

Einstein's STR, GTR, & QIG Skylativity

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Three Tests: Failure of GTR

- 1. a. Gravitational bending of light from stars behind Sun and
 - b. Observed red shift of light caused by gravity of the Sun
- a. Details analyzed by 3- Scientists: Einstein, Newton & R Gupta
- Event: Total Solar Eclipse, deflection arc sec in South Africa/America
- | <u>Einstein</u> : 1.75 arc sec | <u>Newton</u> : 0.87 arc sec | <u>R C Gupta</u> : 0.87-1.75 arc |
|--------------------------------|------------------------------|----------------------------------|
| Einstein: Metric tensor | Newton: Gravitation Law | Refraction: Snell's Law |
| Space/time curves | Light deflection (particle) | Light particle diffuses in |
| by Massive objects | Mass occupies the space | Hydrogen atmosphere |
- Measured deflection : 1.61-1.98 arc sec
- b. Observed red shift of light verified: compared to pure source.
 - i. Surface of the Earth that support Einstein's conclusion space-time is curved by gravity of massive object
 - ii Skylativity suggest experiment should verify that red-shift varies when measured by space probes travelling towards the sun
- Gravitational space-time curvature inverse square law.



Three Tests: Failure of GTR

- 2. Advancement of perihelion, orbit of Planet Mercury 100 years
- Einstein: Observed shift in orbit 5600 arc s per century
- Einstein's correction: 43 arc s using space-time curvature
- Metric precisely includes effects of gravity from all planets
- Did not prove that space-time curved, mass occupies space
- Newton: Calculated value 5557 arc s, discrepancy 43 arc s
- Did not include period difference Mercury & Jupiter orbits
- Skylativity®: Calculated discrepancy 17.5957 arc s
- caused by Jupiter's orbit distance modification
- Period of Jupiter's orbit 12 years and Period of Mercury 88 days
- Einstein: Metric tensor, inefficient/expensive, light cone 300k km
- Skylativity®: Jupiter orbit correction depends on location of
- 3 Earth relative to planet Mercury, Real-time solution



Three Tests: Failure of GTR

- 3. Einstein GTR, Singularity at the (center) core of Black hole.
- Skylativity[®]: Black hole, quark star + neutron star core radius R_c
- Claim: Singularity can not exist within sphere, critical radius R_c .
- Gravity core mass vs forces quark charge repulsion + binding energy
- Gauss's Law: Force/Field of gravity $\propto$ (proportional) Enclosed mass
- Critical radius calculation: Forces Charge on Quarks $F_q = \text{Gravity } F_g$
- Quark packing density $13/27$, $F_q = 25.63 \text{ N}$, $F_g = 9.0156 \times 10^{-20} \times R_c$
- Critical radius $R_c = 2.8428 \times 10^{17} \text{ km} = 0.300476 \times 10^5 \text{ lys}$
 $= 30047.6 \text{ lys}$ Approximately 30,000 light years
- This proves that singularity does not exist at the center of any black hole, a failure of Einstein's GTR
- 4. Einstein's Geodesics equation poses NP-incomplete problem for
- Solution, orbits of binary system of stars/black holes. Also, spacetime curvature could not explain highly elliptical orbits of Haley's comet.



Skylativity® GTS vs. Einstein's GTR

General Theory of Skylativity® [GTS] Light Zero Rest Mass

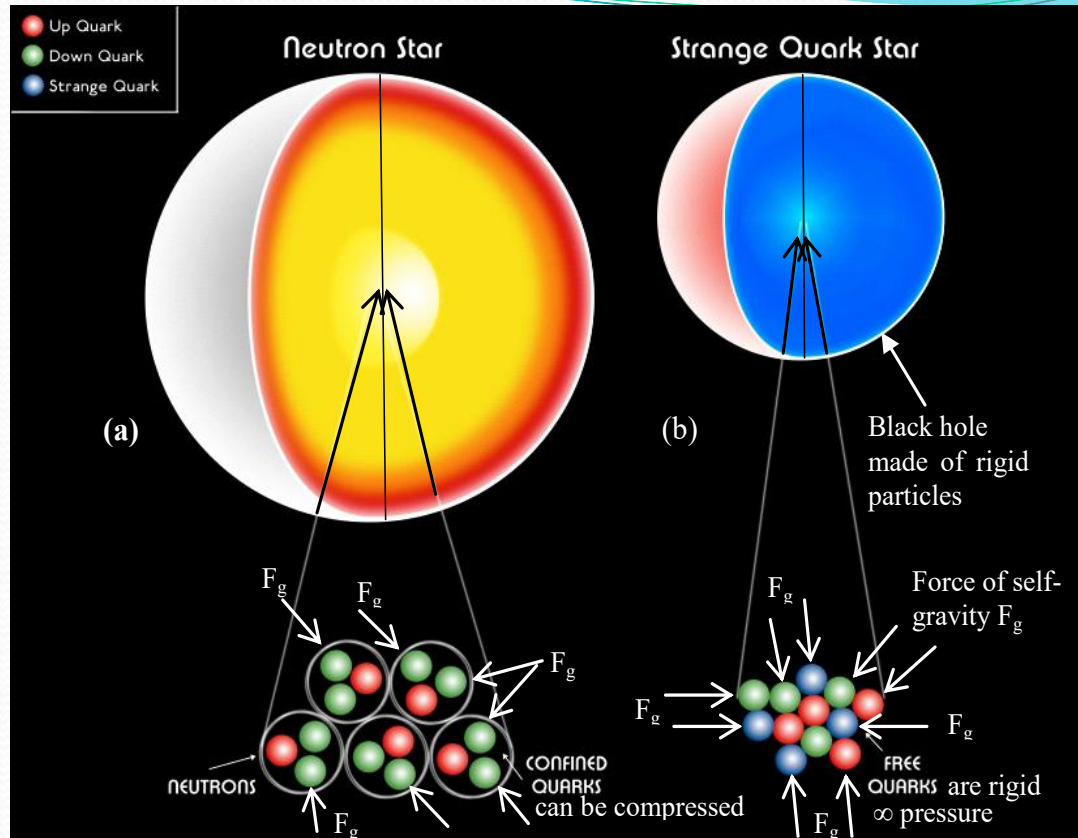
- Light/Radiation are refracted, follows Feynman's QED
- Light/radiation zero rest mass, insensitive to gravity
- Gravity deflects objects/particles, non-zero rest mass
- Explained the effect of gravity on atomic clocks
- As gravity decreases, λ of light shrinks, clocks speedup

