31st

NCSC

National Children Science Congress

Celestial Forces: Probing Gravity and Electromagnetism Through Time

Sub Theme :**Technological innovation for ecosystem and health**

Research By:

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Under Mentorship & Guidance of:

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Abstract

Utilizing the amalgamated gravitational-electromagnetic potential as our foundational formula, the project takes shape. I aim to elevate its context by introducing novel facets of statics. The pivotal roles in play encompass an in-depth exploration of space time, delving into the intricacies of relativity. Additionally, I harness the power of infrared electromagnetism with particular emphasis on its application in reconstructing bygone epochs. This endeavor is further enriched by the incorporation of ancient wisdom. Via this undertaking, I envision the revelation of a profoundly precise portrayal of the gravitational fields surrounding celestial bodies. Through the integration of electromagnetism, our objective is to enhance our comprehension of celestial mechanics, a development with wide-ranging implications for disciplines like astrophysics, space exploration, and satellite technology. This research constitutes a pivotal stride forward in the examination of gravitational interactions within the cosmos.

@Research By: Prabir Kishan

Content

Introduction

This project delves into the intricate interplay between gravitational fields and electromagnetism in astronomical objects. I aim to develop a comprehensive model that accounts for both gravity's influence based on distance and the additional complexities introduced by electromagnetic forces. This research represents a significant step towards a deeper understanding of celestial mechanics.

This project has been divided into three distinct parts, encompassing five individual research endeavours. The first phase involves measuring the distance of an astronomical object from Earth. In the second part, we focus on determining its gravitational field and escape velocity, all while situated on our home planet. The third part involves gaining insights into the object's nature and past, which is further divided into three sub-sections. Will also know, what happens when two fundamental forces are combined and when two fundamental forces have fusion.

The initial sub-section centres on extracting the combined potential of gravitational and electromagnetic forces already at play on the astronomical object. This extracted force is then subjected to meticulous research to unveil its historical narrative. It might be pondered: what novel contributions does this research offer? Much like gravity itself, which existed before Newton bestowed it with a name and value, this venture explores uncharted territory.

Moving to the second sub-section of section three, we shift our focus towards channelling these waves back to Earth for extensive examination. Although this task demands advanced scientific equipment and technology, it's worth noting that the essential principles lie within ancient knowledge, making it an achievable feat.

The third sub-section centres on conducting an analytical inquiry into the waves and atoms, striving to uncover their historical trajectories. It's important to acknowledge that modern science has made significant strides in this area, and my role lies in refining and directing an existing concept towards its comprehensive fruition.

Hypothesis

- *The foremost intriguing question arises: why do waves and particles seem to divulge information only about the past, and not the future? This query finds its resolution in the fact that waves and particles offer a macroscopic view of events. For instance, if we consider an astronomical object that is situated 100 light years away, the current wave reveals information pertaining to a century prior concerning said object. Furthermore, as an object traverses through space, a noteworthy transformation occurs. For instance, when an object has covered half the distance, it is 50 light years away. In essence, it is observing and relaying information about the spatial configuration from half a century prior. This dynamic alteration in distance over time is the key factor that allows us to glean insights into the past. However, the prospect of peering into the future beckons if we invoke the special theory of relativity. This theory*

posits that time and space form a fabric, one that is not only dynamic but also subject to folds and warps. This distinctive perspective offers a potential avenue for glimpsing into what lies ahead.

- *The second query arises: why is light perceived to possess a dual nature? While I offer a hypothetical explanation, it is essential to emphasize that in reality, light is characterized by a singular nature. Photons, constituents of the smallest units which include electrons and protons, encapsulate this essence. In classical physics, electrons and protons are viewed as distinct entities, separated by waves. However, within the realm of quantum physics, particularly quantum mechanics, particles such as electrons, protons, neutrons, and even molecules necessitate a wave-like framework for their comprehensive description. Hence, particles exhibit both wave-like and particle-like attributes within their inherent nature. This duality is further affirmed when delving into the realm of wave functions.*

Methodology

I. *In this section, I will provide a concise overview of the methods employed, which encompass formulas and other techniques. Elaborate analysis will be presented in the subsequent section.*

II. *This research is primarily divided into five distinct parts. Part 1 involves determining the distance to a specific astronomical object while situated on Earth. Here, the parallax method takes precedence, as elucidated in NCERT's XIth grade Physics and Surya Sidhant.*

III. *Moving on to Part 2, it revolves around comprehending the gravitational field of the astronomical object. This isn't an invention, but rather a discovery, as gravity has always existed. It is simply articulated by connecting the dots of existing formulas, leading to the derivation of the object's gravitational field and escape velocity.*

