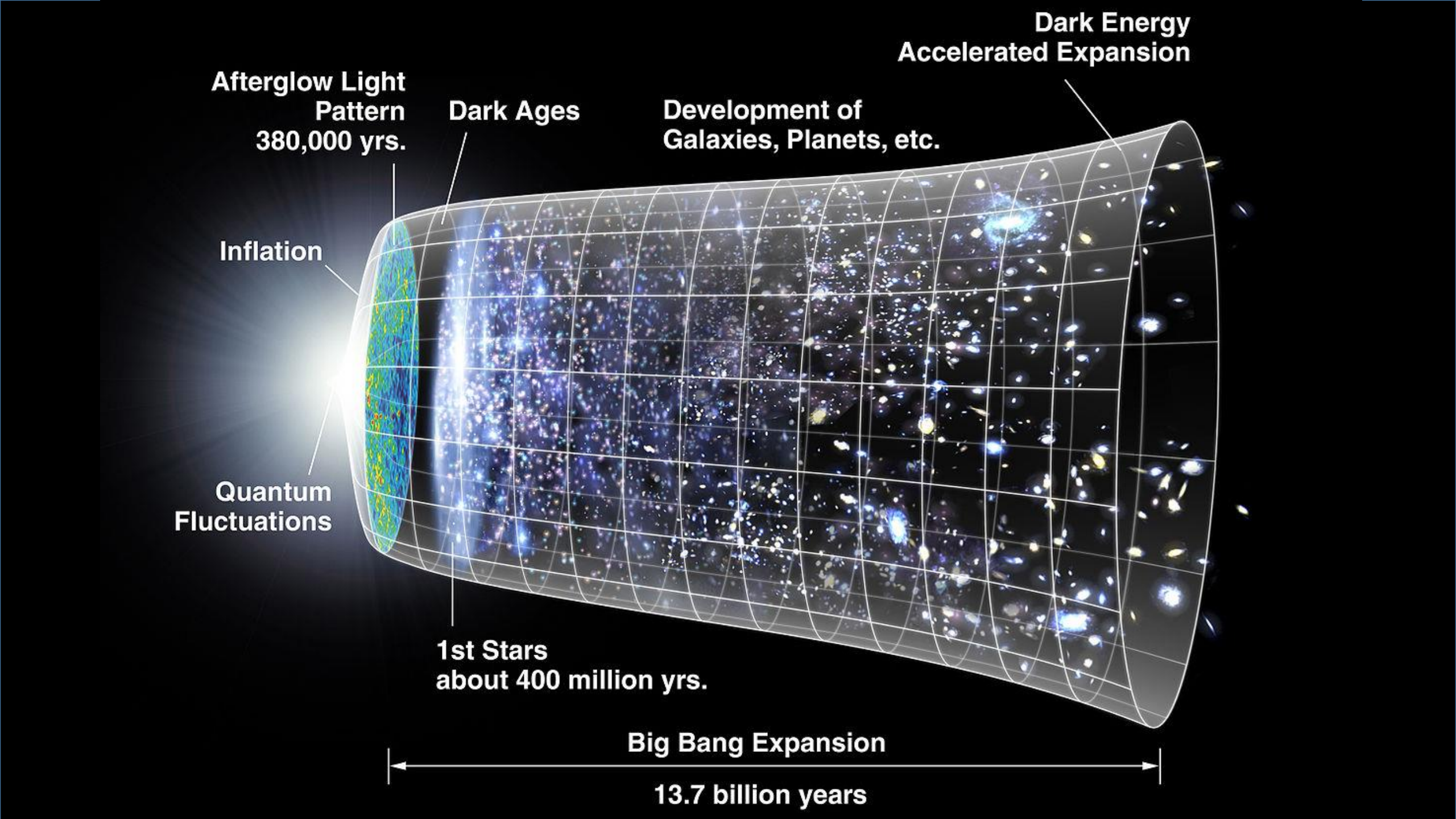
http://www.supernovae.net/images/illustration.jpg, http://www.supernovae.net/

Remnants of Stellar Death

- Smaller stars leave behind white dwarfs (carbon)
- Larger stars leave behind either a neutron star or a black hole depending on the mass of the core (>3x mass of the Sun results in a black hole)
- Ejected material goes to seed stellar nursery and forms new stars
- Size - 185,900,000 (185.9million) miles/16.6 light minutes