Einstein's General Theory of Relativity [GTR]

- Cause of gravity and speed of propagation unknown
- Acceleration of objects is independent of mass
- Gravity warps spacetime & deflects light and matter
- As gravity decreases, λ expands, clock slowdown
- Solution of Einstein's field equation, real Universe



Black Hole: Strange Quark Star

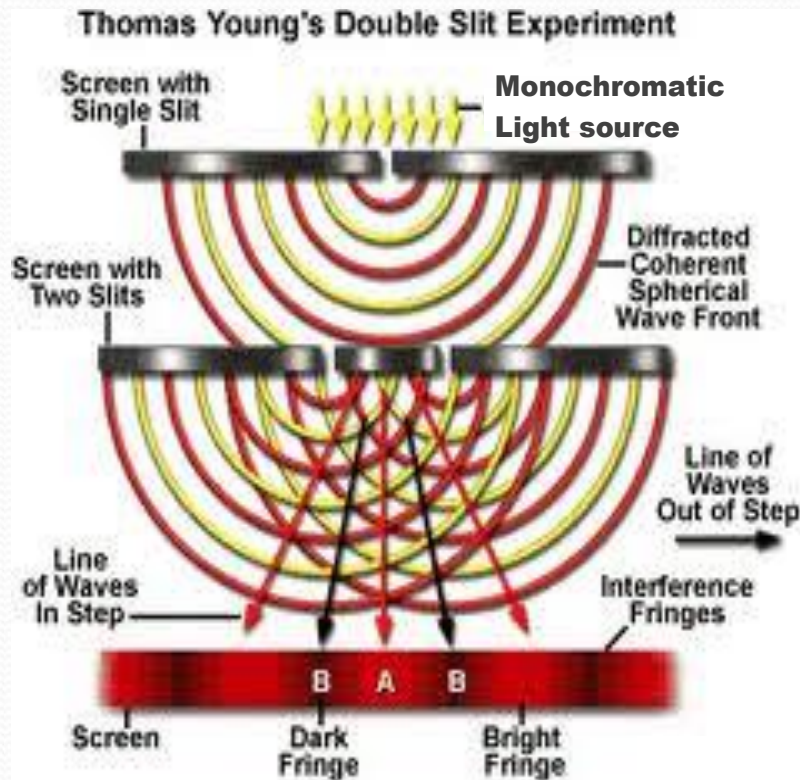


- Quark degenerate pressure due to color charge prevents singularity
- Rigid particle quarks do not crash, differential ΔF_g not enough
- Black holes insensitive to light and radiations as there are no electrons to provide response. Light appears to be trapped.
- **6** Interaction of light with electrons, Feynman's QED

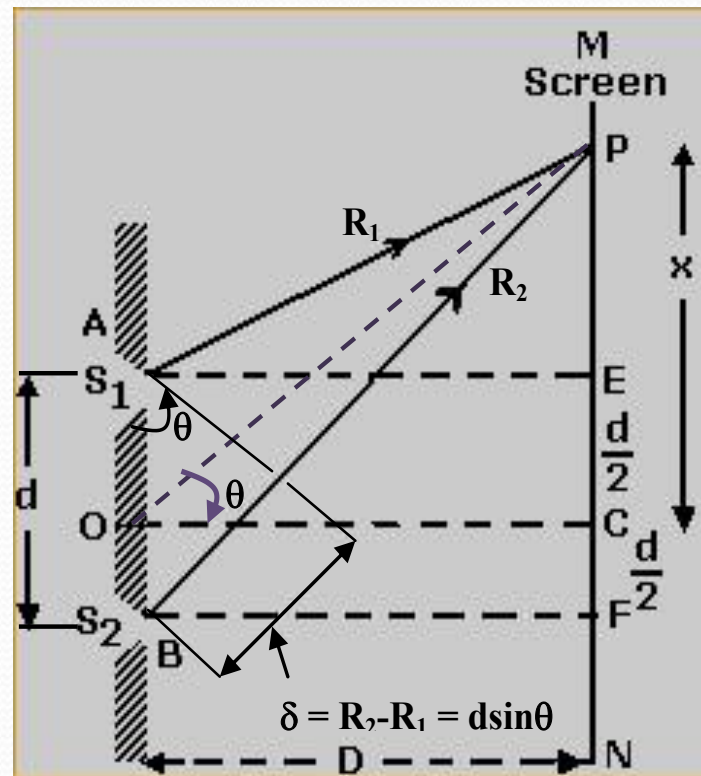


Revisit Quantum Behavior

- Revisit Quantum behavior: Young's Double Slit experiment, Photon
- Young's Double Slit, light interacts with both slits
- Depicting wave nature of light & interference patterns observed, True
- Bright fringes $d \sin \theta_{\text{bright}} = m\lambda$, dark fringes $d \sin \theta_{\text{dark}} = (m+1/2)\lambda$
- Linear position for small θ , $X_{\text{bright}} = D \times m\lambda/d$



