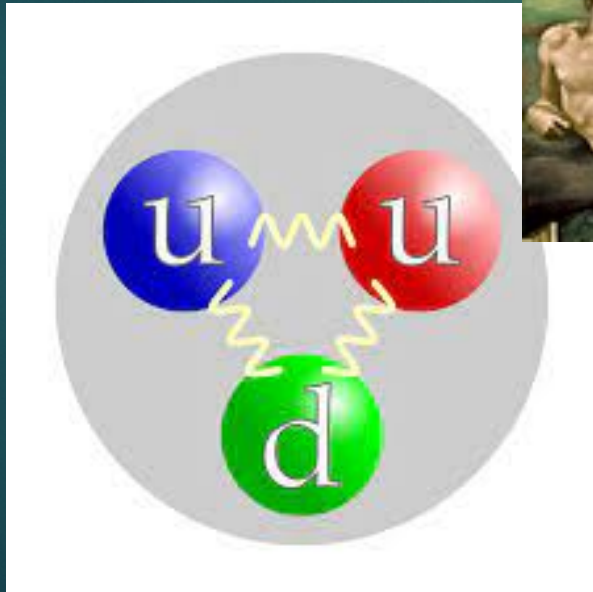


Quarks to Quasars Or science for creationists VIII. The Heavens



Outline/Review

- ▶ I. Introduction – importance, improbability, theory flaws
- ▶ II. Quarks and Atoms – Big Bang, string theory, atoms, relativity
- ▶ III. Molecules and Cells – many complex systems but great order
- ▶ IV. Cells=Life – abiogenesis/cell formed, division, genetics
- ▶ V. Life to Man – many huge changes, no transitional forms, man special
- ▶ VI. Other creeping things – many special design ; complex and improbable
- ▶ VII. Earth and Geology- dating problems, age appearance, Flood, design
- ▶ VIII. Heavens
 - ▶ Wide range of celestial bodies
 - ▶ Inconsistencies with Big Bang

Broad principles in studying science

- ▶ **Wrong assumptions**/biases commonly lead to wrong conclusions.
- ▶ Hierarchy of (un)certainty in science:
 - ▶ **facts, provable theories, principles, hypotheses, thoughts, opinions**
- ▶ Things are **more complex than portrayed**
- ▶ ?More faith to believe in evolution than creationism
- ▶ Knowledge is power (F Bacon, *Meditations Sacrae*, 1597)
 - ▶ we should strive to know what we can so as to avoid being marginalized or intimidated by “experts”
 - ▶ John 8:32 “and ye shall know the truth and the truth shall make you free”
 - ▶ Prov 24:5 - A wise man is strong; yea, a man of knowledge increaseth strength.

Recurring “proof” themes (evaluate these throughout)

- ▶ Mathematical improbabilities
- ▶ Violations/misapplications of logic and scientific principles
- ▶ Supernatural design (vs results of natural selection)
- ▶ Contradictions of Scripture/theological bases

Purpose of this section

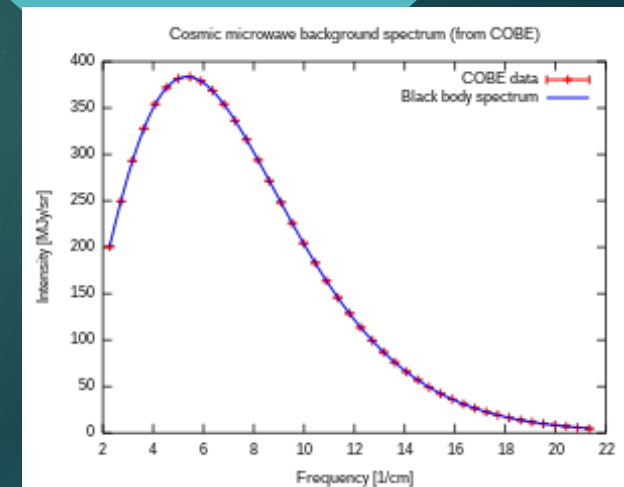
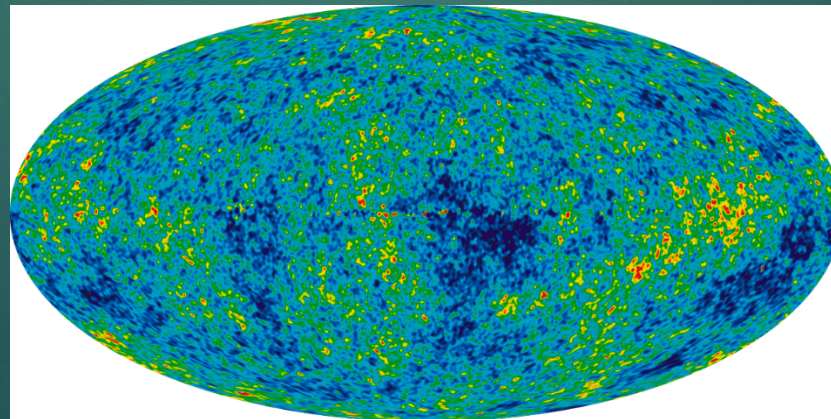
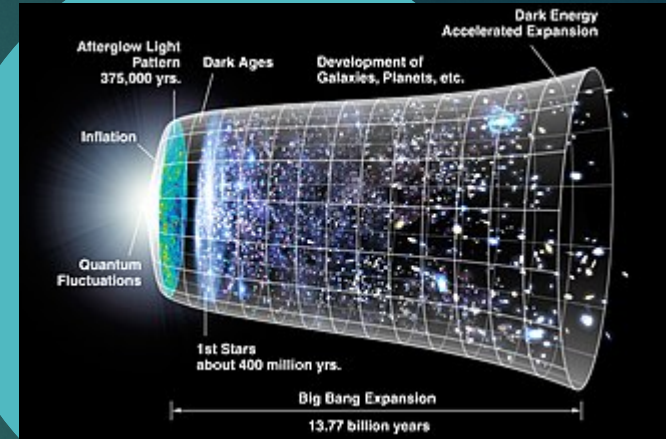


- ▶ Review many findings that are not c/w Big Bang cosmology
- ▶ How information has been ascertained
- ▶ Survey the wonder and variety of the (creation of the) heavens
 - ▶ Complexity, but order/consistency
 - ▶ Evidence for young universe
 - ▶ Psa 19:1 - The heavens declare the **glory** of God; and the firmament sheweth his handywork.
 - ▶ Psa 50:6 - And the heavens shall declare his **righteousness**: for God is **judge himself**. Selah.
 - ▶ Psa 97:6 - The heavens declare his **righteousness**, and all the people **see his glory**.

Big Bang Theory- ?bookends



- ▶ Universe expanded from a high density/temperature state (“a singularity”) to form the cosmological entities (a “plasma”-electron-less atoms 2° to high temp), 14.7B yr ago
- ▶ Invokes nuclear fusion/evolution of elements and celestial bodies
- ▶ Big Bang “evidences”
 - ▶ The Red Shift is key element in explanation (universe still expanding)
 - ▶ Cosmic microwave background (CMB) radiation (cooler items
 - ▶ discovered 1964 (?just noise?)(Nobel physics 1978 Penzias and Wilson

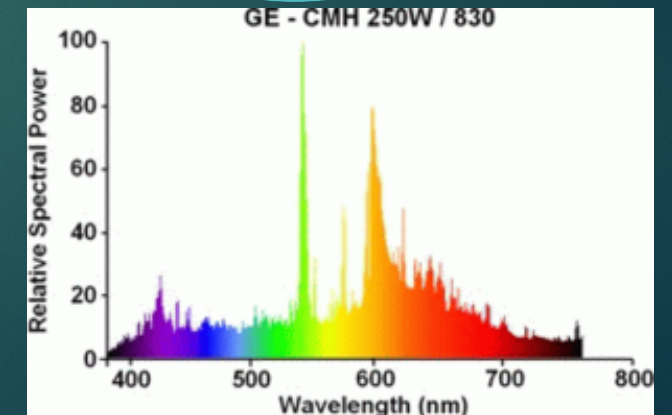
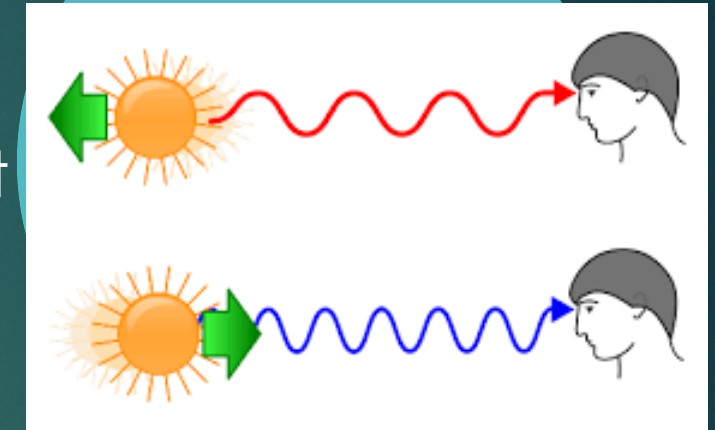
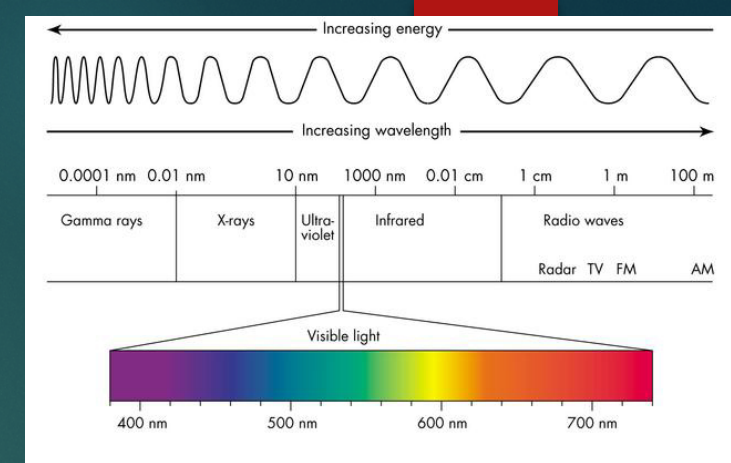
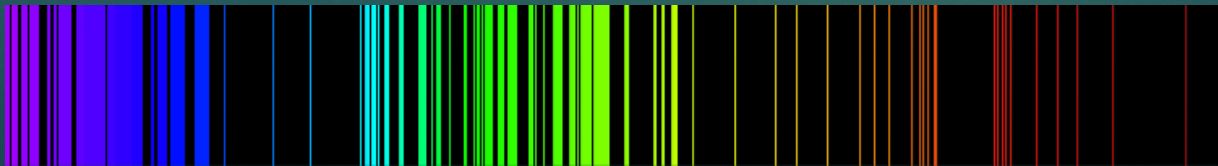


From COBE study

Red Shift – a key to BB

- ▶ Equivalent to Doppler effect in sound
 - ▶ Light sources moving away (ie expanding) fast enough to make perception as longer wavelength than true
 - ▶ Red is longer wavelength than other visible light
- ▶ Interpreted to explain lingering expansion after distant Big Bang
- ▶ Observed by Hubble – comparing energy emission spectra of “known” elemental values
 - ▶ Emission spectra are a “fingerprint” of an element or compound – quantum emissions (energy emitted with decay of excited electrons) are unique in accordance with $E_{\text{photon}} = h\nu$,
 - ▶ Hubble’s Law (further away is expanding faster)

Spectrum
mission of
Fe



Eg, emission spectrum of metal halide lamp

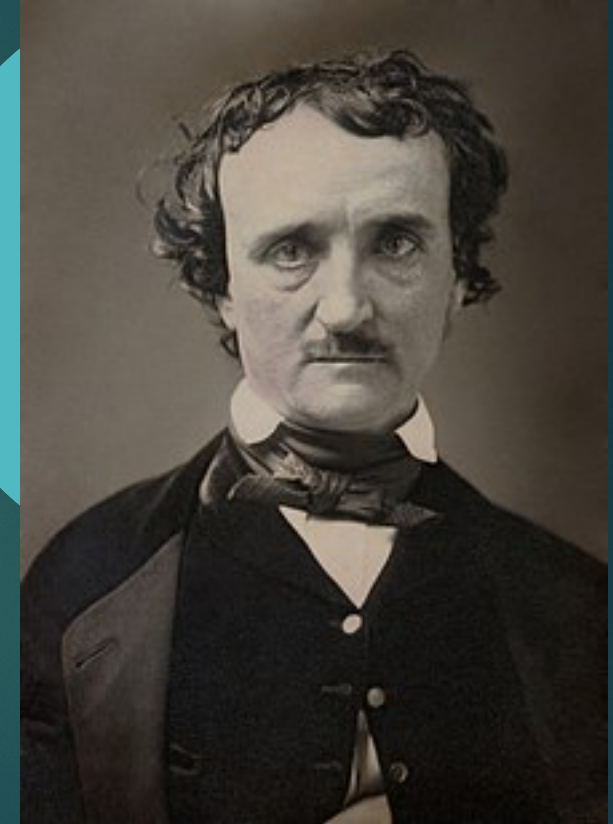
Expanding Universe? or, Man not understanding structure?

- ▶ Psa 104:2 - Who coverest thyself with light as with a garment: who **stretchest out the heavens** like a curtain:
- ▶ Isa 40:22 – It is he that sitteth upon the **circle of the earth**, and the inhabitants thereof are as grasshoppers; that **stretcheth out the heavens** as a curtain, and spreadeth them out as a tent to dwell in:
- ▶ Isa 25:12 – I have made the earth, and created man upon it: I, even my hands, have **stretched out the heavens**, and all their host have I commanded.
- ▶ Job 26:7 - He **stretcheth out** the north over the empty place, and **hangeh the earth** upon nothing.
- ▶ Jer 10:12 - He hath made the earth by his power, he hath established the world by his wisdom, and hath **stretched out the heavens** by his discretion.

For the literary types in the audience...

Big Bang – Edgar Allan Poe a cosmologist?

- ▶ *Eureka – A Prose Poem* (1848) - final major work
- ▶ thoughts on the construction of the Universe
 - ▶ “My general proposition...is this. In the **Original Unity** of the First Thing lies the Secondary Cause of All Things, with the Germ of their Inevitable Annihilation”
 - ▶ “One may suppose that all the planets...were **created together**...at first, one common chaos...by the spirit of **God**...**separated into several parcels**...a planet...sun also separated...”



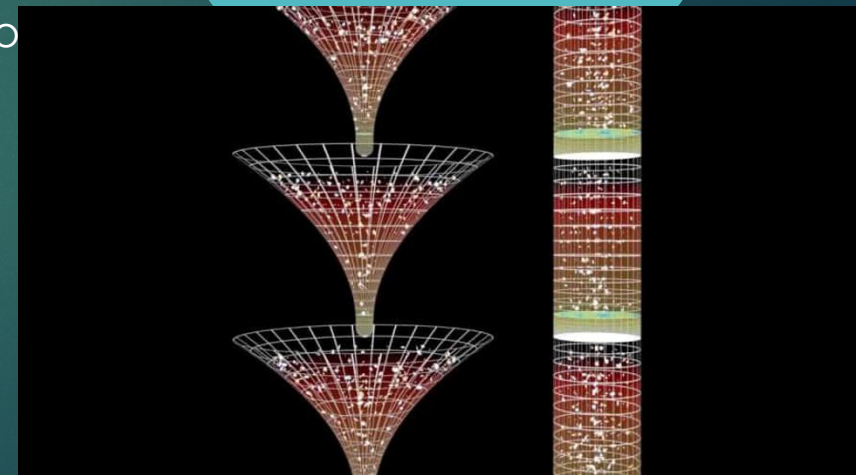
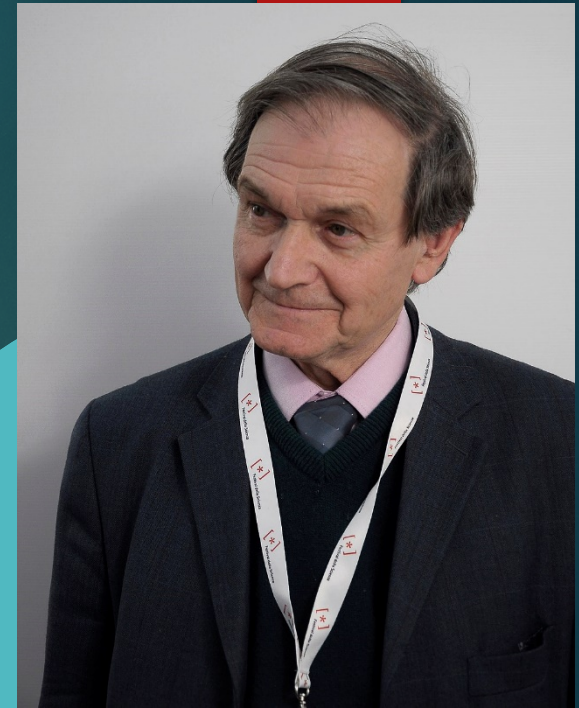
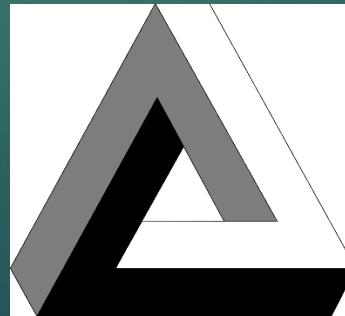
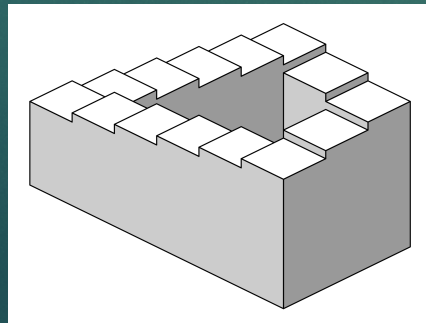
1809-1848

With a hint of valid doctrine!