IV. *Part 3 delves into the realm of electromagnetism. In the contemporary scientific understanding, there are four fundamental forces, but only two, electromagnetism and gravity, extend infinitely. Thus, scrutinizing atoms and deciphering the nature of the astronomical object using specially designed satellites proves to be an economically burdensome endeavor. In this phase, we focus on potential energy and the directive process back towards Earth. The latter is particularly challenging, but we surmount this obstacle through our ancient wisdom from Surya Sidhant. This phase reveals the outcome of the fusion of two fundamental forces: electromagnetism combined with gravity, as well as the repercussions of the collision of two electromagnetic forces—one emanating from the astronomical object and the other from solar winds, both characterized by electromagnetic fields. This collision ultimately yields the essential data regarding the nature and history of the astronomical object.*

V. *Before this data reaches Earth, we invoke the wisdom of the modern ancient scientist, Sir J. C. Bose, in its interpretation.*

VI. *Part 5 involves the interpretation of the obtained wave data, offering insights into the nature and history of the astronomical object. This constitutes an advanced scientific process, necessitating an array of sophisticated technologies. As a researcher, I propose this concept, leaving it to the scientific community to utilize and refine.*

VII. *In conclusion, I reiterate that much like Newton revealed the pre-existing concept of gravity and Galileo expounded upon astronomy, I have connected the dots to present a groundbreaking methodology for acquiring knowledge of distant points from the vantage of Earth. While this may have been previously discovered in the ancient world, I stand as a pioneer in the modern age, with 2/5ths of its proof currently at our disposal.*

Analysis

I. *Now, let's embark on a detailed overview of the research. Part 1 is focused on determining the distance to the astronomical object. Calculating the distance to an astronomical object becomes quite straightforward through the application of the parallax method. Here, we generally form an isosceles triangle. The formula used for this calculation is* $D = \frac{b}{Q}$, *where D represents the distance, b denotes the baseline (approximately 1.276×107), and Q is in radians.*

The radian value (rad) can be derived from the formula $(\alpha \times 60)(4.85 \times 10-6)$ *rad. In this equation,* α *represents the angle in inches, converted from angles, and reflects the viewing angle.*

As an illustrative example, let's consider finding the distance to the moon: Given Q=1.54 degrees, i.e., 114 inches.

$= (114 \times 60)(4.85 \times 10-6)\ rad$

$= 3.32 \times 10-2\ rad$

Since 1 inch corresponds to $4.85 \times 10-6$ *rad:*

$b = AB = 1.276 \times 107$ *meters*

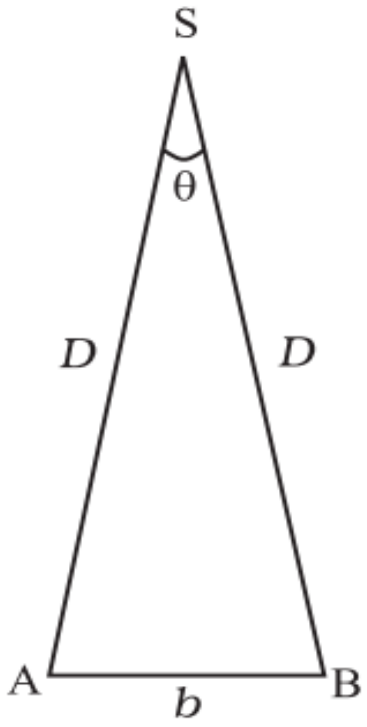
Finally, applying the formula $D = \frac{b}{Q}$*:*