(a)

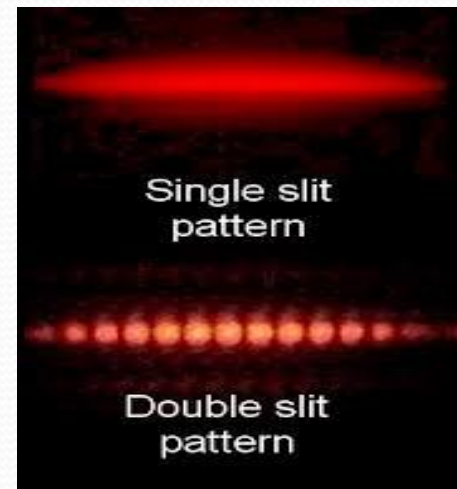
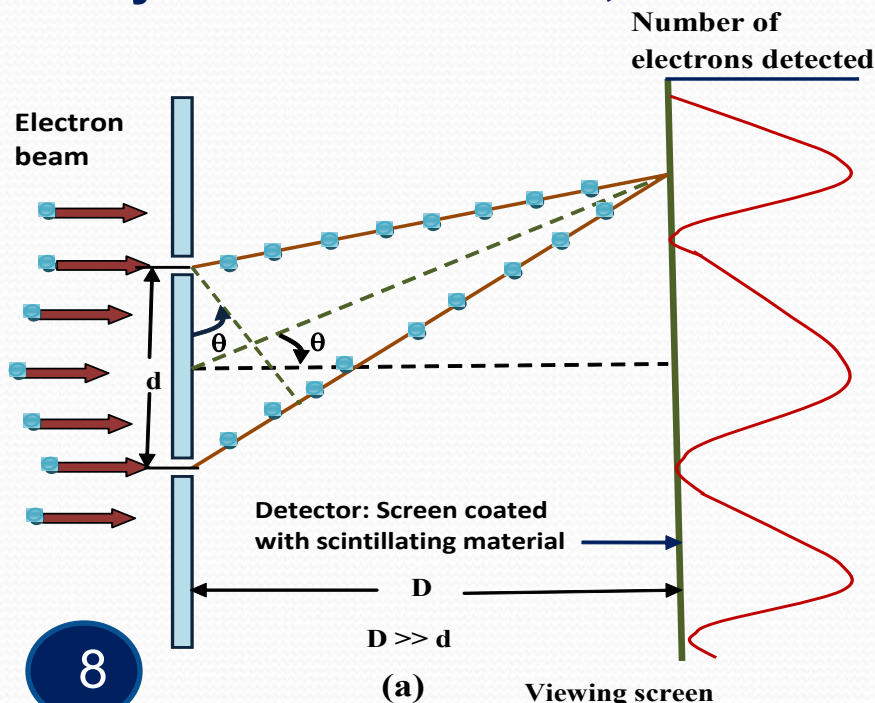


(b)



Young's Double Slit Experiment

- Revisit Quantum behavior: Young's Double Slit experiment, E-beam
- Young's Double Slit, electron beam interacts with both slits, incorrect
- Not at the same time. Interference is superposition of many electrons.
- Depicting wave nature of particles, incorrect conclusion
- Bright fringes $d \sin \theta_{\text{bright}} = m\lambda$, dark fringes $d \sin \theta_{\text{dark}} = (m+1/2)\lambda$
- Image of E-beam sensitive to gravity, light waves not effected
- Gravity effects too weak , cannot be isolated from fringe position



Analysis of U-Tubes

- 1. Anti-matter (negative mass) in Halo & Hubble Expansion
- What Does Negative Mass Mean? Part 1
- <https://www.youtube.com/watch?v=zEGsq7H5egE>
- What Does Negative Mass Mean? Part 2
- <https://www.youtube.com/watch?v=1Xr4dTCZc7g>
- Negative Mass Part 3: Energy, Friction, Gravity, and More
- https://www.youtube.com/watch?v=2YFyvR7M_LI
- Negative Mass Part 4: Life, the Universe, and Everything(-ish)
- <https://www.youtube.com/watch?v=Pr3jooDIrvM>
- 2. The Nobel Prize, Proved Einstein Wrong | Quantum Weirdness Made Simple
- https://www.youtube.com/watch?v=pSQov1KobIg_EPR
- Scientists Measure Quantum Entanglement Speed – and It Breaks Physics
- https://www.youtube.com/watch?v=t3wjY95zvNM_EPR
- 3. Quantum Leaps Explained: Niels Bohr's Idea That Redefined Physics
- <https://www.youtube.com/watch?v=xPyOGFng6uA>



Analysis of U-Tubes

- **1. Anti-matter (negative mass) in Halo & Hubble Expansion**
 - Four U-tubes explains interaction of positive mass & negative mass
 - Analysis of inelastic and elastic collision vs end result motion direction
 - We establish a possible connection among existence of negative
 - Mass in halos (mass in space between receding galaxies) and Uniform
 - Expansion model of Universe discovered by Edwin Hubble Z-shifts
 - Implying creation of space resulting into indefinite Universe expansion
 - We propose alternate theory: Galaxies are moving apart because negative (dark matter) mass anti-matter in halo causes repulsive motion
 - Among galaxies composed of observable (light EM wave) normal matter.
- **2. U-Tube: Quantum Weirdness, EPR Paradox & Quantum Entanglement**
 - Einstein, Podolsky, Rosen (EPR): Einstein favored (Hidden variable theory) vs. Bohr favored Quantum Probabilities explanation in Quantum
 - Entanglement (QE) Phenomenon. Niels Bohr won. No hidden variable