Biggest question: how did everything come from nothing?

- ▶ Roger Penrose (Oxford Professor Math) (b 1931)- agnostic
 - ▶ Nobel 2020 for finding black hole formation to be c/w Relativity
 - ▶ Lots of complex mathematics (impossible figures)
 - ▶ Theorizes that we are
 - ▶ One of millions of parallel (meta) universes
 - ▶ One in a sequence of universes (black hole contraction births BB fo
 - ▶ Cosmic Background Radiation - anisotropies

▶ But where is the original “singularity”?



Arguments against Big Bang

- ▶ Non uniform distribution of parts of an explosion (even background radiation is not uniform); why larger planets more peripheral?
- ▶ How could curvilinear, rotational motion start, and with such (really mini variation)?
- ▶ Great variation in composition (even if concede evolution on each celestial body)
- ▶ Violation of 2nd law thermodynamics (entropy increases)
- ▶ Webb Space Telescope – finding galaxies that are not consistent with BB and expansion
- ▶ If 15 Byr ago, how can width of universe be estimated to be 80-156 B light years across?
- ▶ No temperature gradient in space – all within 1/100 000 degree
- ▶ Repulsive gas/temperature – should prevent condensation of matter



**Psa 2:1, 4 - Why do the heathen rage, and the people imagine a vain thing?...
He that sitteth in the heavens shall laugh: the LORD shall have them in derision.**

Purpose of this section



- ▶ Review many findings that are not c/w Big Bang cosmology
- ▶ **How information has been ascertained**
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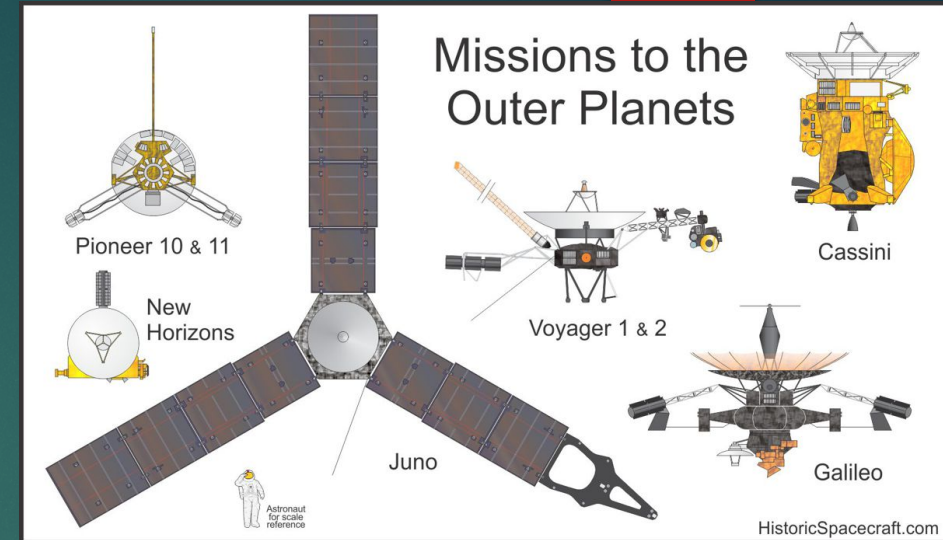
Sources of data/facts...



- First, refractive, 1608
Lipperhay, Netherlands
- 1609 Galileo improved on it
(1733 achromatic lens)
- 1668 Newton, reflective
telescope
- 1900s adapted for different
wavelengths



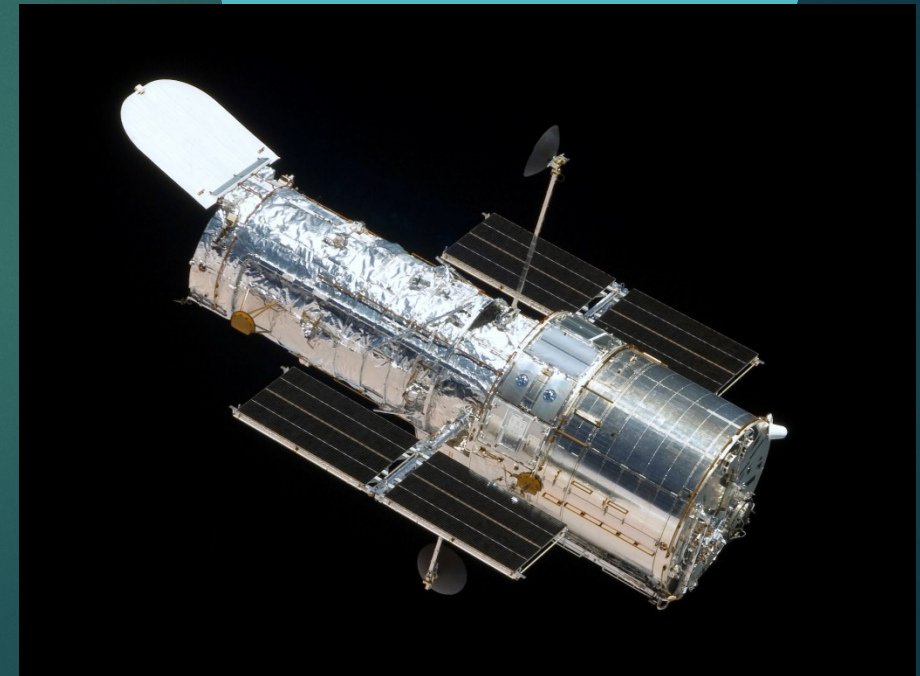
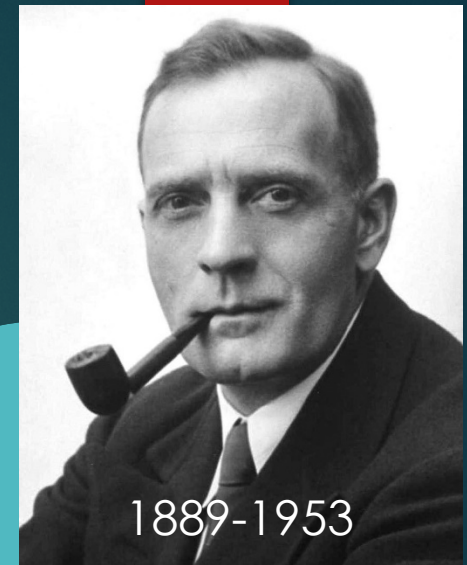
Keck I and II in Hawaii



Many
unmanned
space probes
- Mariner,
Viking,
Magellen,
Pioneer,
Messenger, etc

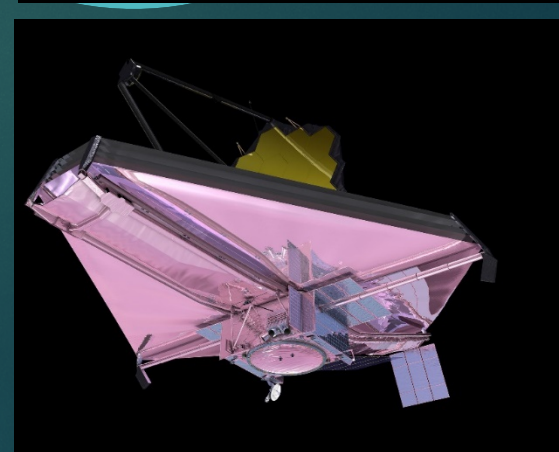
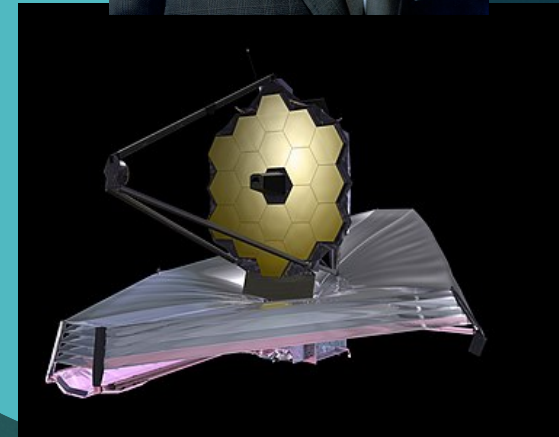
Hubble Telescope

- ▶ Named for Edwin Hubble (1889-1953) leading US astronomer; explained nebulae
 - ▶ orbits 332 mi from earth
- ▶ Launched 1990 (problems with mirrors repaired 1993)
- ▶ Space telescope (although not first); designed to be maintained by astronauts (several missions)
- ▶ UV, visible, and near IR wavelengths
- ▶ Avoids interference by our atmosphere



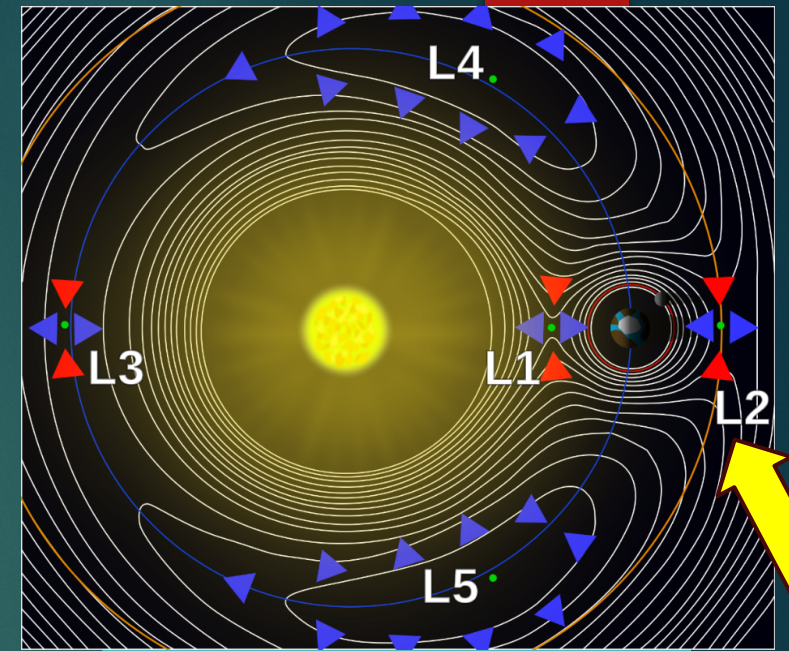
Webb Space Telescope

- ▶ James Webb - long time NASA chief administrator 1961-68 (Mercury, Gemini, Apollo)
- ▶ Launched 12/25/2021; **successor to Hubble**; \$10B
- ▶ NASA, ESA, Canadian, Goddard; Space Telescope Science Institute on campus of JHU (like Hubble is)
- ▶ In a solar orbit (Lagrange point) about **1 M mi from Earth**
- ▶ High resolution, in space, infrared; must be kept very cold (-220°C so the radiation of the microscope itself does not interfere with signal)
- ▶ **Can see items about 100x fainter than the Hubble**
- ▶ **Amazing (and novel) findings!**

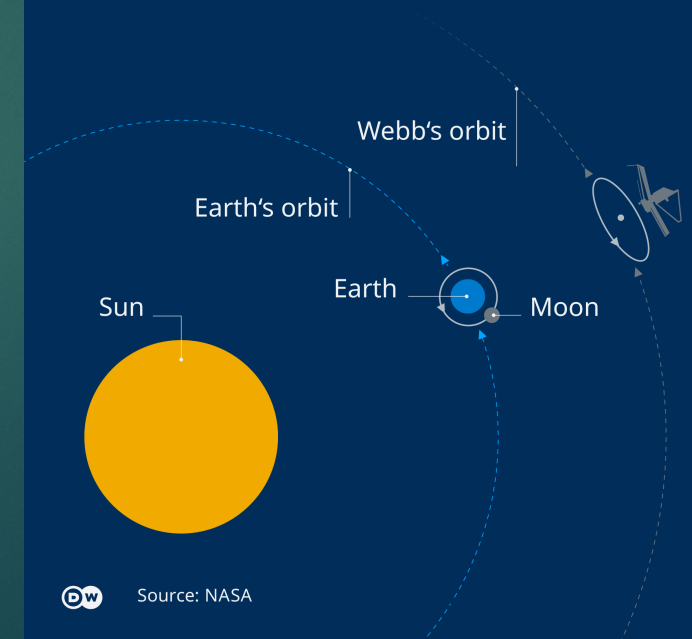


Lagrange Points

- ▶ Where the gravitational effects of 2 large objects balance out the effect on a third object
 - ▶ such as a satellite, but only orbits sun, not earth (Hubble orbited earth like usual satellite)
 - ▶ Earth-Moon and Earth-Sun have several with space dust and a couple asteroids
 - ▶ Jupiter which has 1 million “trojan” asteroids
- ▶ Euler (1750) discovered 3 of them, Lagrange (1760) the other 2, solving mathematically the “3 body” equation

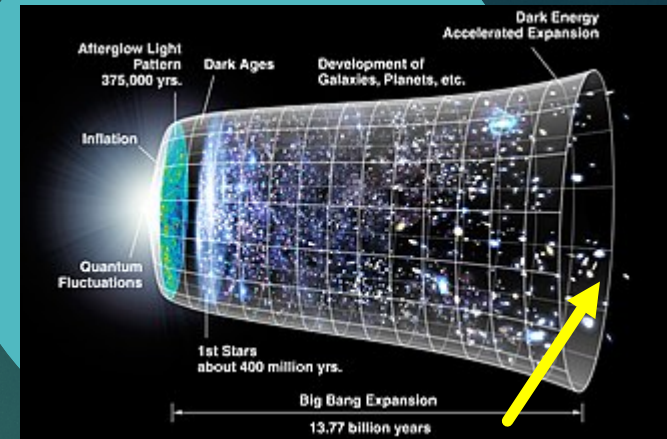


James Webb Space Telescope Orbit



But findings with the Webb telescope show all does not fully add up to Big Bang!

- ▶ Some distant galaxies have been identified that are **too far, smooth, and old** to fit Big Bang Theory
 - ▶ Expanding universe should make objects look BIGGER with time as the light from them gets closer to us (over the eons); these are not getting bigger
 - ▶ Thus implying they are older than the time frame of the Big Bang
- ▶ About 100K times as many galaxies as previously thought are now perceived; **not enough "time" for formation**
- ▶ Some galaxies have been "measured" to have appeared to have formed **in only a few 100M ys**
- ▶ Pluto structure and characteristics very different
- ▶ (**dirty secret**: funding determined by "peer review" and the peers overwhelmingly believe in BB; so no funding, no alternate study...)



https://youtu.be/y8l0N_VwhUI

Purpose of this section

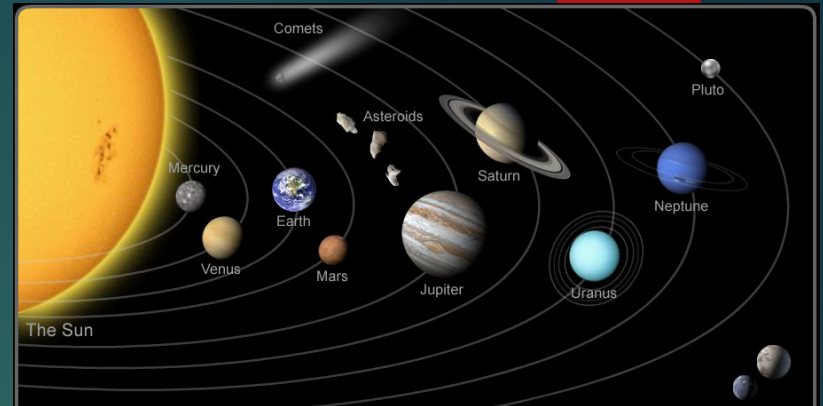


- ▶ Review many findings that are not c/w Big Bang cosmology
- ▶ How information has been ascertained
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Some of the wonders...