$$D = \frac{1.276 \times 10\text{^}7}{3.32 \times 10\text{^}-2}$$

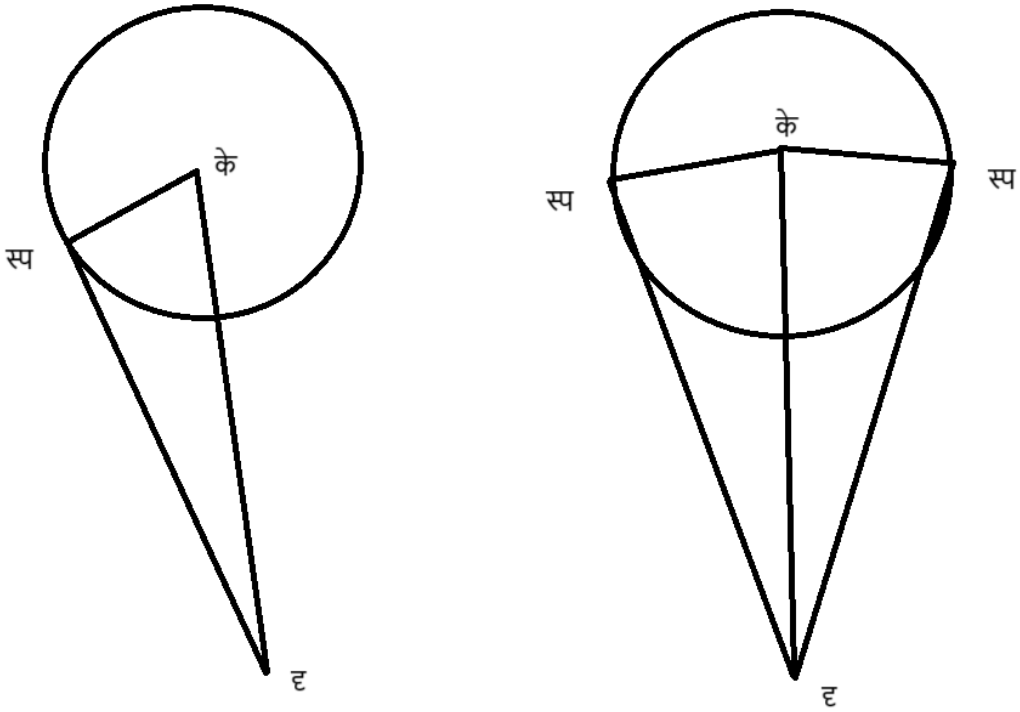
$D = 3.84 \times 108\ m$

Hence, this calculation provides the distance to the moon.

$$D = \frac{b}{\theta}$$



In Chapter 4 of the book "Surya Sidhant," Shlok 2, 3, 4, and 5 provide detailed instructions on how to determine the distance, measure the radius of planets, and ascertain their respective masses. Remarkably, this ancient text asserts that while situated on Earth, we can indeed deduce the mass of an astronomical object.



II. *Now, let's direct our focus towards Part 2, where we delve into the gravitational characteristics of the astronomical object. Understanding gravitation necessitates knowledge of certain attributes of the object: its mass, radius, distance from Earth, and the gravitational constant. Herein lies the method to acquire such information through this research.*

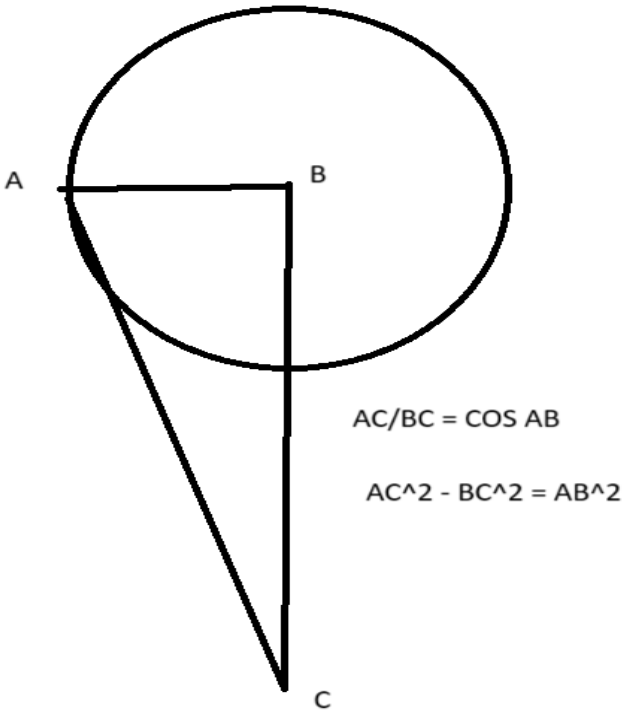
Initially, we revisit the process of determining the distance, as previously explained. Following this, we employ either trigonometry or the Baudhayana Ganit Sutra, akin to the Pythagorean Theorem, to ascertain the radius of the object.

For the sake of visualization, let's envision the astronomical object as a circle with a triangle placed upon it. This conceptual image finds its roots in ancient knowledge and is featured in the initial section.

Within this triangle, denoted as ABC, angle "a" is positioned at the center of the circle, angle "b" forms a right angle (90 degrees), and angle "c" represents the viewing angle. This arrangement gives rise to a