Analysis of U-Tubes

- **2. U-Tube: Quantum Weirdness, EPR Paradox & Quantum Entanglement**
- Quantum Entanglement verified for causally connected space
- Observable composed of mutually exclusive property magnetic moment
- A. Counterclockwise vs Clockwise orientation. The observable is binary, deterministic observable. QE likely to fail if observable has > 2 states
- B. Quantum Entangle not verified for causally disconnected space
- Recent tests: QE not instantaneous, controlled ns delays linkage.
-
- **3. Quantum Leap; Bohr explains quantized energy states of electrons.**
- De Broglie wave behavior of electrons: Integral number of wave function cycle forces electron orbits in fixed stationary energy states.
- Therefore, quantum states of electrons are quantized. Electrons can not emit or absorb radiations for energy difference that does not corresponds to specific multiples of Bohr radius (ground state energy in Hydrogen atom).



Analysis of U-Tubes

- Revisit General Theory of Relativity (GTR) Spacetime curvature
- Einstein described gravity, not a force. However, it is a property of curved space-time dimension. Developed concept of inertial frame in which trajectory of small objects follows geodesics in curved space created by vast celestial objects such as stars (sun) and black holes (galaxy center).
- Argument favoring GTR: In an inertial frame, no way to distinguish in phenomenon a free-falling apple on earth vs. earth moving toward apple for an observer located at center of gravity of the earth.
- Newton' Law: Acceleration of apple lot larger than acceleration of Earth
 - $A_a = G M_e / R_e^2$ vs $A_e = G M_a / R_e^2$ Results in
 - different displacement/unit time example projectile motion
 -
- Einstein GTR: Solar Eclipse Experiment, measures deflection of ray of star light 1.43 arc sec (See Figure 1 nanoscopic view next slide)
- Point 1: Image of star developed on photographic plate during solar
- eclipse by several low energy photons (millions), exposure requirement
- 12 results in smeared image.



Analysis of U-Tubes

Point 2: Star behind the sun is orbiting surrounding galactic center black hole at different speed than the sun. Apparent position.

Annular Solar eclipse, sun blocked by the shadow of the moon

Moon in orbit
The earth

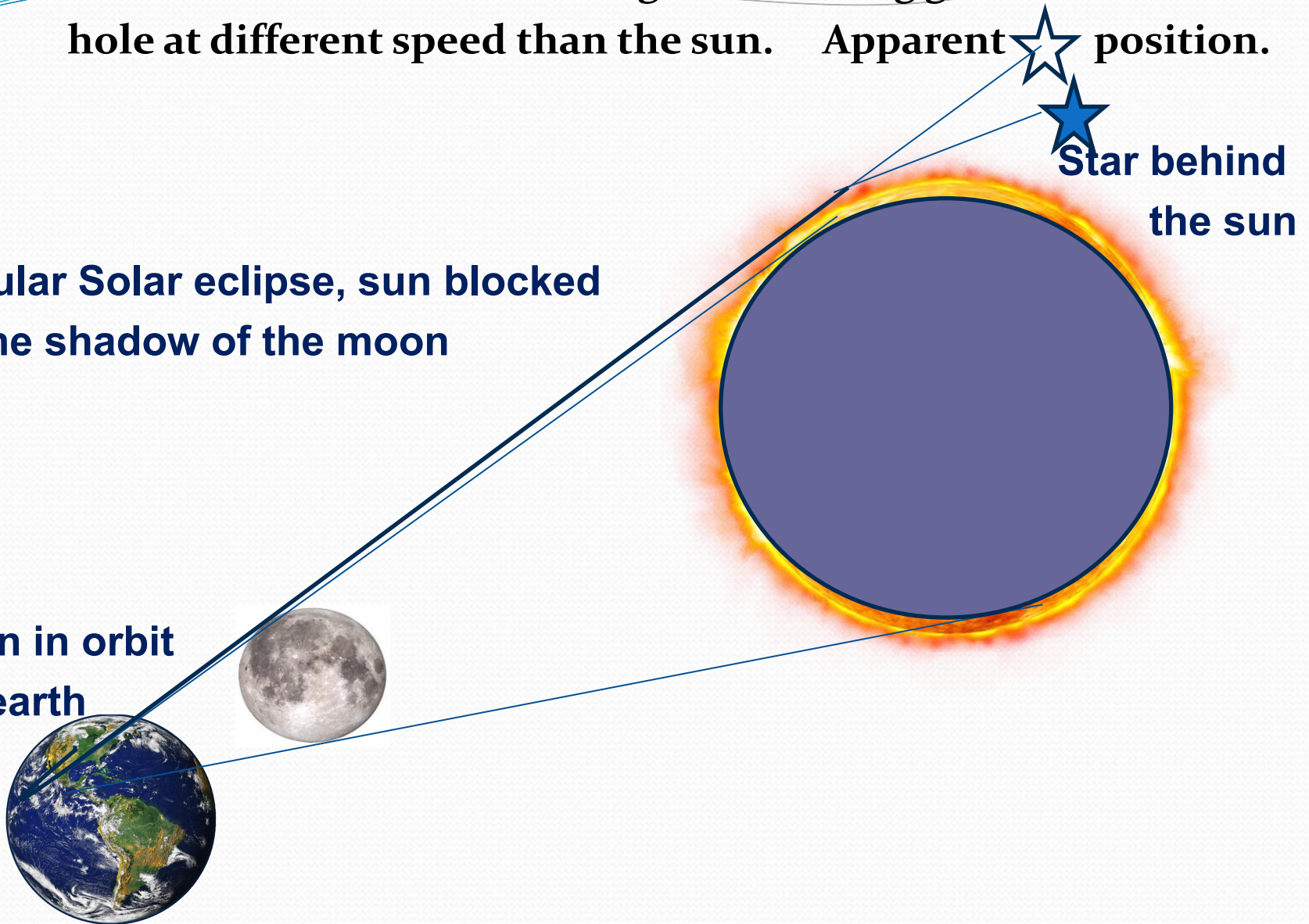
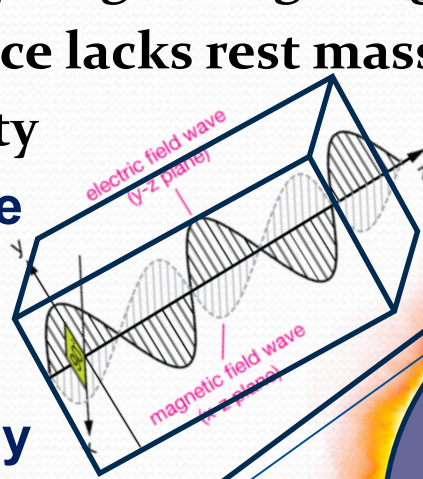