- ▶ Our solar system
 - ▶ Celestial motion
 - ▶ Stars (nebula, supernovas, black holes, constellations) and beyond our solar system
-
- ▶ Units of measurement – vastness requires
 - ▶ astronomical unit (AU) – Sun to Earth distance (93 M mi)
 - ▶ Light year – distance light travels in a year (~6 T mi)
 - ▶ Parsecs (relative to other known distances; usually in AU)

Our Solar System



▶ Sun, 8 planets (4 terrestrial; 4 gaseous; Pluto was “demoted”) >200 moons, 10^6 asteroids

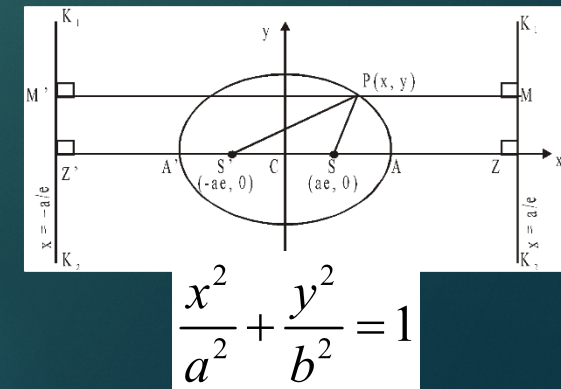
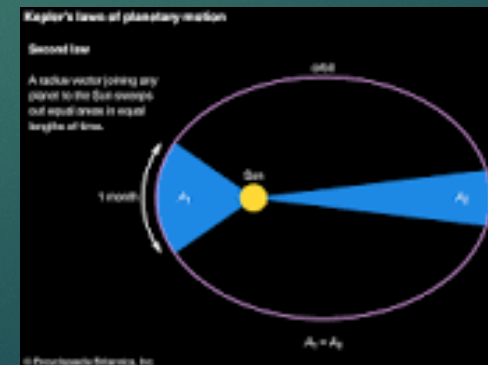
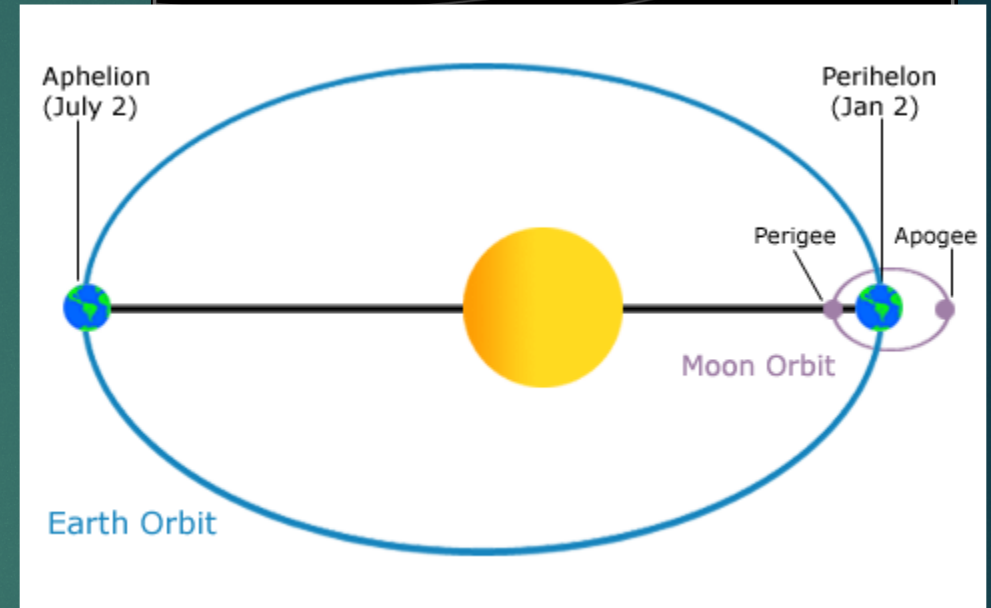
▶ Kepler’s (1571-1630) laws

1. Elliptical planetary orbits Sun at a focus
2. Equal area/time subscribed, so faster when closer, at the perihelion
3. Period of orbit (yrs)² proportional to (mean distance mi)³

▶ Actually there are some variations
(Milankovich cycles)

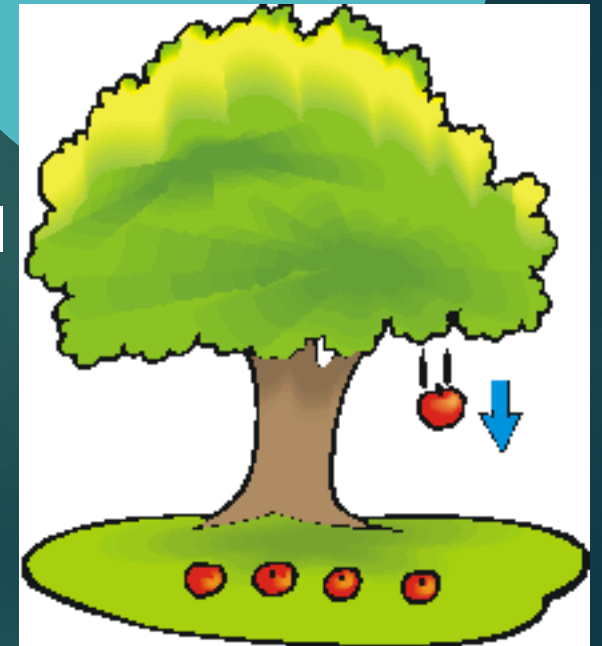
▶ Psa 8:3-4 : 3 When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained; 4 What is man, that thou art mindful of him? and the son of man, that thou visitest him?

▶ Incredible design evident



Gravity – a testimony

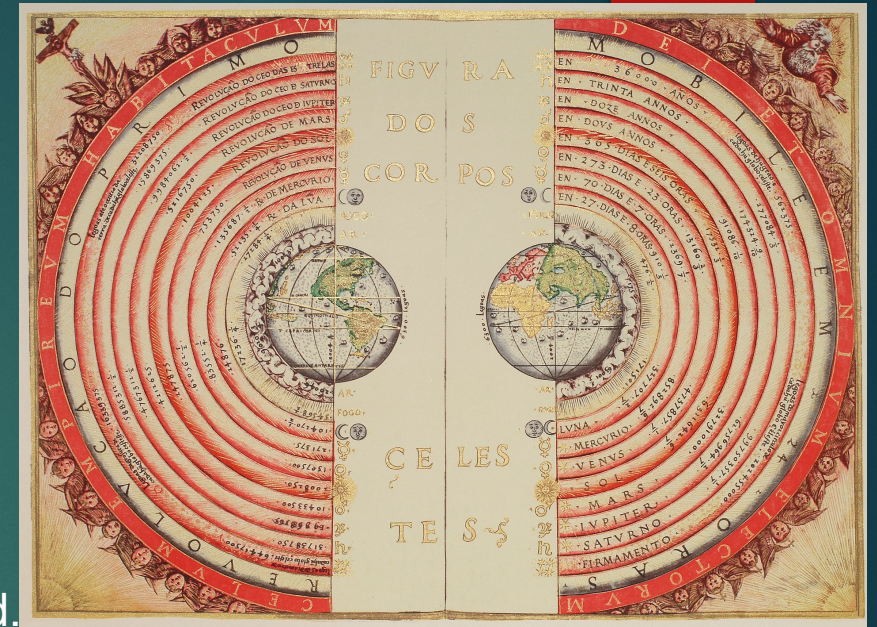
- ▶ Galileo (1564-1642) – Copernican heliocentrism (gravity, pendulum, thermoscope; a polymath)
 - ▶ “From the Divine Word, the Sacred Scripture and Nature did both alike proceed” [heretic for contradicting papal (Biblical) authority (Urban VIII)]
 - ▶ Vindicated 1992 by John Paul II proclamation
- ▶ Newton (1642-1727) – laws of gravity/motion
 - ▶ Gravitational system...could only proceed from the counsel and dominion of an **intelligent and powerful Being**.
- ▶ Cavendish (1731-1810) – measured gravitational constant, 1798: ($F = GMm/r^2$)



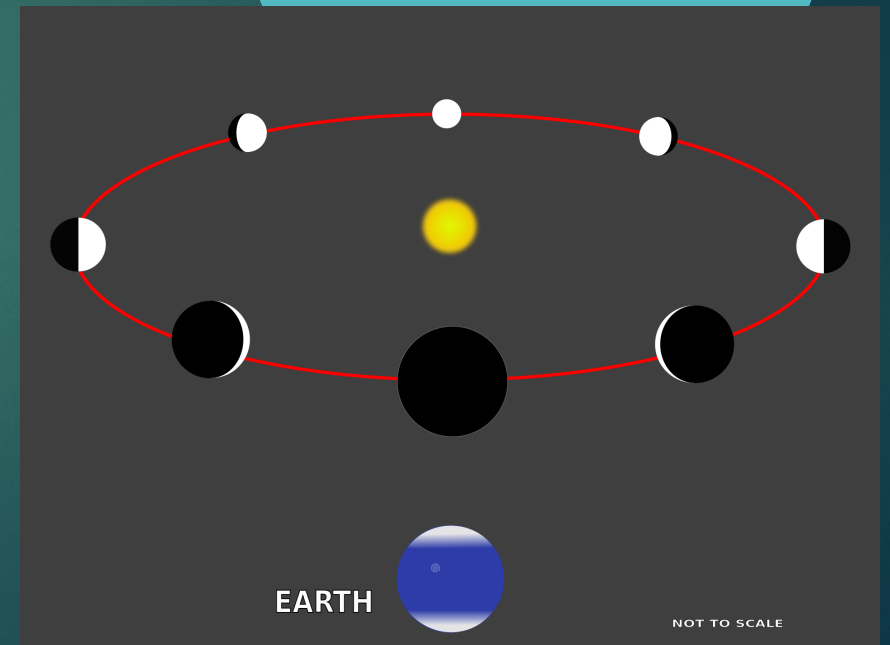
Motion of solar system

- ▶ Geocentrism
 - ▶ Aristotle (384-322 BC) and Ptolemy (100-170 AD)
 - ▶ Church held to be Scriptural
 - ▶ Josh 10:12 – ...Sun, stand thou still upon Gibeon...
 - ▶ Psa 93:1 - ... the world also is stablished, that it cannot be moved.
 - ▶ As late as 1664 Alexander VII papal bull – prohibited contrary ideas
 - ▶ “cracks” in position by 1800s; not admitted wrong until 1992
- ▶ Heliocentrism
 - ▶ Aristarchus of Samos – Greek – c300BC
 - ▶ Copernicus (1473-1543) (independently)
 - ▶ Galileo observed Venus to have phases like moon

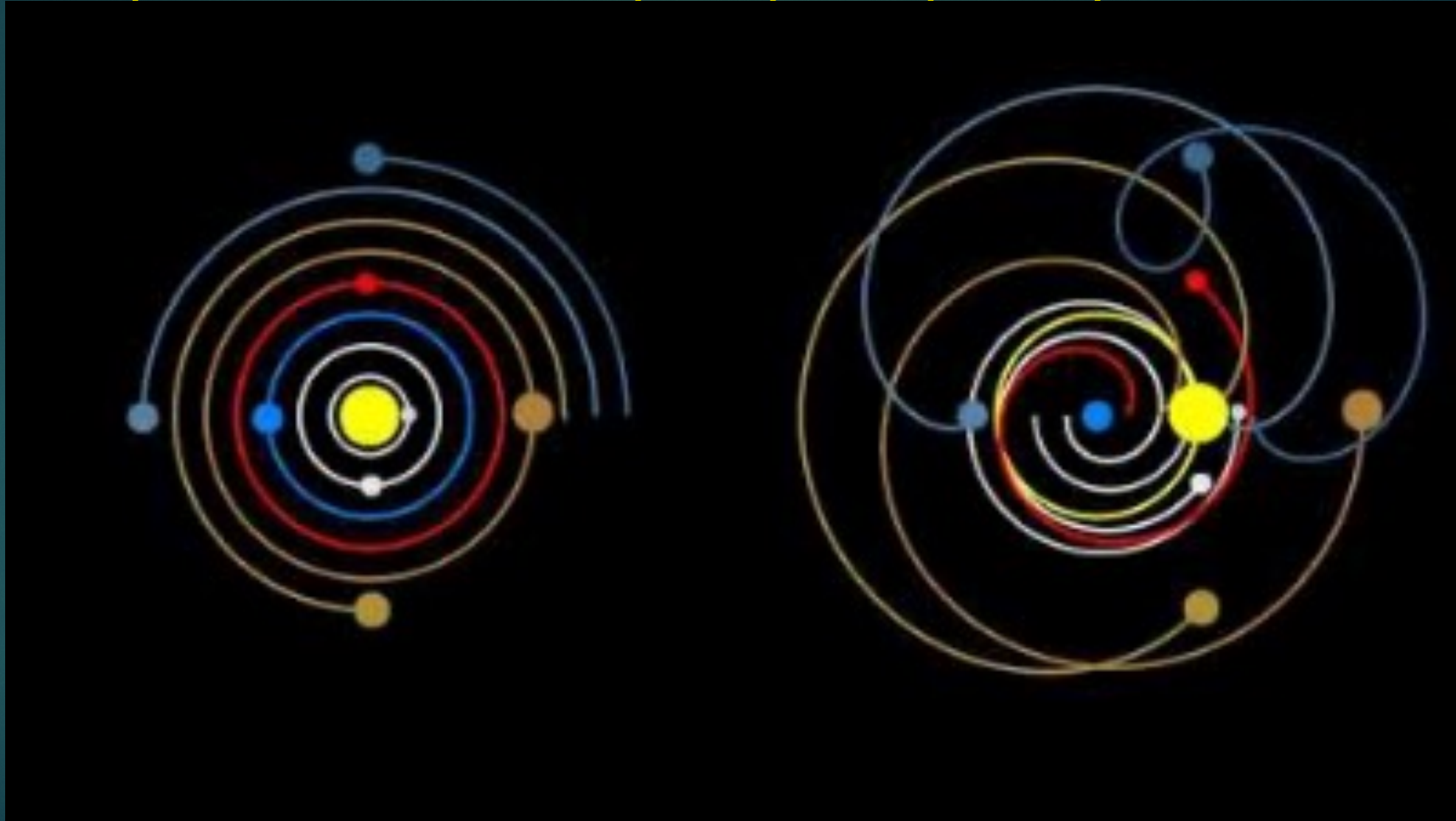
Does suppressing alternate theories sound familiar?



Velho 1568



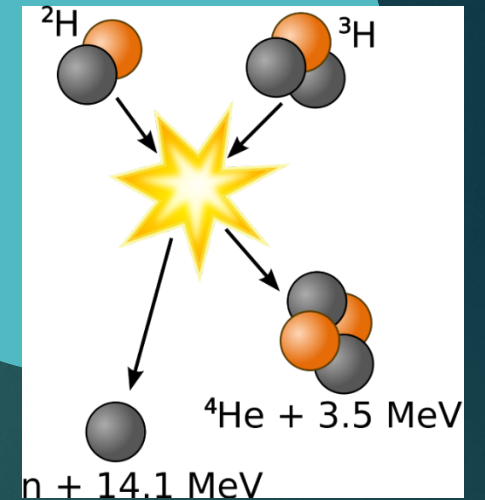
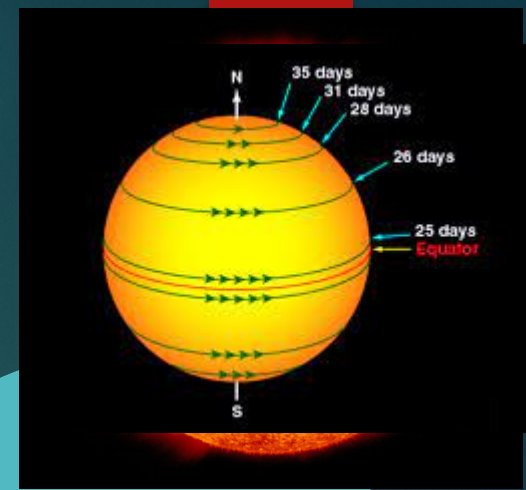
Heliocentric vs Geocentric orbits- Importance of proper perspective



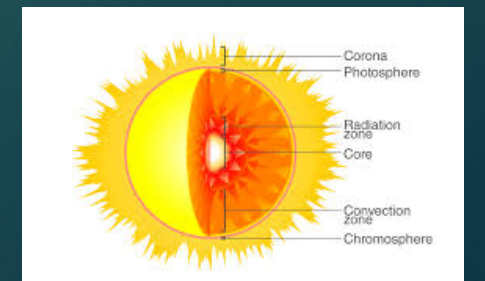
<https://www.youtube.com/watch?v=ZeS8h1t-uMA>

Sun (helios, Greek sun deity)

- ▶ Created 4th day w moon ...the stars also (Gen 1:16)
 - ▶ to separate day and night, mark passage of time, to give light (Gen 1:14-15), to declare God's glory (Psa 19:1-6), to rule the day (Gen 1:16)
- ▶ 109x Earth diameter; 330K x Earth mass; 99.8% of solar system mass but only 2% of angular momentum; variable rotation interval (faster at equator)
- ▶ Hot: "new" star (4.6 by), G-type main-sequence, yellow dwarf
 - ▶ H₂ (75%) and He gas; probably nuclear fusion at core; intense heat/neutrino production (6000 C° at surface)
 - ▶ does not fit new (old) sun:
 - ▶ if fusion for 5 By, would have been too faint to start/sustain life on Earth
 - ▶ since shrinking, 100K y ago, too hot on Earth for life; in 20my, size of Earth
 - ▶ Thermal oscillations – too slow to fit "old" star
 - ▶ Lithium/Beryllium should be burned by 7500 yrs; Li is almost gone, but Be persists
 - ▶ neutrino flux (indicating cooler core temp)
- ▶ One of $>10^{11}$ stars in our galaxy!



cf H-bomb



Solar system planets- design!

- ▶ Only 5 can be seen without telescope
 - ▶ Known to ancient astronomers
- ▶ “planet” from Greek for “wanderers”
- ▶ “solar system” never referenced in Scripture

Will survey
the planets
with many
facts, will
highlight the
most
distinctive



Before drilling down on our solar system...