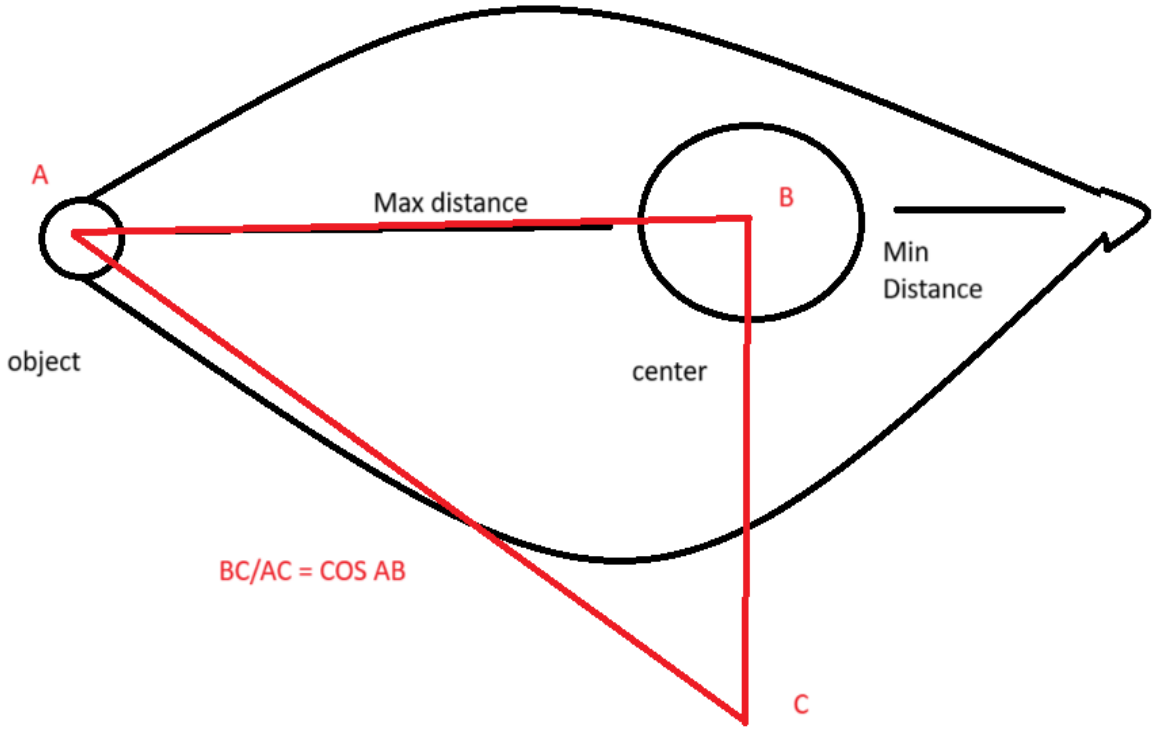
right-angled triangle. We are already acquainted with the fundamental principle: the sum of the squares of two sides of a triangle equals the square of the hypotenuse, expressed as $a^2+b^2=c^2$. With the hypotenuse and height being known quantities, we can deduce the base. In instances where this approach may not yield results, employing the cosine function (cos θ) provides an alternative method for measurement.

By implementing these techniques, we successfully determine the radius of the astronomical object. This process forms a critical step in comprehending its gravitational characteristics.



Now, we approach the intricate aspect: identifying the central body around which the astronomical object revolves. For instance, the moon revolves around the Earth, and the Earth orbits the sun, and so forth. Once we've determined this pivotal point, we proceed to measure the time taken to complete one full revolution.

Utilizing the specialized trigonometric function, COS θ, we embark on a calculation to ascertain the maximum and minimum distances between the astronomical object and its central body. This analysis is a fundamental step in comprehending the dynamics of the object's orbit.



Moving on to the third segment of the second part, we will implement Kepler's Third Law formula. This formula plays a crucial role in furthering our understanding of the orbital dynamics of the astronomical object. (Note G=6.674 x 10^{-11}).

1. **Kepler's Third Law** (for celestial bodies in orbit):
   - For objects in orbit around a central body, you can use Kepler's Third Law to find the mass of the central body. This law states that the ratio of the cube of the semi-major axis of an orbit (a^3) to the square of the orbital period (T^2) is the same for all objects in the system. The formula is:

     $$M = \frac{4\pi^2 r^3}{GT^2}$$

     Where:
   - M is the mass of the central body.
   - r is the semi-major axis of the orbit.
   - G is the universal gravitational constant.
   - T is the orbital period of the object.

After doing the calculation, mentioned above, we get to know about the mass of that particular astronomical object.

With the knowledge of distance and the orbiting path between the center and the astronomical object, we're equipped to calculate speed. Observing fluctuations in speed allows us to derive changes in

velocity, which in turn provides us with crucial information about acceleration.

Now that we've established both acceleration and mass, their product yields force. This fundamental principle will be instrumental in the forthcoming segment of our research. ($F = ma$).

We can now easily find, Gravitational field of that astronomical object and its escape velocity.

- **Gravitational Field Strength**: This is the force of gravity experienced per unit mass at a given point in space. It's calculated as $g = \frac{GM}{r^2}$, where G is the gravitational constant, M is the mass of the planet, and r is the distance from the center of the planet.

- **Acceleration Due to Gravity**: This is the acceleration an object experiences due to the gravitational field of the planet. It's calculated as $g = \frac{GM}{r^2}$, where g is the acceleration due to gravity, G is the gravitational constant, M is the mass of the planet, and r is the distance from the center of the planet.

- **Escape Velocity**: This is the minimum velocity an object needs to break free from the gravitational pull of the planet. It's calculated as $v = \sqrt{\frac{2GM}{r}}$, where v is the escape velocity, G is the gravitational constant, M is the mass of the planet, and r is the distance from the center of the planet.