Figure 1: Solar eclipse experiment: Deflection of light ray from star.



Analysis of U-Tubes

- Point 3: Mass density of Hydrogen at gazing distance from surface of the sun 10^{-18} kg/m^3 , space lacks rest mass.
- Unit volume of space empty
- Light wave $E = 1 \text{ eV}$ visible
- x-ray energy $E = 100 \text{ eV}$
- energy mass $= E/c^2$
- 2.7K CMBR thermal energy
- G-field weak, can not bend the space.



G-field



Star behind the sun

Shadow blocks sun

Orbiting moon

The earth



Diameter of the sun

$1.39 \times 10^6 \text{ km} = 864000 \text{ miles}$

Surface gravity $28g = 281.4 \text{ kg/m}^2$

solar mass $= 1.989 \times 10^{30} \text{ kg}$

Figure 2: Nanoscopic View: Trajectory of starlight through space.



Analysis of U-Tubes

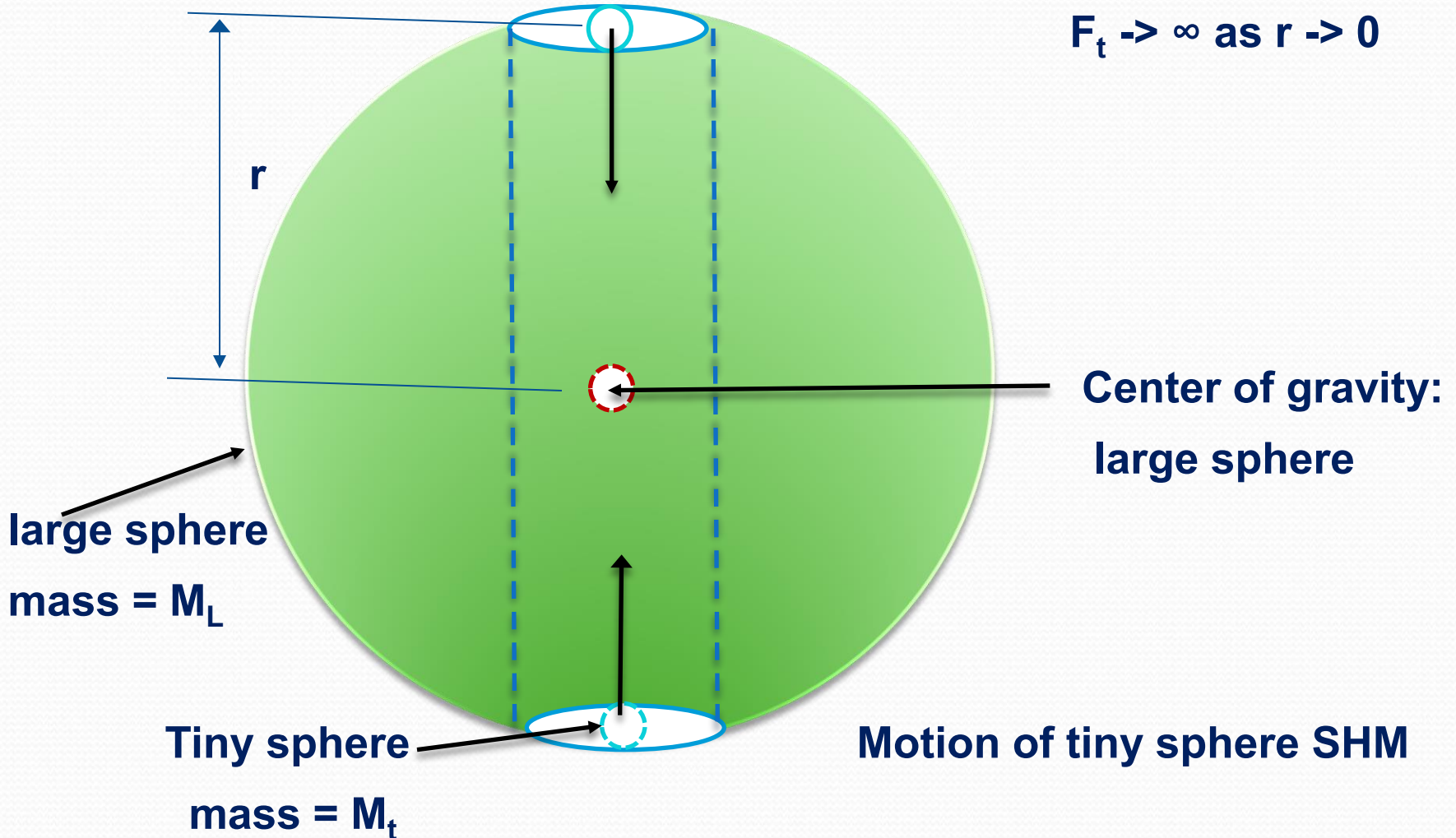
- **Point 4:** Space without rest mass is not curved by the effect of gravity.
- Mass equivalent of radiation energy is space at 2.7 K temperature = σT^4 ->
- Stephen Boltzmann Law, very small energy/mass.
- **Conclusion:** Physical space is not bent by force of gravity from the sun
- **New Thought Experiment:** Newtonian Classical Mechanics right concept
- How the One-Way Light Problem DISPROVES Einsteinian Relativity
- https://www.youtube.com/watch?v=Wst36uwM_iY U-tube
- Hypothetical Thought Experiment defies spacetime curvature GTR
- Motion of Tiny Sphere within large sphere : SHM Oscillations
- Figure 3: Motion of solid sphere, simple harmonic nature
- Einstein's Geodesics spacetime fails: motion within celestial bodies
- Motion of a ray of light within in hollow cylindrical tube in sphere
- Figure 4: Light waves with zero rest mass emerges at the same speed