Conventions and terminology

▶ Orbital period

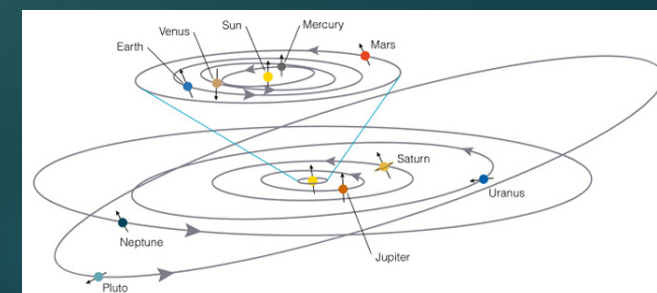
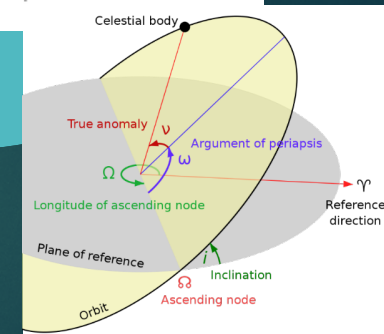
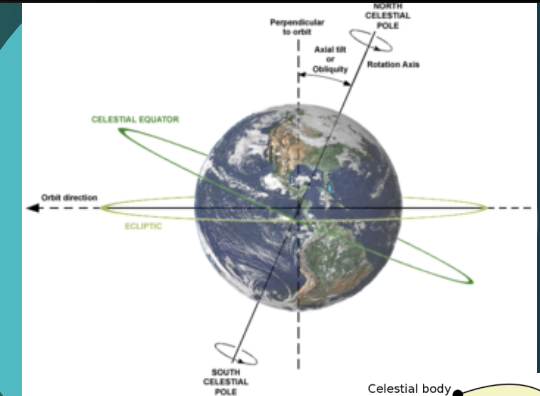
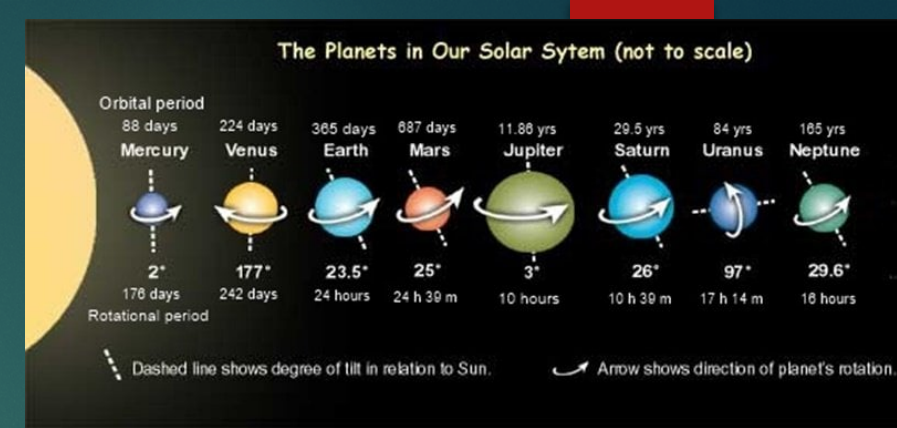
- ▶ Sidereal orbital period- in relation to the larger object (eg to Sun)
 - ▶ synodic orbital period – in relation from something smaller (eg Earth); time it takes to “lap” or be lapped by the object (slower planets longer synod cf sidereal)(~1yr for very distant)

▶ Rotational period

- ▶ Sidereal rotational period (day)- rotation cycle cf to distant star (does not include adjustment for orbiting “with” the rotational day of orbit) (~same for distant planets)
 - ▶ Synodic rotational period (eg Solar day from Earth)- cycle for sun to be in same position as observed from the rotating satellite (> sidereal for counterclockwise rotation; so Venus is shorter)

▶ All movement is by convention oriented from top down to plane of orbit

- ▶ Rotation **most counterclockwise** [except Venus (ie 180° tilt); Uranus sideways (98°)]
- ▶ Orbit **-All planets, most moons and asteroids orbit counterclockwise (prograde)**
- ▶ **Axial tilt** (obliquity)(axis of rotation) – 23.5 for Earth- responsible for seasons (cf tropics of cancer and capricorn; points sun directly overhead at summer/winter)(**but changes**)
- ▶ **Orbital inclination** (angle plane of orbit makes with equatorial plane of sun unless otherwise stated) (only Mercury is >3.4°)(but Pluto 17, Moon 5)(Earth=0 by convention)



Mercury (Roman “messenger to the gods”)

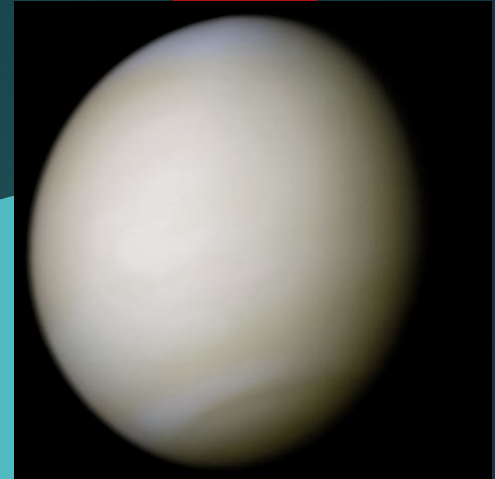
- ▶ 1st observed 14th century BC, Assyrian; Roman god of commerce, messenger of the gods, mediator gods/morals; cf Greek god Hermes
- ▶ **fastest moving planet**
- ▶ 0.39AU; .38 diameter of Earth; .98 density Earth; .38g; 0 moons
- ▶ 88d sidereal orbit (116d synodic pd rel to Earth)
- ▶ 59d sidereal rotational pd; 1 (76 d synodic since orbits so fast)
- ▶ 2° axial tilt and **smallest orbital inclination** (.03°) (makes huge temp variation: -280°F to 800°F), but **most eccentric orbit** (1.5x); ice at poles/craters despite hot!
- ▶ **spin orbit resonance**- rotates 3 times for every 2 orbits
- ▶ too small (weak gravity) and hot for atmosphere; but 1 of 4 terrestrial planets; O, Na, H, He, K principal; B field 1% of Earth
- ▶ Cratered surface but some plains; Mariner 10 (1974/5) passed by it and Messenger (2008) orbited x4000 times over 4yrs), crashed into it (2015) after exhausting fuel supply; BepColumbo (2021)
- ▶ **High density**– against slow accretion evolution model
- ▶ **(weak)magnetic field**: requires liquid core; does not fit with old Mercury



Mariner 10

Venus (Roman goddess of beauty)

- ▶ 2nd brightest (after moon) in night and AM sky
- ▶ 1st observed by Babylonians 3000BC; thought to be 2 stars
- ▶ 0.7 AU; similar in size (0.9) to Earth; .95 density Earth; 0.9g; 0 moons
- ▶ 229 day orbit, (synodic 19 mos); most circular orbit of any planet
- ▶ -243d sidereal rotation; -117 d synodic rotation rel to Earth (shorter since antigrade rotation); sun rises in west (180 axis of revolution); Note, this means orbits faster than rotates, day>year
- ▶ thick, mostly CO₂ atmosphere 92x pressure of Earth; 900°F- hottest (traps Sun energy), but emits nothing
- ▶ Magellan orbited (1990)- mapped in detail, unique geographical feature (archnoids, novae, tesserae, coronae, pancake domes)- c/s God's creativity (1st attempt was Soviet, Venera was lost)
- ▶ With all similarities to Earth,
 - ▶ Why such different constitution of Mercury and Earth?
 - ▶ No atmosphere, no water, hot, high atmospheric pressure
 - ▶ Young surface characteristics; no moon

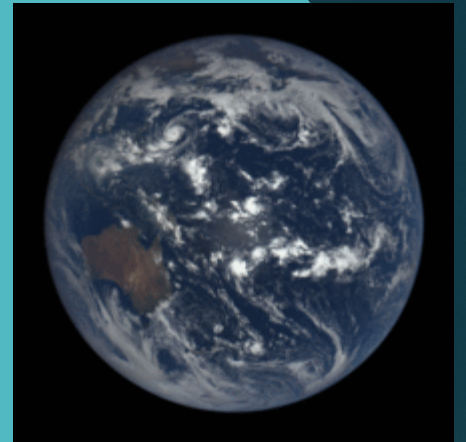


Van Gogh's Starry Night
(McLean's song)

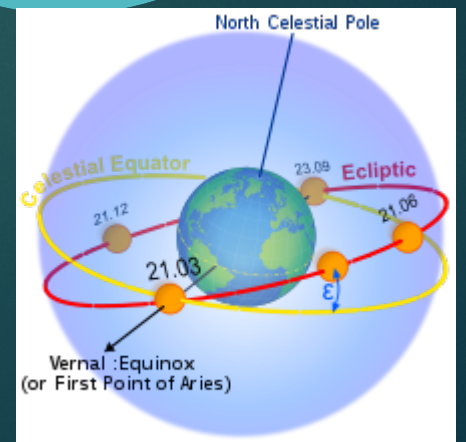
Gen 1:13...the third day...

Earth

View from
Apollo 17, 1972



- ▶ 93M mi from Sun (1 AU); 5.5 g/cm³ (densest); 1 moon
- ▶ 365.25 orbital period; 30km/sec orbital speed; densest planet
- ▶ axial tilt 23.5° - livable seasons due to tilt; 0° inclination by definition
- ▶ 0.46 km/sec rotational speed (1040 mi/hr) at equator
 - ▶ Flattened at poles (27mi less than equator); due to centripetal force
- ▶ Sun/Earth/Moon same arc size (eclipses)
- ▶ Suited to sustain life: water (71% of surface); various biologic cycles (N, H₂O, C, etc); correct sun distance
- ▶ Rotation described: Prov 8:27 a compass on the face of the depth
- ▶ Orbit described: Isa 40:22 - It is he that sitteth upon the circle of the earth, and the inhabitants thereof are as grasshoppers; that stretcheth out the heavens as a curtain, and spreadeth them out as a tent to dwell in



Design in Earth placement

- ▶ Major **temperature** changes if closer or farther from Sun
- ▶ **Atmosphere**
 - ▶ Just the right O₂ mix to support life without combustion and provide ozone
 - ▶ enough CO₂ (0.03%) to trap radiation/provide fuel for plants if 5x higher, too hot
- ▶ Tilt – gives **seasons** (cf some other planets); if more, large temp extremes and longer dark periods
- ▶ Rotation **buffers temperature** (cf Moon and closer planets) avoids ice buildup at poles and unbearable heat at equatorial) (cf roasting on a spit)
- ▶ Oceans
 - ▶ No other planet has **liquid water**; huge ecosystem benefits
 - ▶ Reservoir/buffer for many chemicals (eg CO₂) and temperature
 - ▶ Produces about 80% of the O₂
- ▶ Earth's crust
 - ▶ Supports continents
 - ▶ Has the right amounts of metals to avoid too much oxidation

Other movements of planets

▶ Axial Precession (nutation)

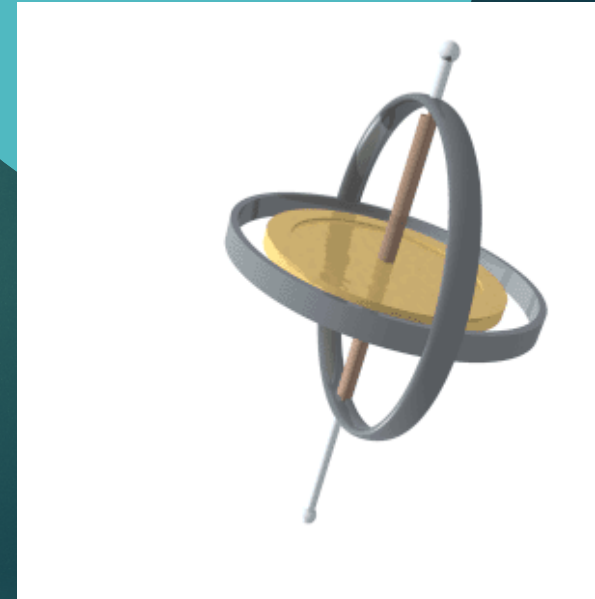
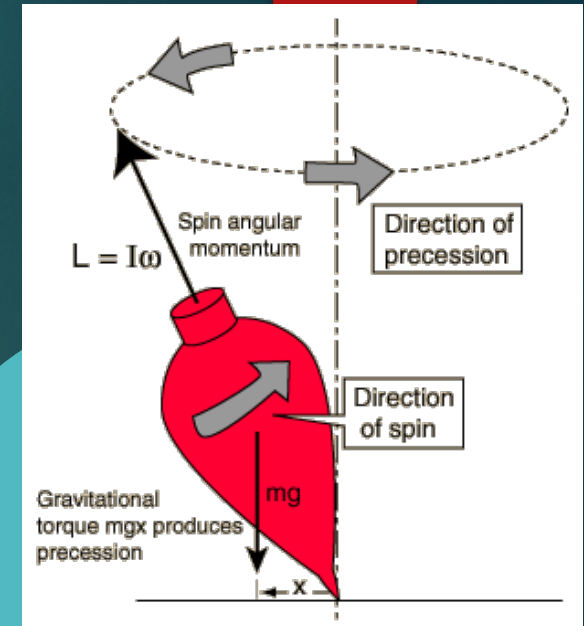
- ▶ Attributed to Hipparchus, ~100BC- observed shift of equinoxes
- ▶ gradual shift in the orientation of Earth's axis of rotation
 - ▶ like a spinning top
- ▶ is gravity induced (Sun & moon) related to equatorial bulge
- ▶ period of 26K yrs for Earth

▶ Wobble- Earth not spherical

- ▶ Discovered by Chandler, 1891
- ▶ Axis intersection of solid Earth off about 30ft, period of 433 d
- ▶ Like a spinning top slowing down, but motion can sum to speed it up!
 - ▶ Gradually slowing spinning Earth, but eg 1.59 ms differences either direction daily
 - ▶ Related to nonhomogeneity/mixed phases of Earth/ tidal friction moon

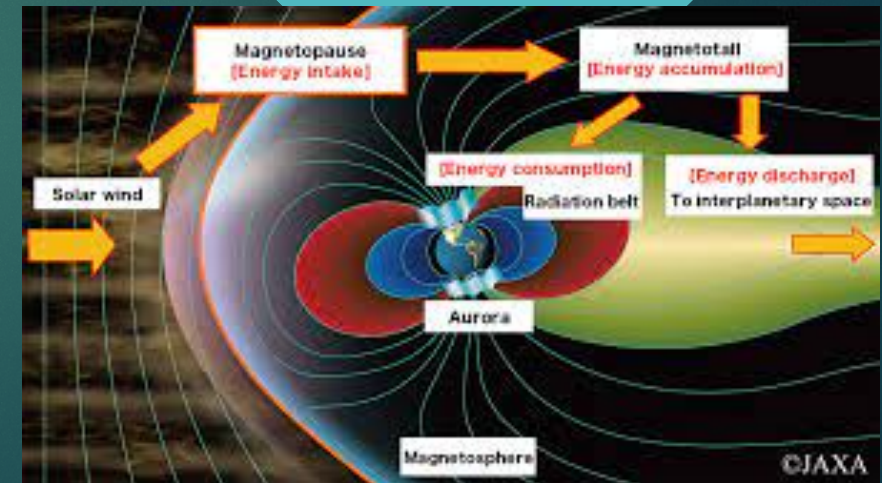
▶ Variations in elliptical eccentricity over 1000s yrs

▶ Earth **shakes every 26 seconds** noted 1962; pulsating 3.5 km/s (~Rayleigh wave) (<http://ciei.colorado.edu/pubs/2006/3.pdf>)



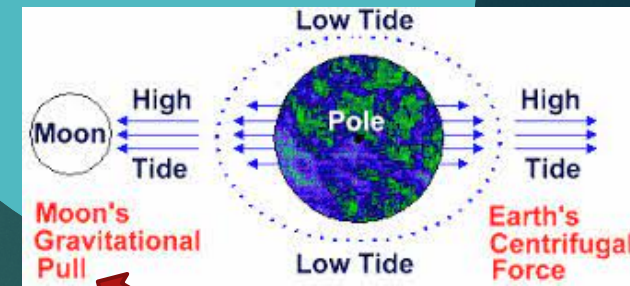
Auroras – Roman goddess of the dawn

- ▶ **Polar lights** (Northern lights)- aurora borealis, aurora australis
 - ▶ Borealis term coined by Galileo (1619), Greek name for north wind; australis – south wind
- ▶ Disturbances in the **magnetosphere** (areas at poles rich in charged particles, at dipoles) by solar wind in polar latitudes
- ▶ Electrical energy release (ionization energy), only in upper atmosphere - like a neon light?
- ▶ Color determined by altitude (red higher, green, blue; lower to more energetic ionic – electrons and protons- collisions), concentration influencing the quantum level of O_2 and N_2 ionization
- ▶ **Van Allen (radiation) belts** in magnetosphere – this is where the action is; is the reason for the “black out” zone upon spacecraft reentry
 - ▶ Were predicted before space age
 - ▶ Confirmed by Explorer 1 and 3; later mapped by Explorer 4, Pioneer 3, and Luna 1