Let's have example of Moon:

Radius = 1737.4 km

Mass = $7.34767309 \times 10^{22}$ kg

Acceleration of Moon = $0.0027ms^{-2}$

Gravitational field of Moon = 1.6 N/kg

Escape velocity of Moon = 2.38 km/s

Acceleration due to gravity of moon = $1.625m/s^2$

III. *Now, let's delve into Part 3, where we explore the realm of electromagnetism and energy associated with the astronomical object. Understanding the electromagnetism of this object is pivotal, and the interplay between electromagnetism and gravitation offers valuable insights. To begin, we'll extract the potential energy of the astronomical object. Leveraging our existing data and applying pertinent calculations, we will unveil this crucial aspect. The combination of gravitation and electromagnetism yields a wealth of information, allowing us to make significant strides in our research.*

$$U_{\text{total}} = -\frac{GMm}{r} + \frac{k_e Qq}{r}$$

Where:

- U_{total} is the total potential energy of the particle (in joules).
- G is the gravitational constant ($6.67430 \times 10^{-11}\ \text{m}^3\,\text{kg}^{-1}\,\text{s}^{-2}$).
- M is the mass of the massive object (in kilograms).
- m is the mass of the charged particle (in kilograms).
- r is the distance between the charged particle and the massive object (in meters).
- k_e is the Coulomb's constant ($8.9875 \times 10^9\ \text{N}\,\text{m}^2\,\text{C}^{-2}$).
- Q is the charge of the massive object (in coulombs).
- q is the charge of the charged particle (in coulombs).

(M, m can be the two different masses of two different bodies. This formula will work on two charged particles or between two different masses.)

Now to find q (coulombs), we will use two formulas. i.e. –

a) Electrical field formula

$$E = \frac{k_e \cdot q}{r^2}$$

Where:

E is the electric field strength at the point (in newtons per coulomb, N/C).
k_e is Coulomb's constant ($8.9875 \times 10^9\ \text{N}\,\text{m}^2\,\text{C}^{-2}$).
q is the charge generating the field (in coulombs, C).
r is the distance from the charge to the point where you're measuring the electric field (in meters, m).

b) Charge formula

$$Q = \frac{F}{E}$$

Where:

- Q is the charge (in coulombs).
- F is the force (in newtons).
- E is the electric field strength (in volts per meter, V/m).

Example –

$$Q = \frac{F}{E} \; ; \; (\chi = \frac{1}{y})$$

$$(E = \frac{k_e \, X \, q}{r^2})$$

$$y = \frac{8.9875 \, X \, 10^7 X \, x}{1000\text{^}2}$$

Answer =

$X \approx 0.4997$ *and* $y \approx 20.025$

IV. Moving on to another pivotal task, we now focus on the strategic direction of the wave towards Earth. As previously elucidated in the hypothesis section, waves inherently carry with them the essence of atoms. This Part 4 seeks to shed light on phenomena that have been occurring, yet have not

received the attention they deserve. Much like how gravity pre-existed but was brought to our understanding by Newton, ancient scripts hold insights into these details. In this case, the data draws from the esteemed work "Surya Sidhant." Let's proceed to unravel what is outlined in this significant text and discern the methodology for effectively channeling the energy towards our planet. This step stands as a crucial bridge in our research, enabling us to glean vital information about the astronomical object.

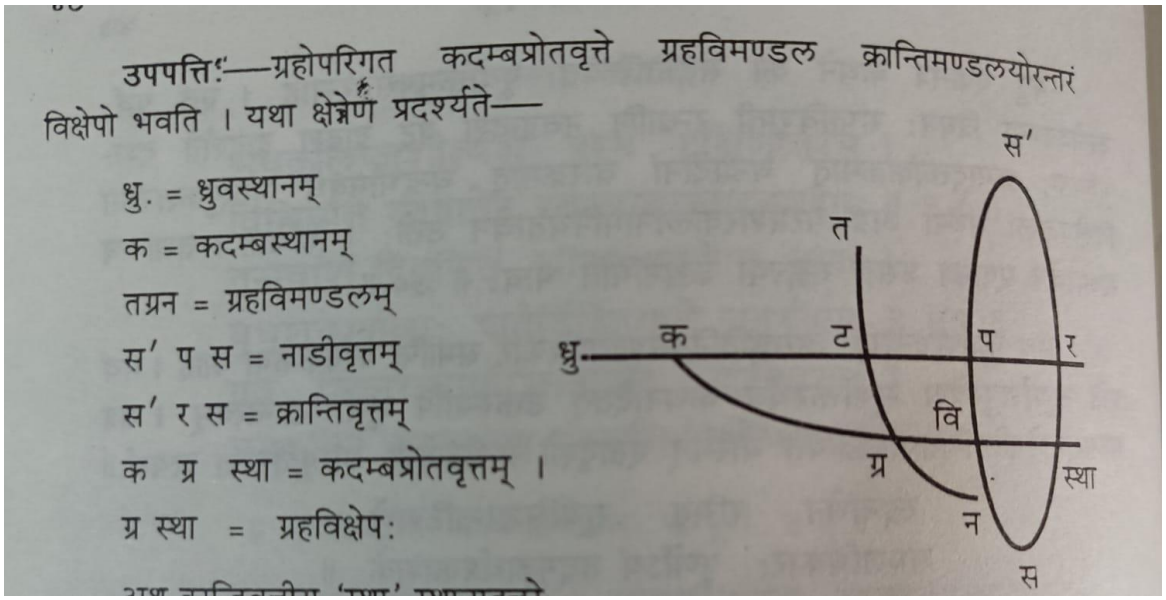
Earth possesses its own gravitational and electromagnetic fields. Over time, the sun emits solar winds, which are essentially electromagnetic in nature. When these solar winds interact with Earth's electromagnetic field, a remarkable phenomenon occurs – the field, typically rounded, opens up. This opening persists for a significant span of distance. To illustrate, consider Earth's motion: it orbits the sun, while the sun itself revolves around the center of our galaxy. This galaxy, in turn, is part of a larger cosmic structure,