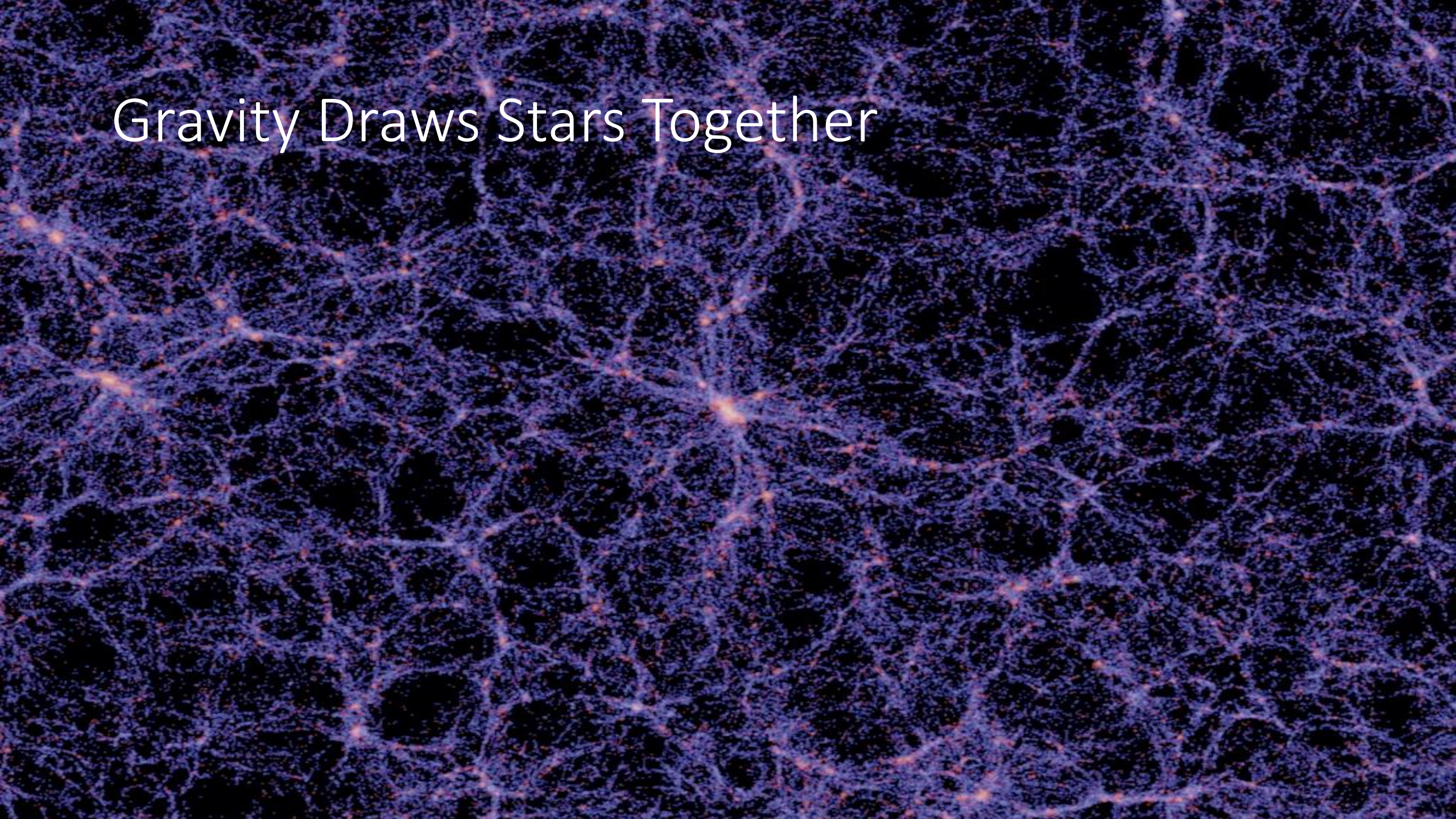
Chandra.si.edu/


The Cosmic Calendar
JAN
1 (12 PM) HYDROGEN AND HELIUM FORM; COSMIC BACKGROUND RADIATION RELEASED
13 FIRST STARS ARE BORN
14 OLDEST KNOWN GAMMA-RAY BURST
16 FIRST GALAXIES FORM
21 OLDEST KNOWN QUASARS FORM
FEB
23 VISIBLE UNIVERSE EXTENDS 2 BILLION LIGHT YEARS
MAR
SERIES PREMIERE FOX
SERIES PREMIERE NATIONAL GEOGRAPHIC CHANNEL
15 MILKY WAY GALAXY IS BORN
18 PEAK OF STAR FORMATION IN MILKY WAY
23 /30
24 /31
APR
MAY
JUNE
6 PEAK OF STAR FORMATION IN MOST OF THE VISIBLE UNIVERSE
JULY
5 DARK ENERGY BEGINS TO DOMINATE GRAVITATION IN EXPANSION OF THE UNIVERSE
AUG
20 1977: VOYAGER 2 LAUNCHED
24 /31
SEPT
2 OUR STAR IS BORN
3 FORMATION OF OUR MOON
5 1977: VOYAGER 1 LAUNCHED
16 OLDEST KNOWN ROCKS ON EARTH FORM
28 LIFE APPEARS ON EARTH
OCT
2 PHOTOSYNTHESIS BEGINS
26 SIGNIFICANT LEVELS OF OXYGEN BUILD UP IN ATMOSPHERE
NOV
9 EUKARYOTIC LIFE DEVELOPS
23 /30
29 SEXUAL REPRODUCTION BEGINS IN ALGAE
DEC
17 CAMBRIAN EXPLOSION
25 FIRST VERTEBRATE (PTEROSAUR) TAKES FLIGHT
28 FIRST FLOWERS EVOLVE
30 LAST DINOSAUR DIES