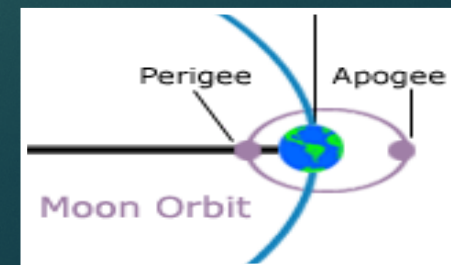


Earth's Moon

- ▶ 5th largest satellite in solar system; **largest/massive of its planet**
- ▶ Mean 239K mi from Earth
- ▶ 0.27 diameter Earth; 0.61 density; 0.17g (highest x Jupiter's lo); area about ~NA + SA
- ▶ 27.3 d **orbit = rotation** (why we never see the **dark side of the moon**-)
 - ▶ up to 120° C to -130° C; coldest recorded temp in solar system, -247° C in north pole crater)
- ▶ Lacks atmosphere, hydrosphere, magnetic field
 - ▶ *Note*: no atmosphere=> no wind=> **all footprints remain as they were**
- ▶ Impact craters; volcanos; solar wind; water cannot persist
- ▶ Change in distance, gravitational pull **causes tides** Moon force of gravity larger (closer), so tides follow lunar rather than solar day, but larger when moon and sun aligned (summing forces)
 - ▶ **Super moon** (larger tides) when moon is closer (at perigee of the ellipse)
- ▶ **Moon gravity very slightly slows down Earth spin**, lengthen days (2 ms/100 yrs)
- ▶ First landings: Soviet Union's Luna 2 (1959); "soft" Luna 9 (1966); US's Apollo 11 1969 (Armstrong)
- ▶ Hypothetical: 4.51 by old, "not long after Earth" 2/2 a giant impact Earth
- ▶ **Moon moving out from earth about 3.8cm/yr; would have been too close to orbit ~10 Myrs ago**
- ▶ **Lava/volcano findings suggest active, young moon; crater patterns not c/w long age**

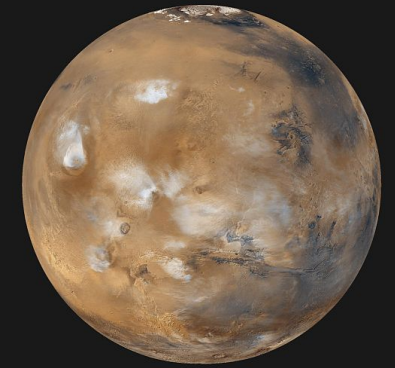


Higher high tide



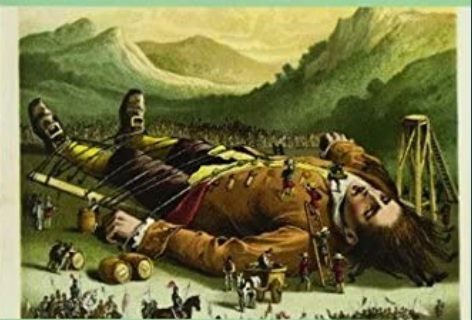
Mars (Roman god of wars)

- ▶ The **most Earth-like geologically**; some ice at poles and vapor in atmosphere; axial tilt (25.2°) and rotational pd (24h 37m) similar
 - ▶ 1.5AU from Sun; 0.95 d of Earth; 0.95 density; 0.38g; 2 moons
 - ▶ Sidereal orbital pd 687d (1.9x Earth); synodic 780 (2.1y)
 - ▶ rotation 1.025d
- ▶ atmosphere too narrow for liquid water to remain; deep blue due to scattering, but less intense sunlight
- ▶ “Red planet” due to oxidized iron compounds
- ▶ **2 tiny moons** (Phobos 10mi=d 8hr orbit, Deimos 8mi=d 30 hr orbit) in circular orbit; could throw a baseball into orbit (well designed moons/orbits); rotate like our moon – “tidally locked” (far side never visible from surface)
 - ▶ Swift’s **Gulliver’s Travels (1726)**– describes **2 Mars moons** before were discovered – also due to close orbit formerly
- ▶ Mariner spacecraft gathered info and Rovers landed
- ▶ “**canals**” are **optical illusion**; Valles Marineris large canyon; mostly smooth, especially northern hemisphere; **water vapor but no liquid; thin atmosphere so could not last (so no life could be supported)**

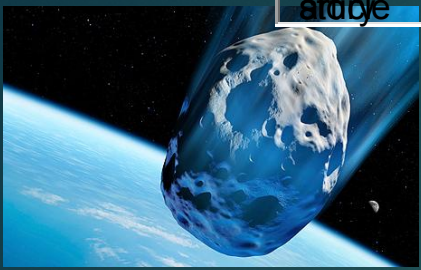


MY
FAVORITE
MARTIAN

GULLIVER'S
TRAVELS



JONATHAN SWIFT



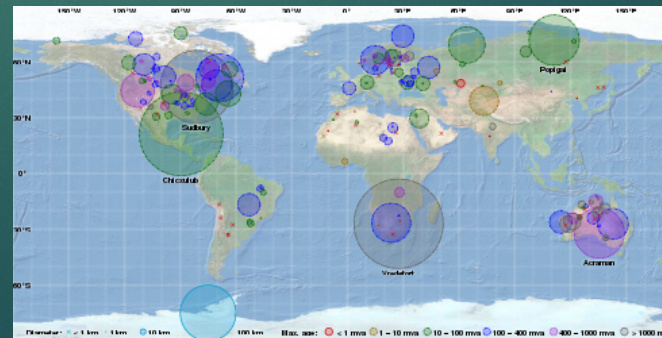
Asteroids (and Centaurs)

- ▶ 1801 Piazzi discovered **Ceres**, a new planet; 15 followed shortly thereafter by '04 by others, so by convention called Minor Planets; Herschel (see Uranus discovery?) coined term asteroids 1802; largest
- ▶ Now >1M; not really a belt- zone, most orbit in plane of planets, but all but 100 rotate sun "**prograde**"; mean separation many millions of miles; so no collisions; combined mass <moon; explored by several spacecraft
- ▶ **150 have moons**, one is 1 mi di (Dactyl, 1994) ; some are binary (or even trinary; one is quaternary- 130 Electra)- orbit each other; largest to hit earth- South Africa (Vredefort crater- ~15 miles across)
- ▶ **Ceres is largest** by far -590mi diameter=1/4 size moon; rock and ice; 4.6 yr orbit; round); Pallas 2nd by volume; Vesta 2nd by mass (rocky)
- ▶ **9/26/22 – NASA destroyed an asteroid** ("to save a future day") a la Deep Impact)
- ▶ **Centaurs**: between Saturn/Uranus – 1st 1977, called Chiron; several 100 now



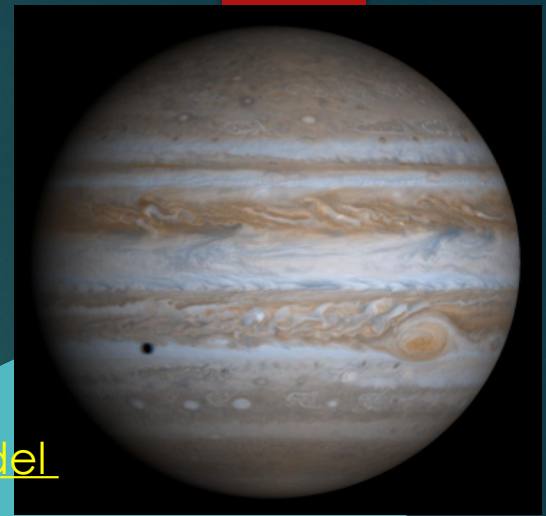
Meteoroids

- ▶ Fragments from comets or asteroids; ejected planetary debris
 - ▶ much smaller than asteroids; most <1 meter
- ▶ Meteor (when enter Earth atmosphere; meteorites when hit surface) – small rocky/metal-containing (Ni, Fe) particles
 - ▶ Burns up when encounters Earth's atmosphere – incandescent/ glowing, "shooting star"
 - ▶ Several notable, larger ones up to several meters/kg (eg 1908 Chelyabinsk Oblast, Russia)
 - ▶ Impact craters can be large (eg Pingualuit, northern Quebec
- ▶ ?killed dinosaurs – Chicxulub in G of Mex



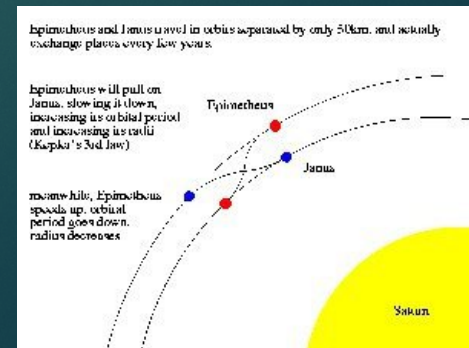
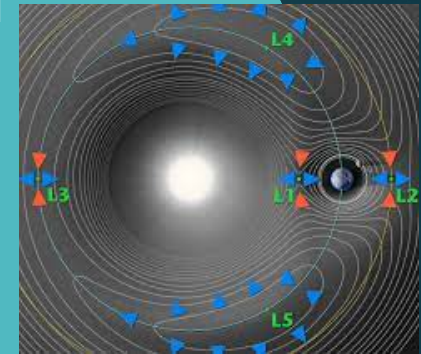
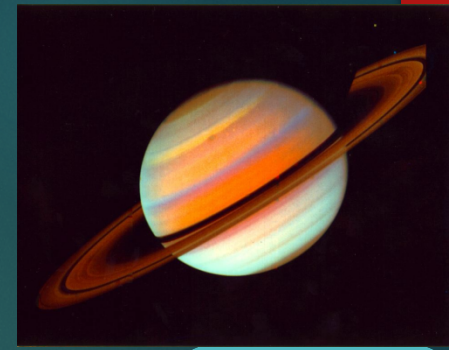
Jupiter (Roman “king of gods”)

- ▶ Observed at least by Babylonians 700BC; Fairly bright; readily visible
- ▶ 5.2AU; **11.2 diameter Earth**; 0.24 density Earth; 2.4g; 1st of gas planets
- ▶ 11.9 yr sidereal orbit; 399d synodic (we catch up to it quickly!)
- ▶ rotation 9.93 hrs; **can see twice/night from Earth; spins too fast form by accretion model**
- ▶ **Most massive** (2.5X all others combined; =318 Earths; .001 of Sun);
 - ▶ H₂, He gaseous, also NH₄, H₂O, MH₄ make colorful clouds; no solid surface; squashed, ~11x Earth diameters
 - ▶ **Rings**- made of **dust**, not ice like Saturn
- ▶ **Strong magnetic field, high internal heat ;actually emits 2X what it receives from universe would have low values**
- ▶ Great Red Spot -more orange hue; **great storm**; discovered 1664 Hooke
- ▶ Jupiter's gravity influences orbits/shape of asteroid belt
- ▶ 1979 Voyager “died” observing many other categories of moons
- ▶ **4 (Galilean) Moons (79 satellites)- several evidences against evolution, for design**
 - ▶ **3 are in orbital resonance (x, 2x, 4x orbital times Europa, Ganymede, Callisto- 3.55, 7.15, 16.7 days); Io orbits 1.77 days**
 - ▶ Ganymede – **most irregular surface; magnetic field (young); size of Mercury**
 - ▶ Callisto – **most cratered; Europa – least cratered (time inconsistency)**
 - ▶ Io – **covered w 400 volcanos, 150 active; volume of lava flow 30x size in 5B yrs**



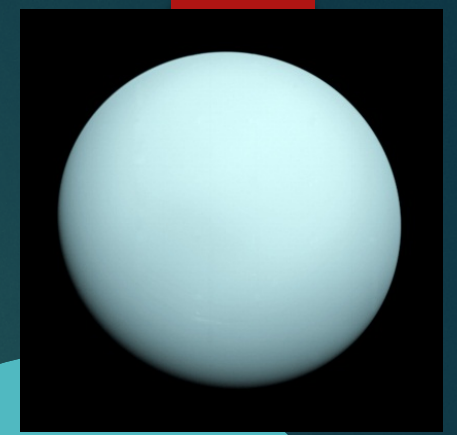
Saturn (Roman god of agriculture)

- ▶ Babylonians by 700BC observed; Galileo saw rings 1610 (telescope)
- ▶ 9.4 AU (.89B mi); 9.5X diameter Earth; 0.13 density; 0.9g;
- ▶ 29.5 yrs orbit
- ▶ 10.5 hr rotation like Jupiter, **can see twice/day** from Earth
- ▶ 95x mass Earth; 1000x Earth's magnetic field (1/20 of Jupiter); "smaller Jupiter"- H₂, He, and small amts of CH₄ and NH₄ (yellow color)
- ▶ Clouds stretched into belts and zones; violent storms- Great White Spot q30yrs
- ▶ **Rings**- 170K mi across; 1 mi thick (.001 DVD); gaps and divides - formed certain moons (largest "Cassini")
- ▶ Pioneer 11, Voyager, Cassini-Huygens aircraft flybys
- ▶ **83 Moons especially demonstrate design evidence and younger solar system**: 83 moons (only 13 >50mi);
 - ▶ Titan is largest 3300mi (2nd only to Ganymede of Jupiter) (>Mercury))- CH₄- **should be broken down by solar radiation within few million yrs ; should be an ocean of ethane to supply all that methane**
 - ▶ Enceladus has **internal heat (also not c/w old universe)**
 - ▶ only planet w **"Trojan moons"- don't move (Lagrangian points, +/- 60°) 2 sets; balance of gravity**
 - ▶ 2 others have nearly circular orbits- Epimetheus and Janus- nearly identical orbits which are closer than their radii, but due to gravitational forces (like happens w our moon, 1.5 inches more distant each year), **they jump orbits instead of colliding (pass each 4 years)!**



Uranus

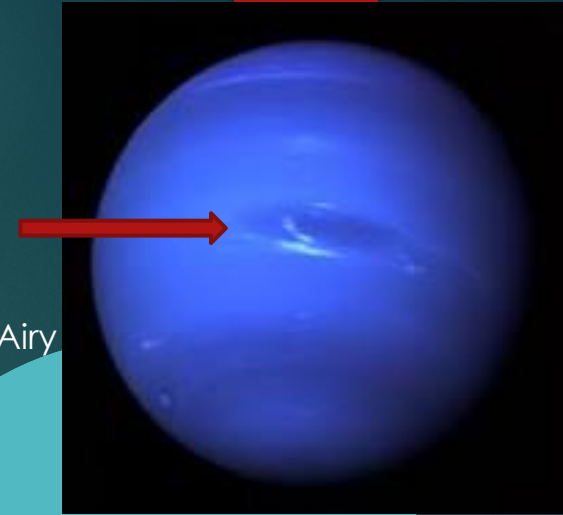
(Greek god of the sky; tried to name after King George III; others Herschel)



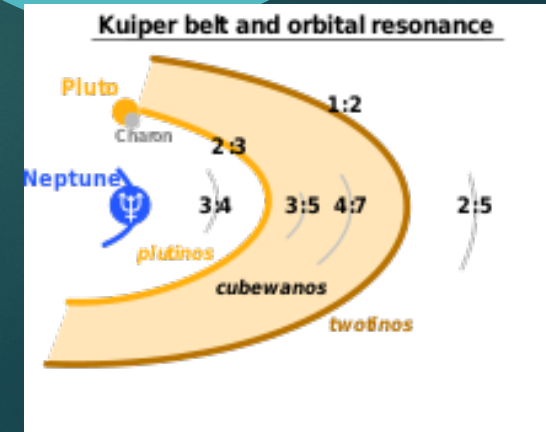
- ▶ 1781 discovered Wm Herschel, but 1609 observed as a star
- ▶ 19.1 AU (~28 mi); 4x diameter; 0.23 density; 0.89g; 13 thin rope rings
- ▶ 84yr orbit; 17.2 hr rotation
- ▶ **98° axial tilt (sideways!** so Sun rises in the south!) ([impossible within evolution theories](#))
- ▶ 1/400 light intensity of Earth; **does NOT radiate energy**
- ▶ Composition similar to Jupiter & Saturn (“ice giants”)
- ▶ **Magnetic field much too strong (10K x) for long age, and is tilted;** magnetic axis off by 60° and strength is *c/w 6000yrs*
- ▶ surface winds up to 560mph
- ▶ **27 moons** (5 major; 22 smaller, all named after Shakespeare or A. Pope characters)- inner 18 almost perfect circular orbits, but outer 9 out of plane including **8 retrograde!**); like Jupiter, moons NOT c/w capture, and varied textures (especially Miranda)
- ▶ Voyager 2 flew past 1986

Neptune (Roman god of the sea)

- ▶ observed by Galileo -confused as a fixed star, 1612
 - ▶ mathematically predicted from Uranus orbit perturbation by Bouvard 1821 as a planet; confirmed 1845 Airy and LeVerrier independently
- ▶ 30 AU (~3B mi); 3.9 diameter Earth 17x mass; 0.3 density; 1.12g; 2.3 arc seconds!
- ▶ **165yr orbit**; 16.1 hr rotation
- ▶ very similar in size/composition to Uranus ("twin planets")
- ▶ Again, has magnetic field (should be too old, [core should be cooled](#)); and tilted B field
- ▶ **large dark spot** in southern hemisphere, like Jupiter's Red Spot; streaks- volcanoes; **Radiates 2x energy it receives (creation evidence)** despite being coldest place in our SS; cf Uranus which lacks internal heat; similar magn field, c/w 6000 yrs strength
- ▶ Triton is largest moon (retrograde orbit!)(.77x moon)- orbits oblique to equator (**unlike other large moons** in solar system); Nereid, 100mi dia, very eccentric orbit (.85-6M mi); 14 moons total
- ▶ Also has **Trojan objects**; has 2:3 resonance with Pluto **crossing orbit** so never collide
- ▶ Its gravitational pull influences **Kuiper Belt** (icy worlds -cf asteroid belt- beyond planets); 200 objects have orbital resonance
- ▶ Ring system- 5 major systems, up to 63K from center (discovered 1968, Guinan); but are disappearing (ie not at equilibrium) (New Scientist 26Mar2005:p21)
- ▶ Voyager 2 passed by in 1989
- ▶ Evolution says Neptune and Uranus should not exist -formation would have taken too long