as detailed in ancient texts like the SAM Ved and modern scientific understanding. This hierarchy implies that Earth's electromagnetic field remains open for extended periods, attracting energy from various astronomical objects. However, eventually, these fields close. During this phase, new solar waves collide with the attracted energy. This collision, occurring between two powerful electromagnetic fields, results in the destruction of the total energy. It's important to note that energy primarily exists in the form of atoms, and quantum theories describe these atoms' movements as electromagnetic waves. These insights are intricately detailed in Surya Sidhant, specifically in sections 1.70, 2.13, 2.42, 3.10, and 12.77. Diagrams accompanying these texts visually depict the concept, where the attraction of waves occurs within solar and lunar spaces. The solar space encompasses our solar system and extends slightly beyond, while the lunar space encompasses the range around Earth's moon. The book employs references to our solar system's planets to elucidate this theorem. This revelation significantly advances our comprehension of celestial dynamics, bridging

ancient wisdom with modern scientific understanding.

To capture these waves, we will employ the ingenious wireless communication concept pioneered by J. C. Bose. When these waves approach Earth, just prior to their collision with the solar winds, we have two viable options for capturing and harnessing this invaluable energy. The first option entails utilizing a satellite strategically positioned to intercept and capture these waves. This satellite can then transmit the captured energy back to Earth for further analysis and utilization. Alternatively, we can establish a network of radio wave antennas on Earth's surface. These antennas are strategically positioned to receive and harness the incoming waves directly. Once captured, the energy can be channeled into various applications and scientific investigations. These innovative methods allow us to seize the energy carried by these waves, facilitating its study and potential utilization for various purposes.

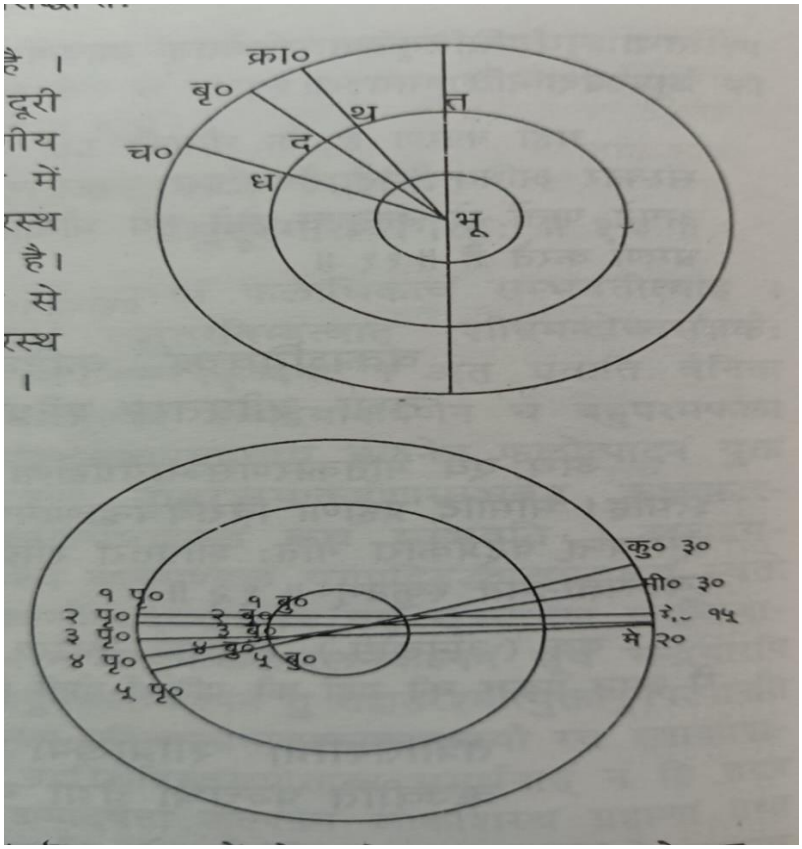
i. *Placement of Planets in Lunar Space. (1.70)*