Hypothetical Experiment, Test GTR

• Motion of solid sphere in hollow cylindrical cavity within Large sphere.

• Tiny sphere oscillates indefinitely, Force on ball at CG = $G (M_t M_L)/r^2$

$$F_t \rightarrow \infty \text{ as } r \rightarrow 0$$



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Figure 3 : Acceleration of tiny sphere at center, $a_t = G M_L / r^2 = \infty$

space within large sphere is not curved.

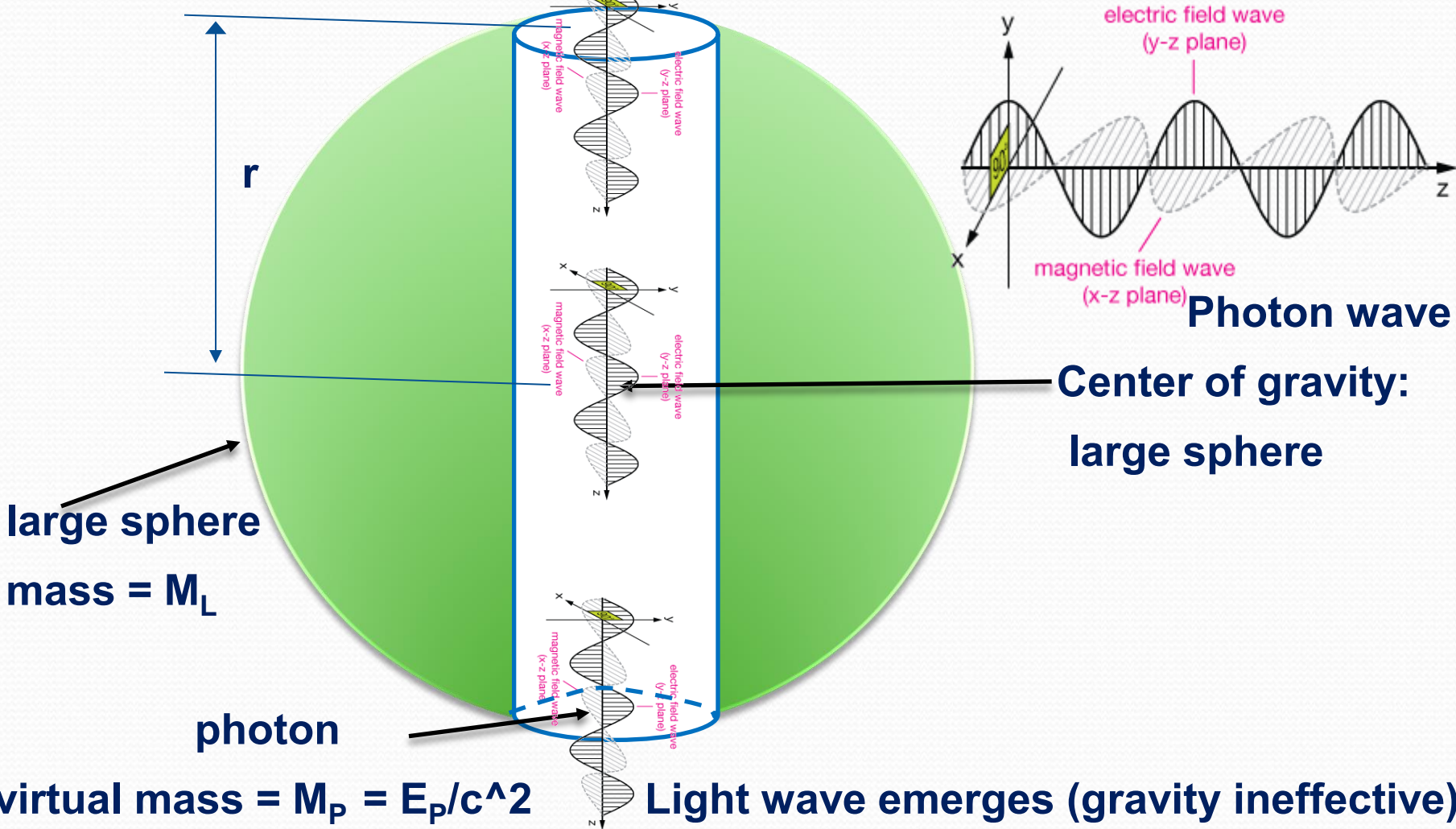
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Hypothetical Experiment, Test GTR

• Motion of light photon in hollow cylindrical cavity within Large sphere.