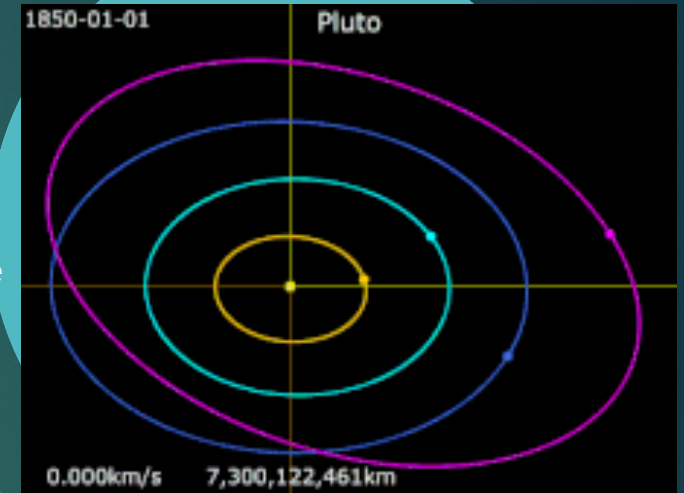
Photograph taken by NASA's [Voyager 2](#) in 1989



Pluto (Roman god of the underworld)

- ▶ Like Neptune, predicted by Percival Lowell in 1906 due to orbit anomalies; but, discovered by Clyde Tombaugh 1930 using “blink comparator”; legal battle by Lowell’s widow (funding) delayed search 10 yrs
- ▶ Planet until 2006 - demoted to trans-Neptunian object (TNO aka Kuiper belt)
 - ▶ Defn of planet (2006): orbits Sun, hydrostatic equilibrium (~ spherical), **cleared neighborhood** – has hundreds of other objects found in Kuiper belt
- ▶ 39.5 AU; 0.19 diameter; <1% mass Earth; 0.33 density; 0.07g; 5 moons
- ▶ 248 yrs orbit; 377.7d; **highly eccentric** (delta 1.9B miles, so closer than Neptune (1979-99); other TNOs more)
- ▶ Rotation -6.4d; **123° axial tilt** (on its side and backwards- sun rises in SW); **17° inclination**
- ▶ Small, rocky/icy; “ice volcanos”; <1% Earth mass; 6.4 days rotational; Tilt of 120°; 39X Earth to Sun; 248 yrs orbit
- ▶ 2/3 of TNOs are “plutinos” which, like Pluto, in **orbital resonance w Neptune (2:3)**
- ▶ Again, moons and TNOs have characteristics of activity/young
- ▶ New Horizons passed by in 2015
- ▶ Webb telescope – ice plate of CO; ?subterreanean ocean; ?hotter than previously thought

Northern hemisphere of Pluto in true color, taken by NASA's [New Horizons](#) probe in 2015

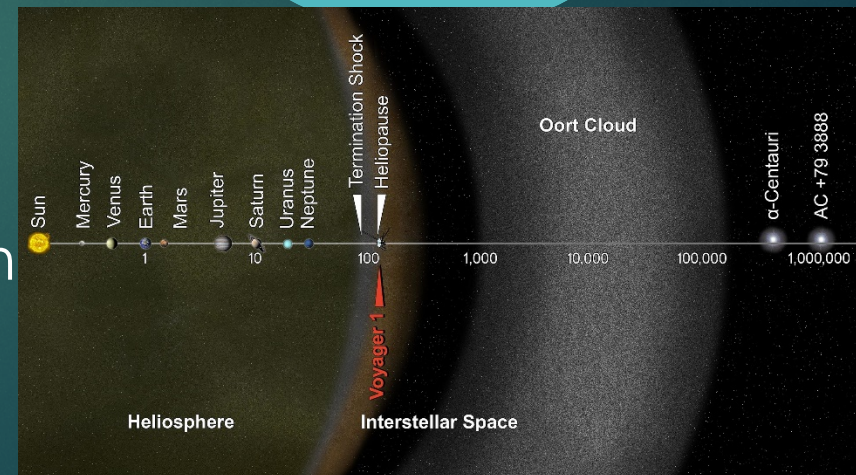
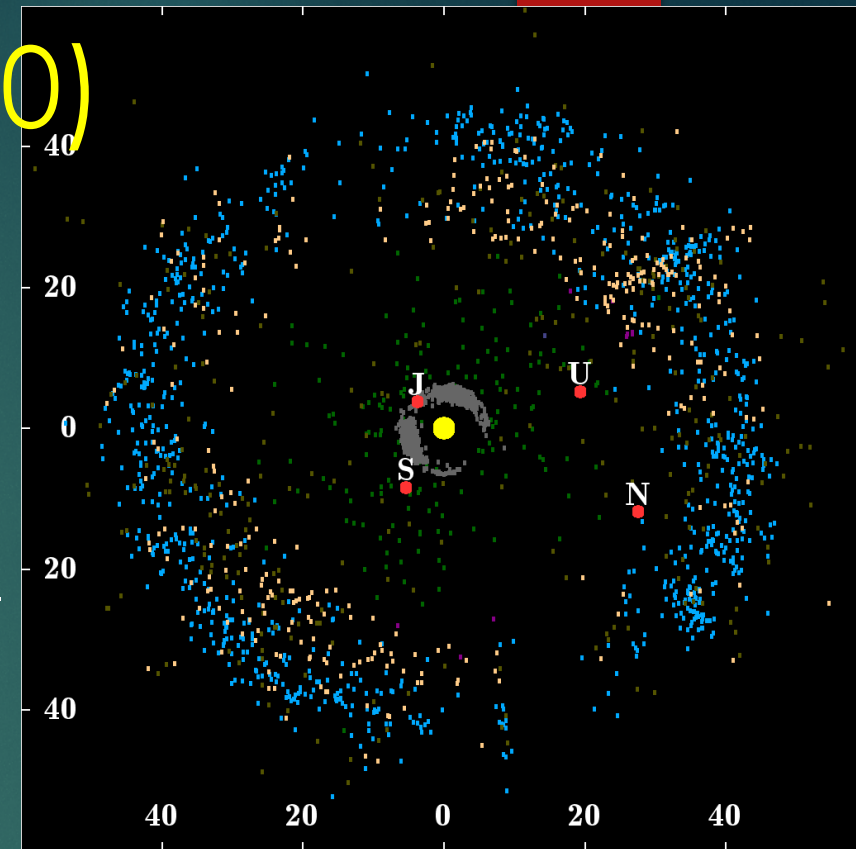


Largest known trans-Neptunian objects (TNOs)



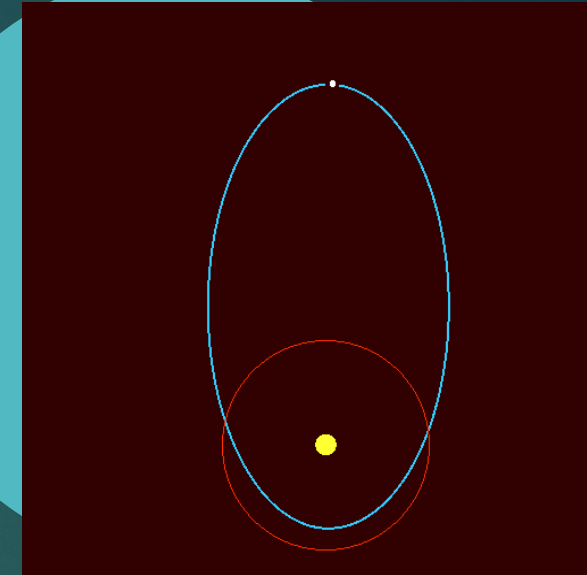
Kuiper Belt and Oort cloud (TNO)

- ▶ Kuiper Belt- beyond Neptune, 30-50AUs (disc)
 - ▶ Suggested by Leonard; discovered 1951 by Kuiper
 - ▶ A more distant “asteroid” belt, 20-200x more massive
 - ▶ Frozen “volatiles”; dwarf planets (includes Pluto in 1930- most massive); also Charon (1978) and Albion (1992)
 - ▶ 3:2 orbital resonance with Neptune
- ▶ Oort cloud – 1000x more distant than Kuiper Belt
 - ▶ Theoretical
 - ▶ Icy “planetessimals”
 - ▶ **Helipause** (point at distance where gravity from Sun is equal to that of other stars) ~50-125K AUs



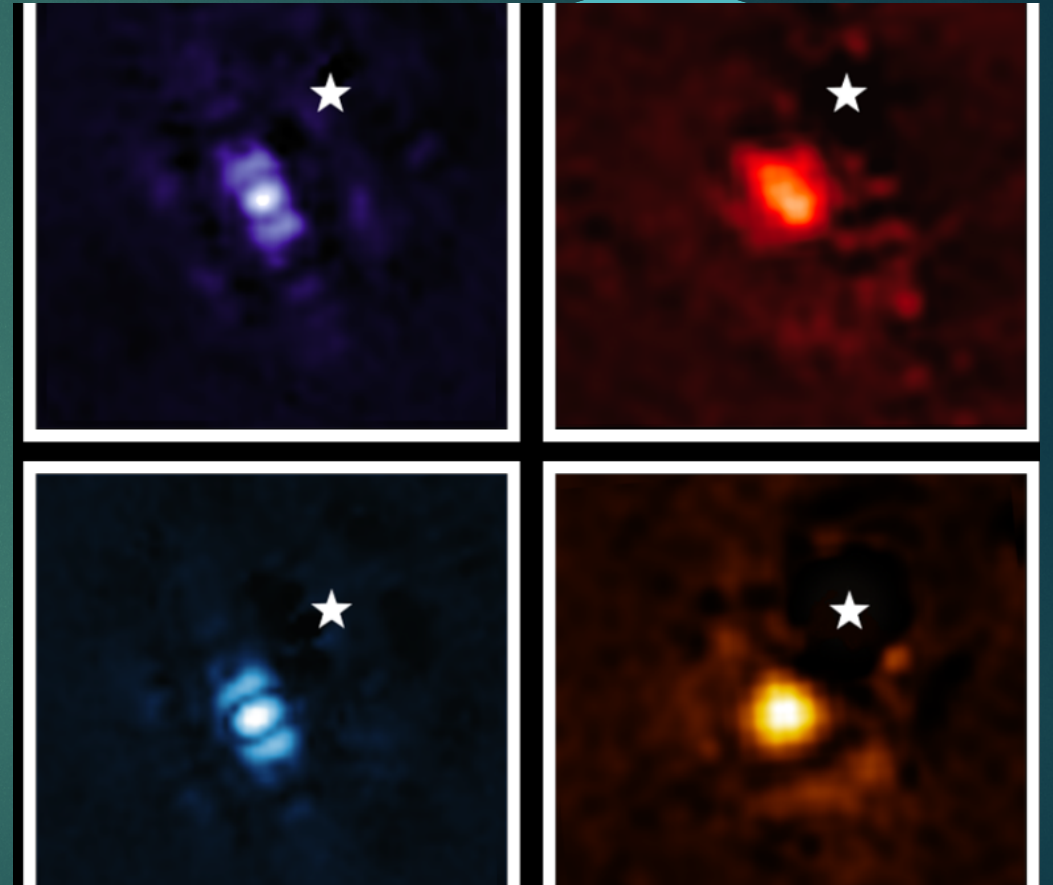
Comets

- ▶ Comets – distinguished from asteroids by composition: ice/dirt; Tycho Brahe (1577) first discovered
 - ▶ Spend most of time in outer solar system;
 - ▶ Nucleus, coma cloud around nucleus, tail makes visible -debris xmillions of miles- commonly 2 tails, colors by ions/gas
 - ▶ Halley's: 1986 last approached Earth, every ~76 yrs (trivia: Mark Twain born and died on appearance yrs)
 - ▶ Long period (>200 yr orbit) vs short period ; mass is reduced gradually- so long period extrapolates to 100,000 year maximum "life" (or less) – or else melted; proposed "nuclei" not enough (ie Oort cloud or, alternative theory, Kuyper belt)
 - ▶ Orbit Sun in opposite direction as planets ie most are retrograde); can be very inclined to the elliptic Stardust space craft (2004) – sample of comet's tail ("Wild-2"): aerogel - high silicone (small amount of water); then Tempel 1 in 2011



Planets outside of our Solar System (Exoplanets)

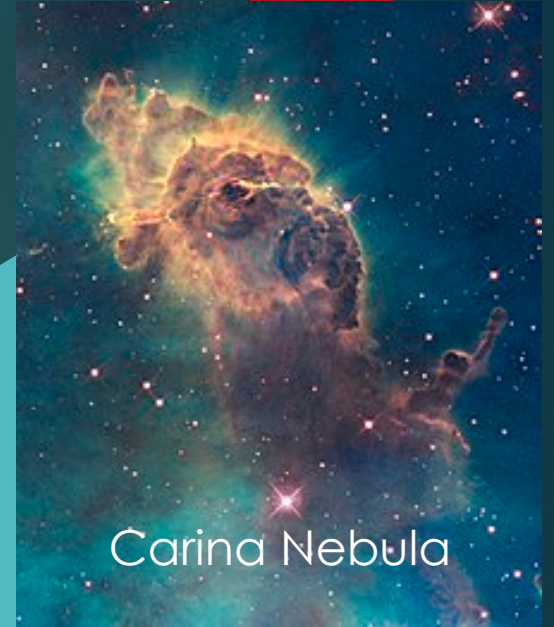
- ▶ Mayor and Queloz- 1995 Nobel prize for discovering 1st (51 Pegasi b) (50Lyrs away)
- ▶ Webb telescope: 1st direct image
- ▶ Now thousands discovered
- ▶ Orbit gas giant stars, uninhabitable
- ▶ 6-12x mass of Jupiter
- ▶ “young” at 15-20- Myo
- ▶ 100x as far from host star as Earth is from Sun



The star gamut, for perspective....

Nebula

- ▶ First recorded
 - ▶ Ptolemy, ~150AD as a nebulous region between Ursa Major and Leo
 - ▶ 1610 Fabri de Peiresc discovered Orion Nebula w telescope
 - ▶ 1715 Halley published list of 6; later others more, but some later classified as mass/clusters of stars
- ▶ Luminescent areas of stuff – “often star-forming areas”; planetary nebulae; result of supernova explosions
 - ▶ Very sparse – 10^4 molecules/cm³; cf our atmosphere 10^{19} air molecules/cm³ (few kg if volume of Earth) – stronger vacuum than can be made
 - ▶ Vast size - Many L-y in diameter
 - ▶ Eg. Andromeda later a galaxy, Eagle, Carina, Crab
 - ▶ Largest: The [Tarantula Nebula](#) (aka 30 Doradus)– 1800 ly across; 170K ly away; in “Large Magellanic Cloud (a “small” satellite galaxy that orbits Milky Way



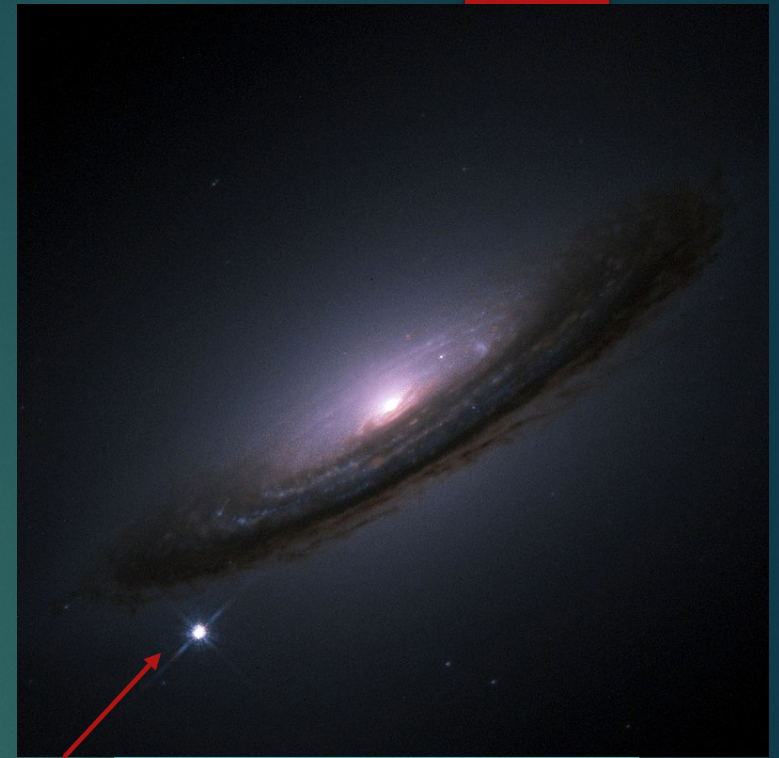
I do not understand this...