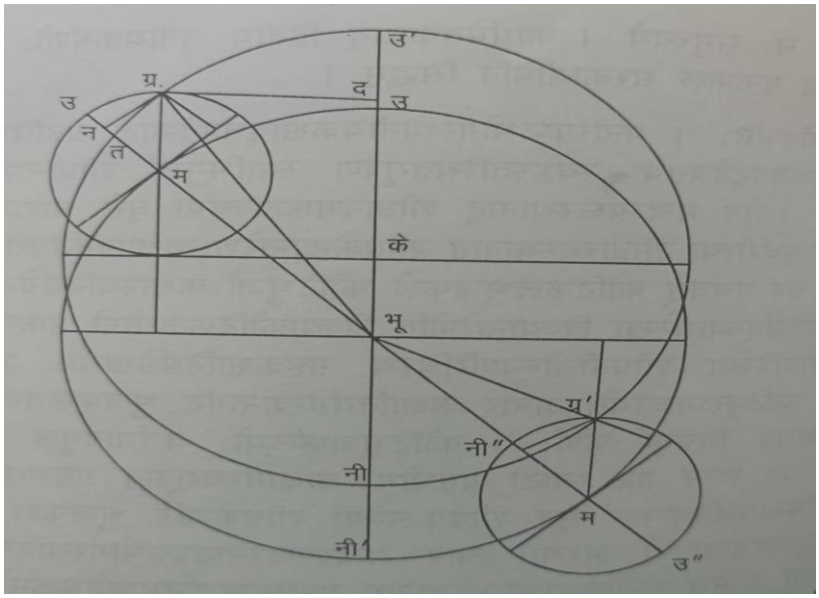
उपपत्तिः—ग्रहोपरिगत कदम्बप्रोतवृत्ते ग्रहविमण्डल क्रान्तिमण्डलयोरन्तरं विक्षेपो भवति । यथा क्षेत्रेण प्रदर्श्यते—

ध्रु. = ध्रुवस्थानम्
क = कदम्बस्थानम्
तग्रन = ग्रहविमण्डलम्
स′ प स = नाडीवृत्तम्
स′ र स = क्रान्तिवृत्तम्
क ग्र स्था = कदम्बप्रोतवृत्तम् ।
ग्र स्था = ग्रहविक्षेपः

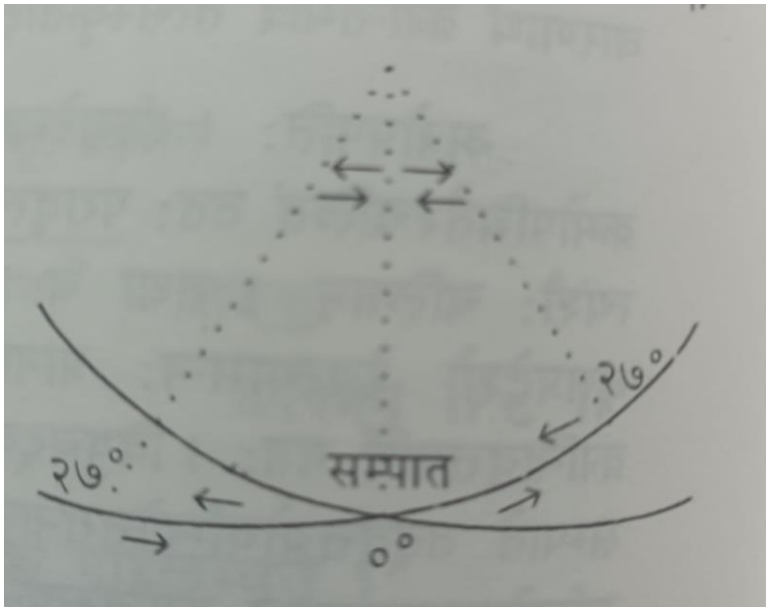
ii. *Changes observed while movement of planets occur. (2.13)*



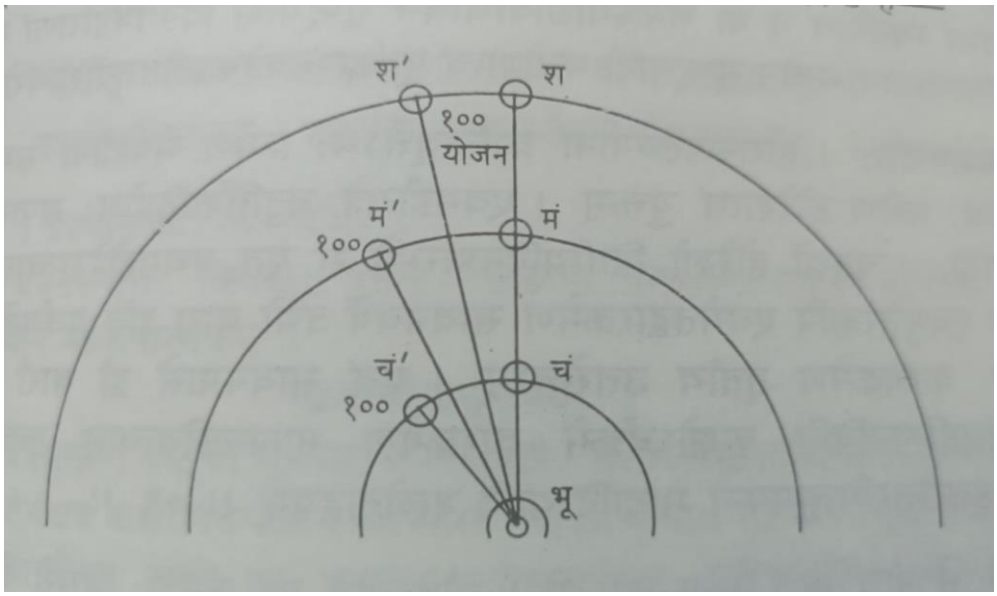
iii. *Angles, and points were different changes happen between earth and that astronomical object. Also how different formation occur. (2.42)*