• Light wave passes through sphere Force on photon at CG = 0, speed c



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Figure 4: Acceleration of photon $a_p = 0$, Speed of light c constant

space within large sphere is not curved.

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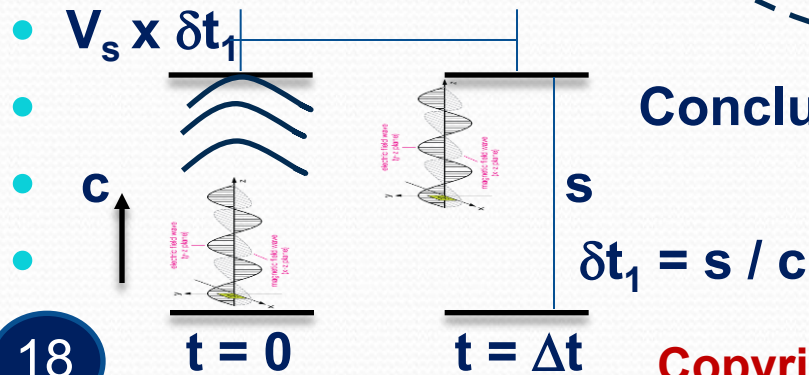
Revisit: Clock in Spacecraft Experiment

- Analysis of Light path depicting different behavior, wave/particle model

- Vertical component of
- light speed different
- wave model c scalar
- particle model c'

- wave from point
- source sphere

- Wave model
- Deterministic



Einstein assumed speed of

light a scalar c

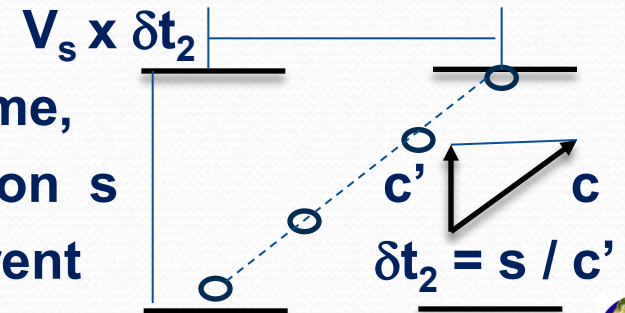
Particle model

c vector

particle occupy
confined volume

Particle model

Probabilistic



Conclusion: Time same,
No dilation s
 c - different

Quantum Theory of Radiation & Gravity

Quantization of Electromagnetic & Gravity Waves, GUT

Radiation & Light, Quanta of Energy = $h \times f$, h - Planck Constant

Frequency $f = 1 \text{ Hz}$

Period $T = 1 \text{ s}$

Wavelength

$\lambda = 2.9979 \times 10^8 \text{ m}$

Visible Light

$f = 400 - 800 \text{ THz}$

$T = 2.5 - 1.25 \text{ fs}$

Red Violet

$\lambda = 750 - 380 \text{ nm}$

Gamma Rays

$f = 10^{18} - 10^{23} \text{ Hz}$

$T = 10^{-3} - 10^{-8} \text{ fs}$

$\lambda = 10^{-1} - 10^{-5} \text{ nm}$

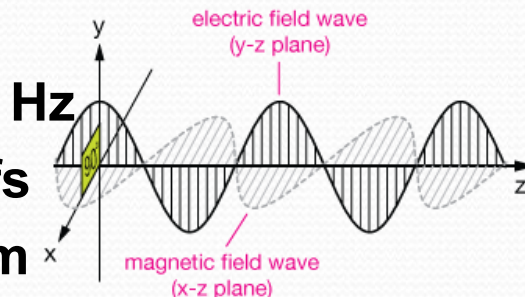
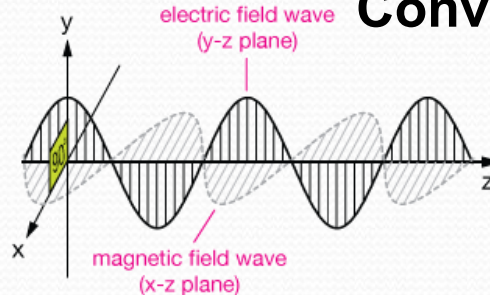
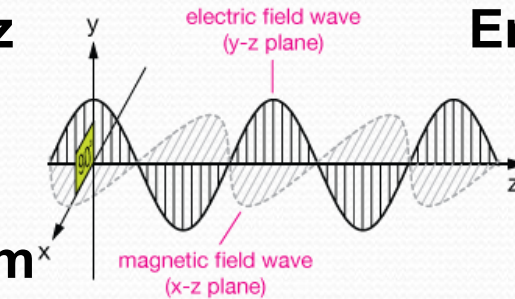
Energy $E = 6.626 \times 10^{-34} \text{ J}$