Dark Energy
Accelerated Expansion
Afterglow Light
Pattern
380,000 yrs.
Dark Ages
Development of
Galaxies, Planets, etc.
Inflation
Quantum
Fluctuations
1st Stars
about 400 million yrs.
Big Bang Expansion
13.7 billion years


First stars

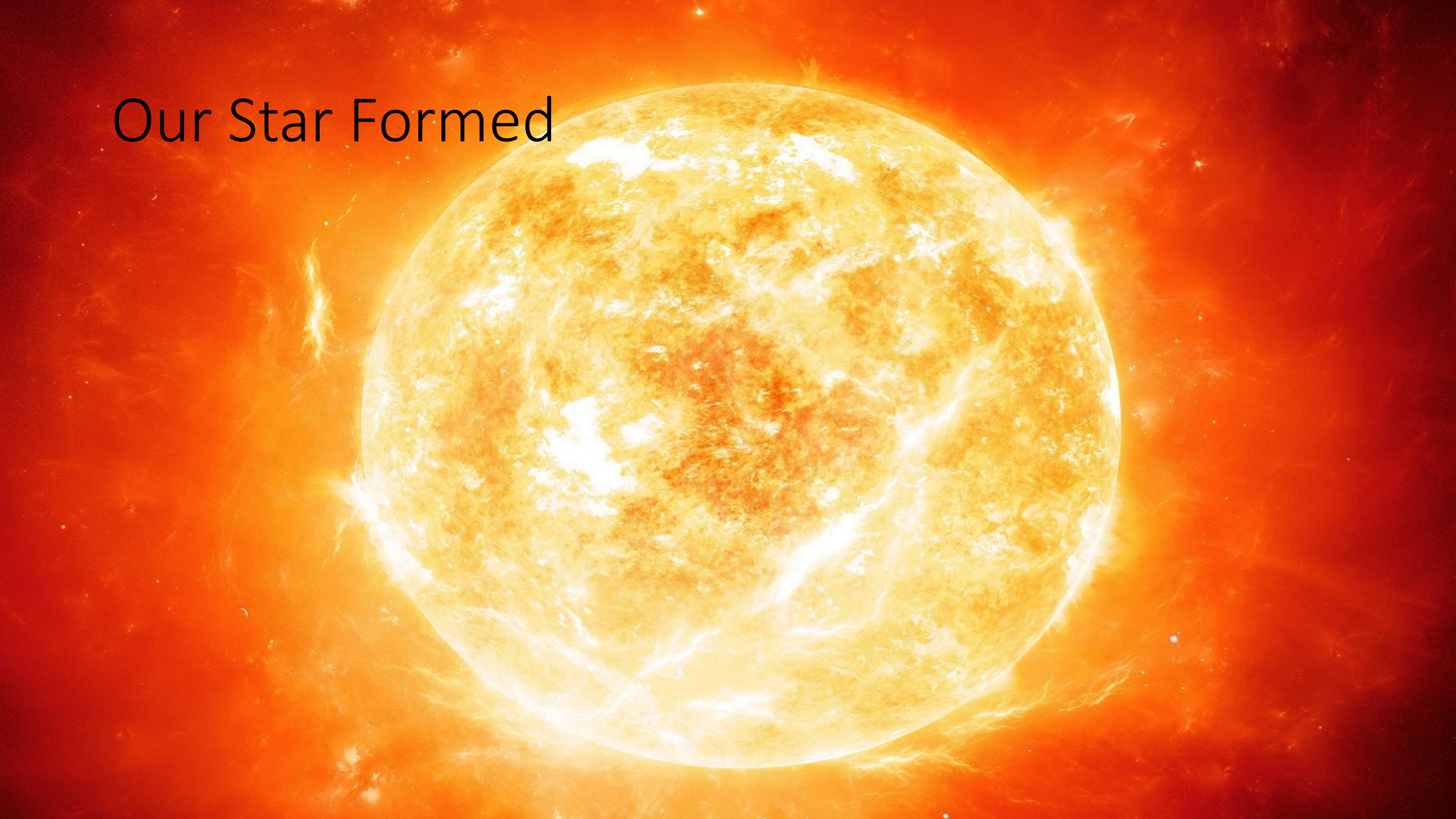
Gravity Draws Stars Together



First Galaxies Formed

Milkyway Formed

Our Star Formed



Earth Forms

Moon Formed

First Life Formed on Earth

First Dinosaurs Roam the Earth

First Humans

You Were Born

Image Sources

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