Scripture tells us Sun, Moon, Stars were created forever (cf Earth)

- ▶ Psa 148:1-6: Praise ye the Lord. Praise ye the Lord from the heavens: praise him in the heights.2 Praise ye him, all his angels: praise ye him, all his hosts.3 Praise ye him, **sun and moon**: praise him, all ye **stars** of light.4 Praise him, ye **heavens of heavens**, and ye **waters that be above the heavens**.5 Let them praise the name of the Lord: for he commanded, and they were created.6 He hath also **stablished them for ever and ever**: he hath made a decree which shall not pass.
- ▶ (but Rev 21:23 – **will have no need for Sun**)
- ▶ (and Isa 65:17;66:12; 2Pet 3:13 – **new heavens and new earth**)

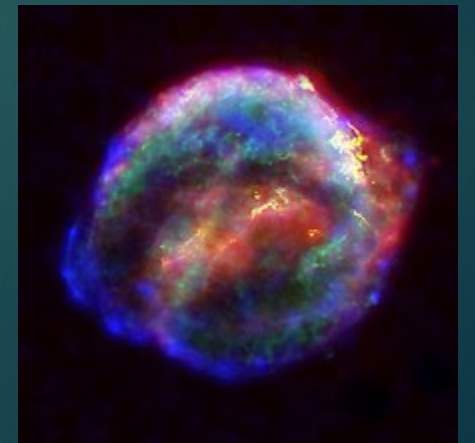
Supernova

- ▶ “star death”
 - ▶ Explosion of a white dwarf star
 - ▶ runaway fusion vs gravitational collapse (black hole)
- ▶ Induced by binary companion accretion, stellar merger
- ▶ 1st seen possibly HB9 around 4500BC (rock carving record) in Kashmir; 185AD Chinese, others
- ▶ leads to remnant neutron star, black hole, or destruction
- ▶ ?source of heavy elements in space?
- ▶ Much theory: classification (Types I-V), etc

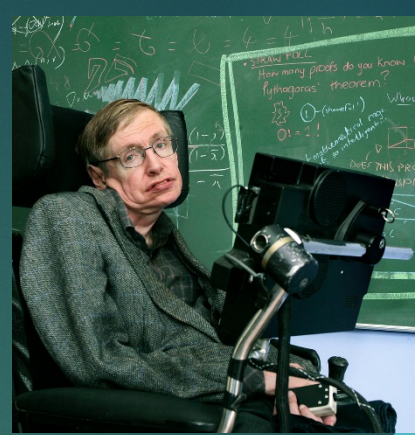


[SN 1994D](#), a [type Ia supernova](#) within its host galaxy, [NGC 4526](#)

Multi-wavelength C-ray, IR, optical image of [Kepler's SN 1604](#)

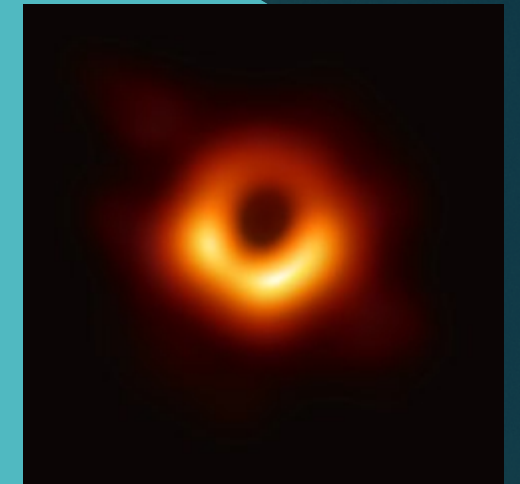


Black Holes

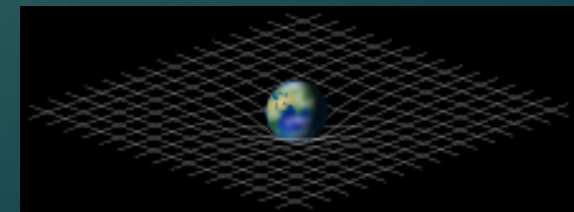


$$v_e = \sqrt{\frac{2GM}{d}}$$

- ▶ Regions when gravity is so strong no particles or radiation can escape
 - ▶ Classical physics: escape velocity is speed at which gravitational potential $(-GMm/x)$ is exceeded by kinetic energy $(1/2 mv^2)$; black hole too massive and distance too small to allow escape (conceptual here)
 - ▶ No emitted radiation; is **inferred by effect** on matter/radiation near it
- ▶ First considered 1700s (Michell and Laplace). Schwarzschild found general relativity solution ("singularity", thus Einstein's field equations infinite) to characterize; Finkelstein (1958) first gave proper interpretation
- ▶ Only 25 found in Milky Way; nearest 1500 l-y; 100 million suspected
- ▶ Large mass distorts space time (relativity)
 - ▶ Largest: TON 618 – mass 66B solar masses



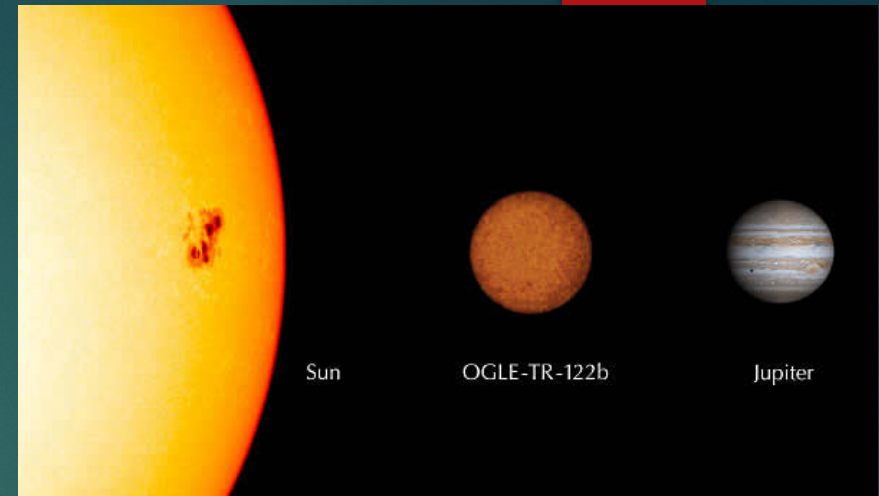
Messier 87 image



$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \kappa T_{\mu\nu},$$

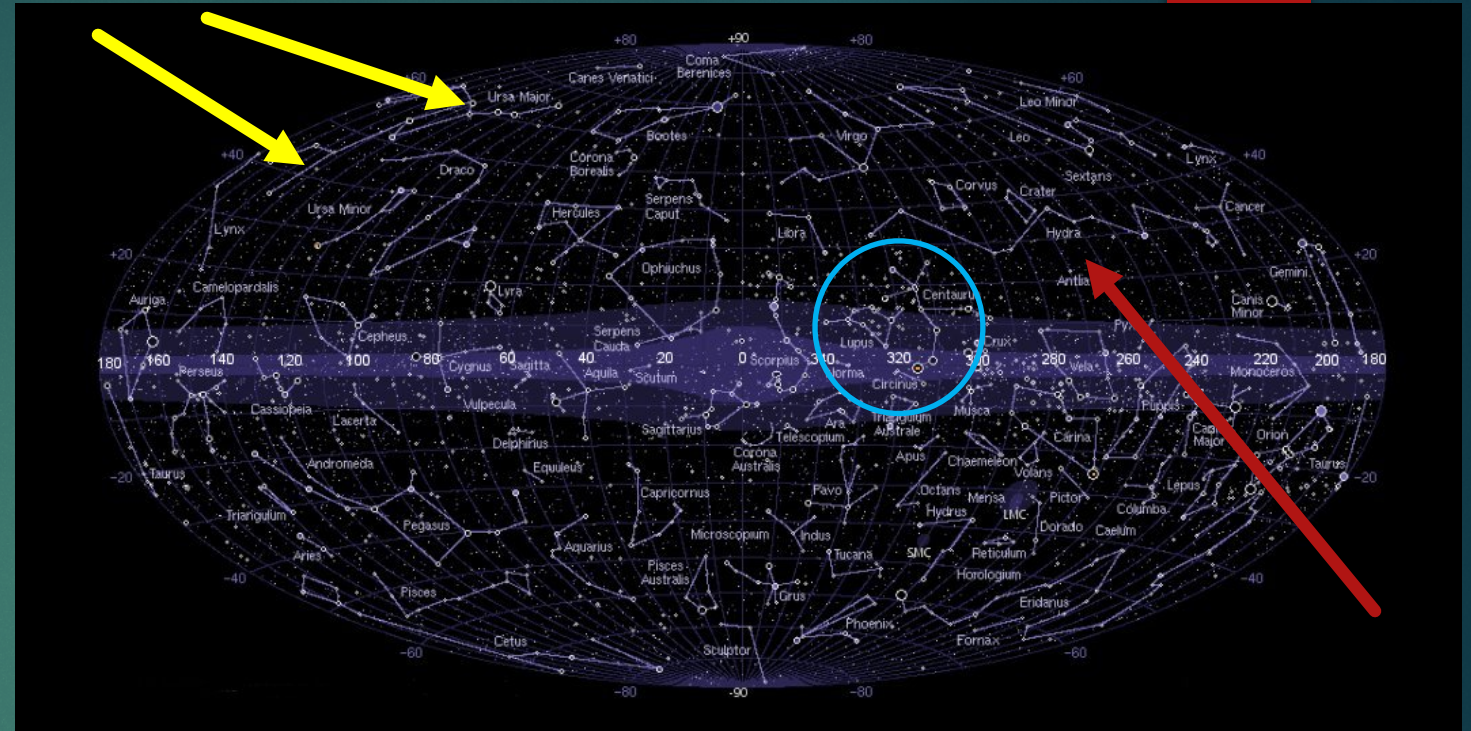
Notable stars

- ▶ Polaris (North Star) – defines true north
- ▶ Sirius A (Dog Star) – brightest (type A)
- ▶ Closest:
 - ▶ Proxima Centauri – (disc. 1915) closest, 269K AU (4 l-y); red dwarf, 0.18 Sun radius
- ▶ Most distant:
 - ▶ ULAS J0015+01 – (2014) most distant in our galaxy – 900K l-y
 - ▶ HD1 star group – most distant – 33G ly
- ▶ Size:
 - ▶ UY Scuti – largest; variable hypergiant, 1700 x radius of Sun
 - ▶ OGLE-TR-122b – smallest (red dwarfs), 0.12 Sun radius, 0.1 solar mass (approaching theoretical limit for fusion of 0.07)
- ▶ Age
 - ▶ Oldest (“Methuselah star”): HD 140283 – (1912) 14.5 by; in Libra, 190 LY from earth



Constellations

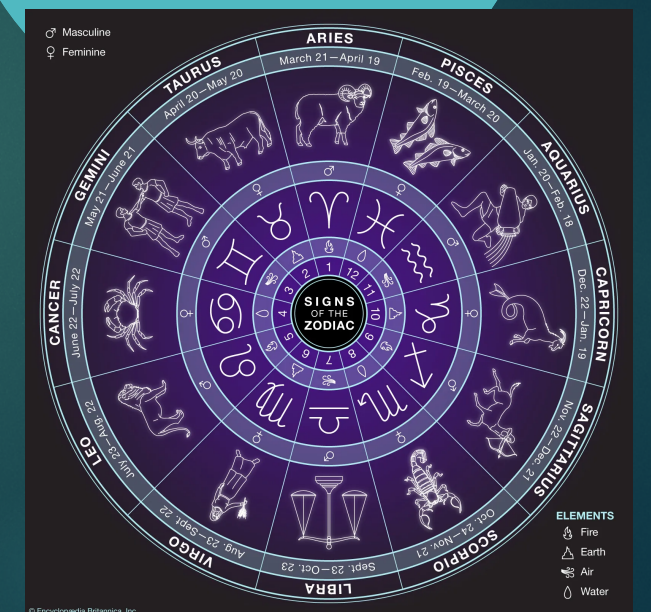
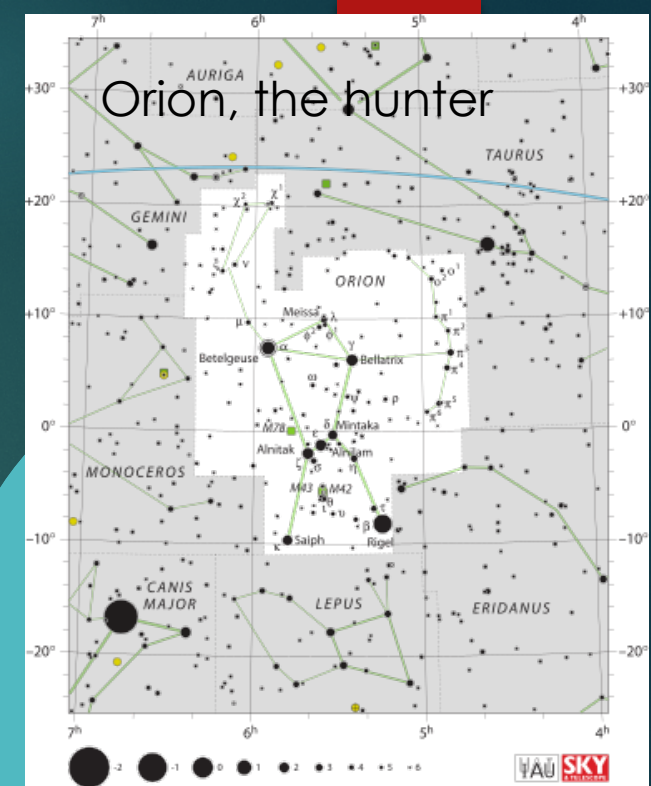
- ▶ 88 recognized by NASA
- ▶ Big and little dipper
 - ▶ (tail of bear in Ursa)
- ▶ Orion (overlap with Centaurus, Lupus)
- ▶ Hydra – largest, 100°
- ▶ some only in seasons, some in certain hemisphere (“circumpolar” means both)
- ▶ Along with bright stars, was important way to navigate



Scripture on Stars/Constellations

Constellations mentioned in Scripture

- ▶ Job 9:8-9 – Which alone spreadeth out the heavens, and treadeth upon the waves of the sea.9 Which maketh **Arcturus, Orion, and Pleiades**, and the chambers of the south.
- ▶ Job 26:13 – By his spirit he hath garnished the heavens; his hand hath formed **the crooked serpent**.
- ▶ Job 38:31-33 – Canst thou bind the sweet influences of **Pleiades**, or loose the bands of Orion?32 Canst thou bring forth **Mazzaroth** in his season? or canst thou guide **Arcturus** with his sons?33 Knowest thou the ordinances of heaven? canst thou set the dominion thereof in the earth?
- ▶ Isa 13:10 – For the stars of heaven and the constellations thereof shall not give their light: the sun shall be darkened in his going forth, and the moon shall not cause her light to shine.
- ▶ Amos 5:8 - Seek him that maketh the seven stars and **Orion**, and turneth the shadow of death into the morning, and maketh the day dark with night: that calleth for the waters of the sea, and poureth them out upon the face of the earth: The Lord is his name:
- ▶ Perhaps indirectly: Isa 27:1; Rev 12:1-4, 15
- ▶ **Angels as stars (symbolically)**; host of heaven (Deut 4:14-19, 2Chron 18:18; Neh 9:6;; Gen 2:1; Rev 12:4, 7-9;and others)
- ▶ Astrology rebuked (Isa 47:13-14), impotent (Dan 1:20;2:27;4:7;5:7-8)
 - ▶ Signs of Zodiac mentioned in scripture, have been satanically corrupted; note positions (and thus any supposed relational basis) **have changed** (period of Earth's precession is about 10K yrs) (John 8:44; Rev 12:9)



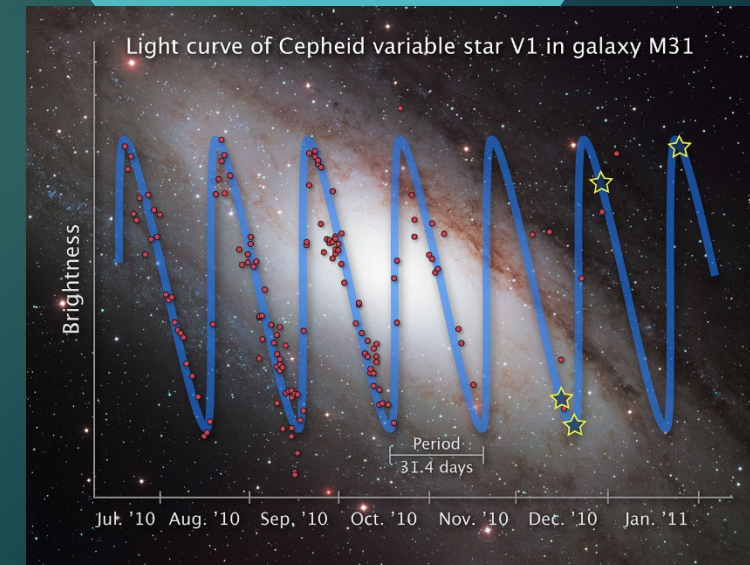
God's Godness

Estimated # stars: 10^{25}

- ▶ Psa 147:4 - He telleth **the number of the stars**; he calleth them all by their names.
- ▶ Isa 40:26 - Lift up your eyes on high, and behold who hath created these things, that bringeth out their host **by number**: he calleth them all by names by the greatness of his might, for that he is strong in power; not one faileth.
 - ▶ Cf Matt 10:30 – hairs numbered; imagine, he can describe the ripples in the ocean, the topography (even mathematically)– in real time!; and everyone's every thought!
- ▶ 1Cor 15:41 - There is one glory of the sun, and another glory of the moon, and another glory of the stars: for one star differeth from another star in glory. (glory ~dignity, **purpose**)
- ▶ Isa 55:9 - For as the **heavens are higher than the earth**, so are my ways higher than your ways, and my thoughts than your thoughts.