Number = Planck's constant

$= 4.135 \times 10^{-15} \text{ eV}$

Conversion $1 \text{ eV} = 1.602 \times 10^{-19} \text{ J}$

$E = 1.65 - 3.26 \text{ eV}$



Formula: $c = f \times \lambda$ and $T = 1 / f$

$E = 10^4 - 10^8 \text{ eV}$

Key Point: EM waves, Photons

Quantized Packets of energy

field spread over several cycles

X-rays: $f = 10^{16} - 10^{21} \text{ Hz}$, $E = 10^2 - 10^6 \text{ eV}$



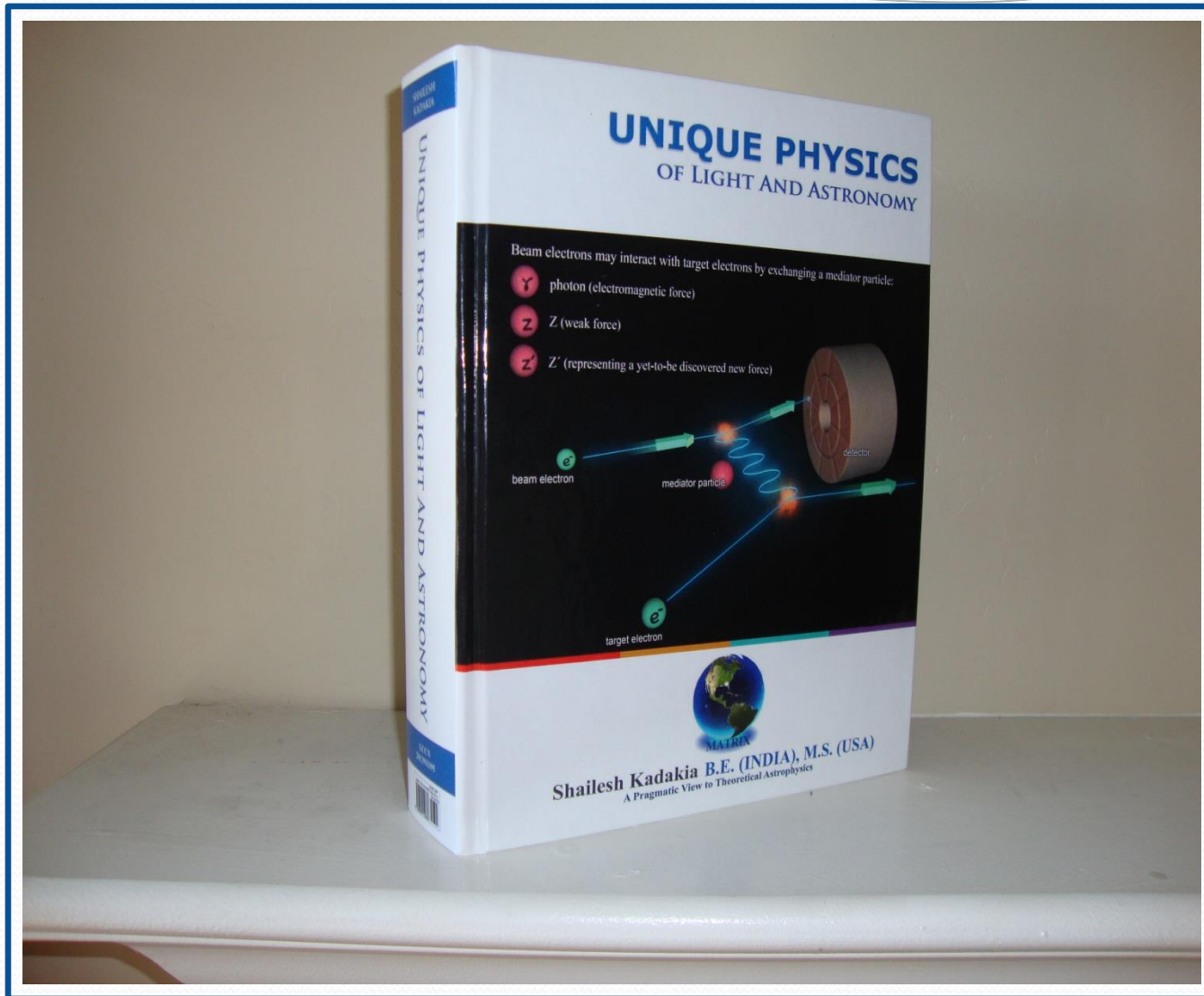
Conversion Multipliers

SCIENTIFIC PREFIXES

Prefix	Symbol	Exponent
yotta	Y	10^{24}
zetta	Z	10^{21}
exa	E	10^{18}
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^9
mega	M	10^6
kilo	k	10^3
hecto	h	10^2
deca	da	10^1

Prefix	Symbol	Exponent
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}
zepto	z	10^{-21}
yocto	y	10^{-24}

Textbook: August 2016



Key References

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- **Tim Folger, “At the speed of Light–What if Einstein was wrong, “DISCOVER April 2003, 34-41.**
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- **S. Hawking, “A Brief History of Time,” Bantam Books, 1988**



U-tube & Other Links

- Relativity 108c: Schwarzschild Metric - Geodesics (Mercury perihelion advance, photon sphere)
- <https://www.youtube.com/watch?v=2pPvUx-EUqE>
-
- Relativity 108d: Schwarzschild Metric-Eddington-Finkelstein, Kruskal-Szekeres, White/Wormholes
- https://www.youtube.com/watch?v=O_2vnb_eVGE&t=803s
- J. Holmes, "What is Singularity, Exactly?"
- <https://www.youtube.com/watch?v=NLQNBfI97Ck>
- Gyroscope stability Space
- <https://www.youtube.com/watch?v=xQb-N486mA4>



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