Electromagnetic Pulse

- ▶ “pulsar” (?vis a vis Revelation) (in “dark universe”)
- ▶ Most powerful is nuclear bomb ($\times 10^6$ any other)
- ▶ Others: lightning, meteor, coronal mass ejection (solar), electric motors, power line surges
 - ▶ Cepheids (Pigott, 1784)– **neutron star** – (an old star) pulsates radially, vary in size/temp
 - ▶ Webb telescope findings call into question their accuracy in dating universe; they are typically in center of a galaxy where “noise”; dating results a variance with older standards (“Hubble tension”)



Why all this detail?

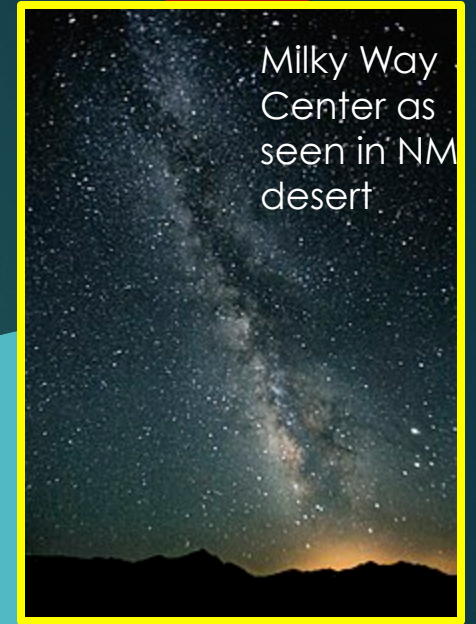
- ▶ Things are more complex than we think – points to a creator with a purpose
- ▶ And it only gets more complex...



(photoschmidt/Shutterstock)

Galaxies – Gravitationally bound system of stars, etc

- ▶ Elliptical, **spiral** or irregular; has satellite clusters; black hole at center
 - ▶ 50/50 rotational direction; rotate with tails trailing direction
- ▶ Average 10^8 stars, but supergiants 10^{14} stars
- ▶ **Milky Way**- proposed Al-Biruni (Persian), c1000; proof Galileo 1610
 - ▶ 87K light years across; >100 B stars; we are 27K ly from galactic center (Sagittarius) where there is bulge w an intense radio source where there is a super black hole (4M solar masses)
 - ▶ is Spiral and rotating (about 212 my period), seems to not obey Kepler laws – but “arms” **are not slowing down as would be expected**
 - ▶ Moving at 600km/s



Milky Way Center as seen in NM desert

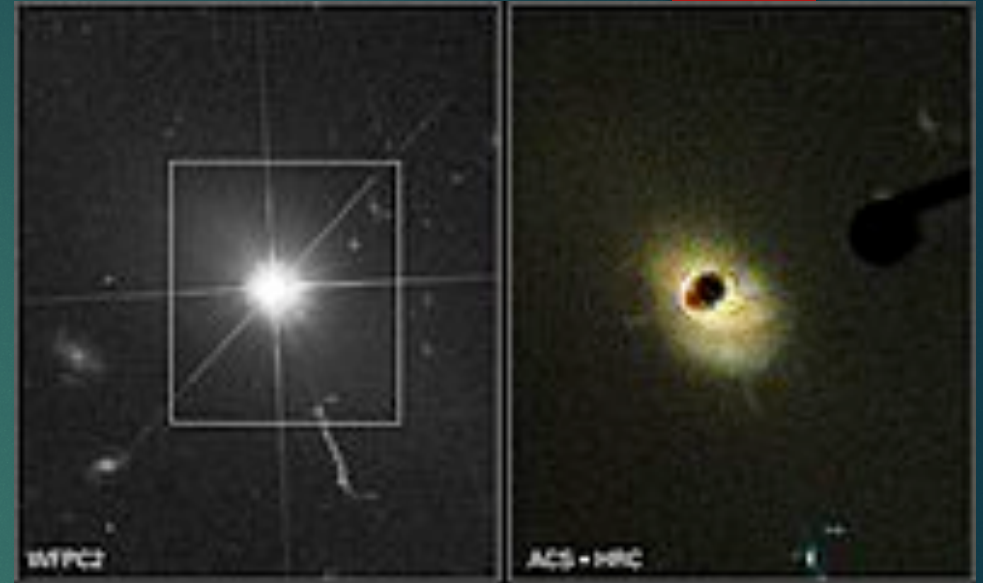


Andromeda Galaxy – initially called a nebula

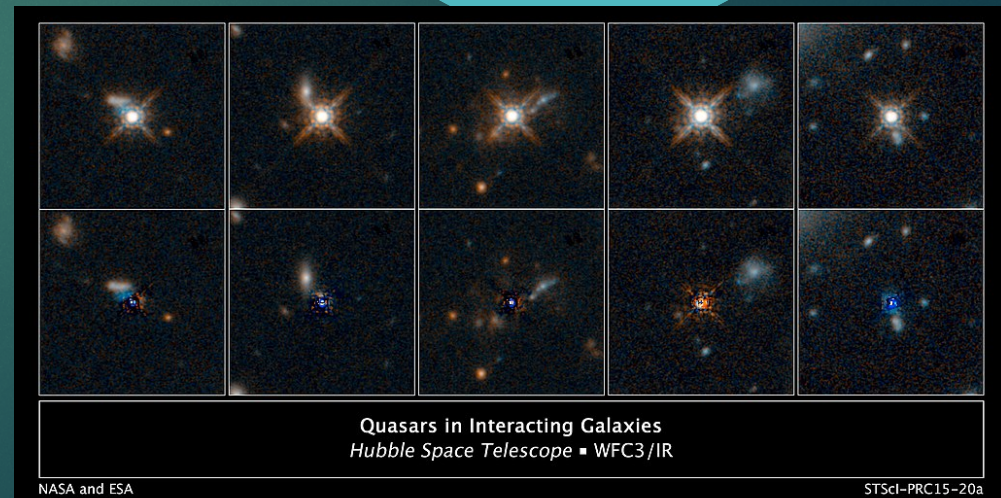


Quasar

- ▶ 1st ID's 1950s as **radio-wave sources w red shift**
- ▶ Hubble Space Telescope images place in center of galaxies where they are theorized to be powered by supermassive black holes (Salpeter and Zel'dovich, 1964)
- ▶ ~million have been found; nearest 600M l-y
- ▶ **Most energetic** and distant members of active galactic nuclei; extremely luminous (100x that of Milky Way)
- ▶ Classified as active galactic nucleus (AGN)
- ▶ Largest: Huge-LQG – 73 quasars; 6×10^{18} solar masses



Hubble images of quasar 3C 273; coronagraph (right)- shielding quasar's to show surround

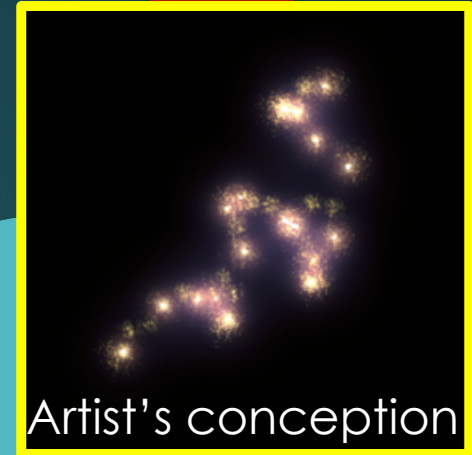


Other largest things in the universe

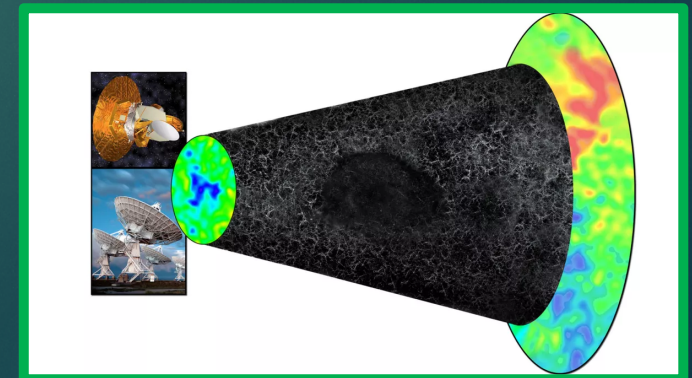
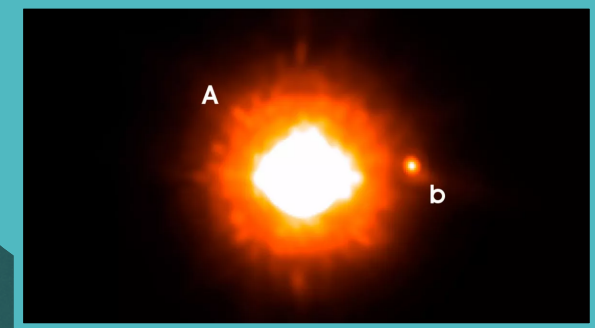
- ▶ **Observable universe** is 93 B LY in diameter
- ▶ **Hercules-Corona Borealis** ("Great Wall")– a cluster of supercluster of galaxies; 10 GLY across; in subset of gamma-ray bursts (GRBs); discovered 2013
- ▶ Our solar system
 - ▶ Planet– Jupiter 11x diameter of earth
 - ▶ moon – Ganymede (Jupiter) 3273 mi diameter
 - ▶ Mountain – Olympus Mons (Mars) 15 mi high
 - ▶ Canyon- Valles Marineris (Mars) 1865 x370 x5 mi
 - ▶ Crater – Utopia Palnitia (Mars) 2050 mi diameter
 - ▶ Asteroid- Ceres 590 mi across
 - ▶ Dwarf planet – Pluto 1473 mi diameter; New Horizons spacecraft confirmed it bigger than Eris, 2015
- ▶ Exoplanet – **GQ Lupi b** – 2005 3.5x diameter Jupiter; ?star
- ▶ Empty spot – **Supervoid in Eridanus** (2004); 1.8 GLY across
- ▶ Single object – **Protocluster SPT2349-56** – 14 galaxies crashed together; 10T solar masses



But God is BIGGER than ALL!

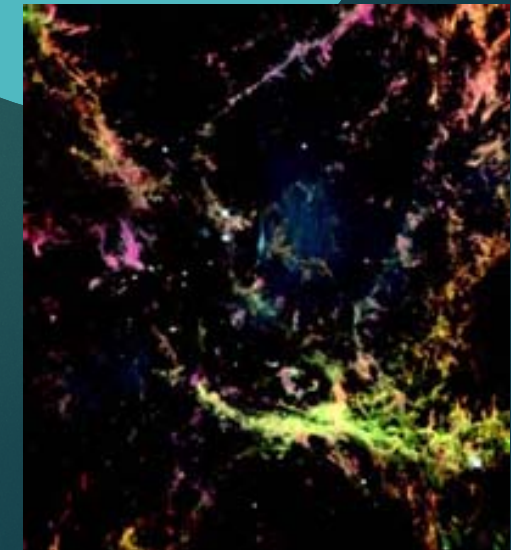
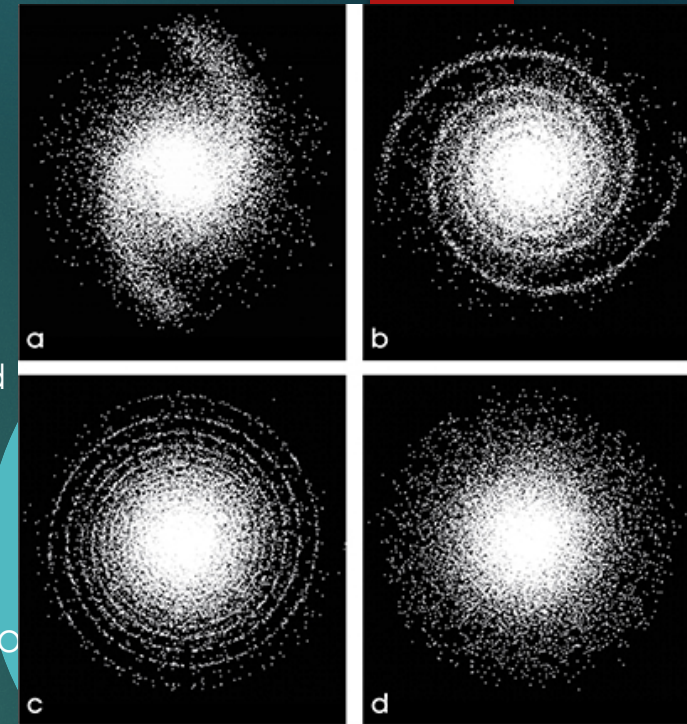


Artist's conception

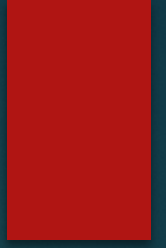


Evidences for young universe

- ▶ The spiral in galaxies **should “tighten”** after just a few hundred Mys - the inside rotates faster than distal arms
 - ▶ Spiral should definitely not be present after 5-10By
 - ▶ Secular explanation: the arms are not physical material, rather a wave (proposed 1940s, refined 1960s) – disagreement even among them
- ▶ Hot blue stars – very massive (25-300x size of sun), consume fuel faster; should have lifetimes of about 15My, not 5By; secular: yes, but new ones form
 - ▶ Black holes withing might not fit either; blue giants are progenitors of BHs
- ▶ Globular clusters – collections of stars (150 in Milky Way); neutron stars, but would have to be very dense, 10mi after forming from supernovas, high speed, **should escape orbit within thousands** (not B's) of yrs
 - ▶ **There are too few supernova remnants** – at current rate, only about 7000 yrs worth are present (about q25yrs)
- ▶ Size of universe larger than 15B Lys radius; how?
- ▶ Comets – should have melted within 10K yrs; secular proposition that new ones form from Kuiper Belt or Oort cloud (farther away)
- ▶ Sun shrinking 0.1%/100yrs (would have engulfed Earth 100K yrs ago) (not enough neutrinos to explain solely on basis of nuclear fusion)
- ▶ Io (Jupiter moon, a small body) should be too old for observed volcano

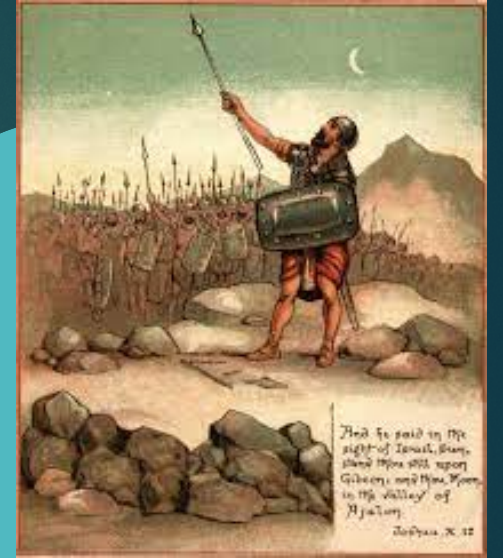


A couple other things...



Celestial miracles – no explanation by definition

- ▶ Stars created to be “signs” and measures (Gen 1:14)
- ▶ Joshua’s Long Day (Josh 10:12-14)
 - ▶ Appears to describe Earth rotation paused
 - ▶ Similar descriptions in Hindus, Greeks, Chinese, ancient Mexicans, American Indians, Polynesians
 - ▶ NASA “missing day” has been disproven
- ▶ Reversal of sun dial shadow (Ahaz - 2Kings 20:8-11)
- ▶ Supernatural darkness at crucifixion (Matt 27:45; Luke 23:44-45); eclipse not described or calculated
- ▶ Star of Bethlehem (Num 24:17,19)- ?conjunction of Saturn, Jupiter, Mars 7BC; Jupiter, Venus 3BC; planets referred to as stars – Matt 24:29
- ▶ Astral catastrophies, supernovas, eclipses, etc cannot satisfactorily explain these



How to explain appearance of age if only 6000 yrs since creation?

- ▶ Created light in the paths?
 - ▶ Some would say this means the distant objects are fraudulent, but (Gen 1:14-17; Psa 19:1-2)
 - ▶ Much information contained in the light
- ▶ Speed of light have been faster previously? Unlikely
- ▶ A warp in time (ie Relativity), a “white hole” (Humphreys); but no “blue shift”
- ▶ Could the “permittivity and permeability” of free space have been different?
- ▶ Is there another dimension we are not able to perceive that somehow explains this (after all, BB theorists go to string theory’s 11 dimensions) (Harnet Model; Carmelian physics)
- ▶ Time variance in universe (Lisle-Einstein Synchrony Convention) (Anisotropic Synchrony convention)
- ▶ Bible: “light” created 1st day (Gen 1:3) before the stars on the 4th day (Gen 1:16)
- ▶ **SUPERNATURAL; we just do not know!**

Summary: Evidence for design- Problems with other theories

- ▶ 99.8% of mass in our solar system is in the Sun, but only 2% of angular momentum
- ▶ Dissimilarities in chemical make ups (eg oxygen levels)
- ▶ Loss of ice mass in comets
- ▶ Sedimentation of solar dust c/w young universe
- ▶ Dipole moments not c/w life if old
- ▶ Dissimilarities in planets' sizes, rotations, revolutions angles and rates
- ▶ Strange things moons do (Trojan, resonance, prograde) and asteroids
- ▶ Craters (eg on Mars 93% on one hemisphere)
- ▶ All chemicals “evolved” the same on all celestial bodies- but not life?
- ▶ Precisely correct location to allow temperature, seasons; atmosphere to sustain/protect only on Earth

A summary of Earth/planetary motion