iv. *Angles formed while waves are near. Also solar winds are near. (3.10)*



v. *Placement of planets in solar space. (12.77)*



V. *Now, armed with both waves and atoms here on Earth, we are poised to embark on Part 5 of our research. DNA, the genetic blueprint inherent in any object, serves as a comprehensive descriptor. Comprising atoms, it indirectly imparts valuable information about the structure and essence of the object. These intricate details can be deciphered in advanced scientific laboratories, where cutting-edge technology plays a pivotal role. With this, we gain comprehensive insights into the nature of the astronomical object. Consider this: when a wave arrives from an astronomical object situated 100 light years away, it effectively transports*

information from a century ago. This phenomenon means that, in essence, we are observing the past. Similarly, when the wave has traversed half its journey, placing it 50 light years away, atoms are privy to their immediate surroundings. This profound concept is eloquently elucidated in the ancient text "Surya Sidhant." The atoms' awareness of their cosmic environment provides us with a unique window into the history of our solar system. Through these intricate processes, we unlock a deeper understanding of the cosmos and its intricate chronicles.

Objectives

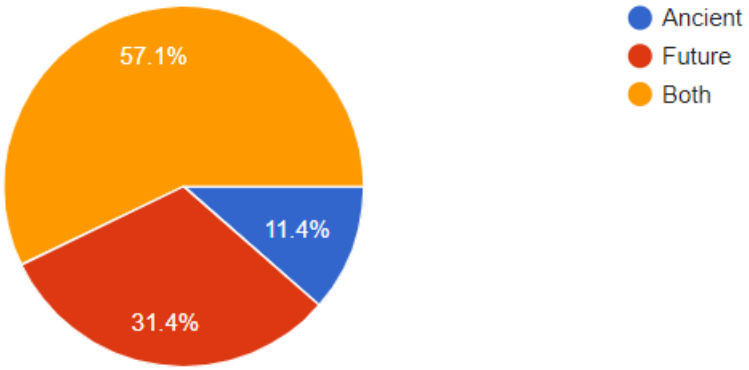
The primary aim of this research is to delve deep into the celestial plane, shedding light on its mysteries and comprehending the intricacies of newly discovered astronomical objects. Through this endeavor, we seek to transcend temporal boundaries, peering into the enigmatic past and unraveling the secrets of the cosmos. This pursuit holds the key to expanding our understanding of the universe, offering insights that may reshape our perspectives on the fundamental workings of celestial bodies and their interactions within the vast cosmic expanse. By venturing into uncharted territories, we endeavor to unearth invaluable knowledge that promises to revolutionize our comprehension of the celestial realm.

Survey Report

Total 35 people participated in the Digital Survey.

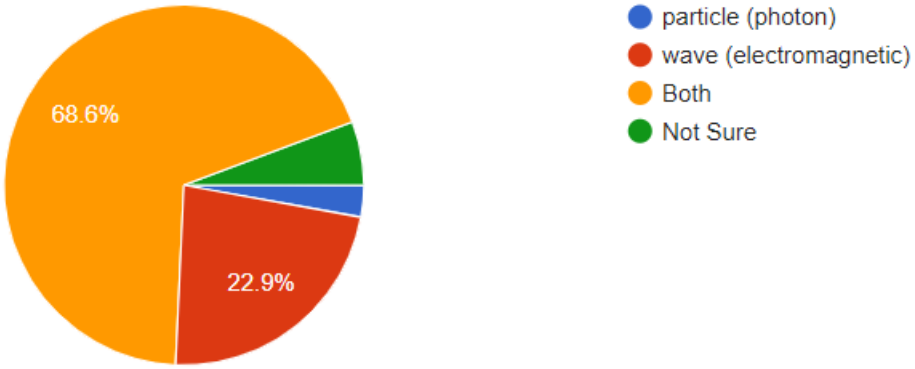
As per your view, in which era time travel was possible?

35 responses



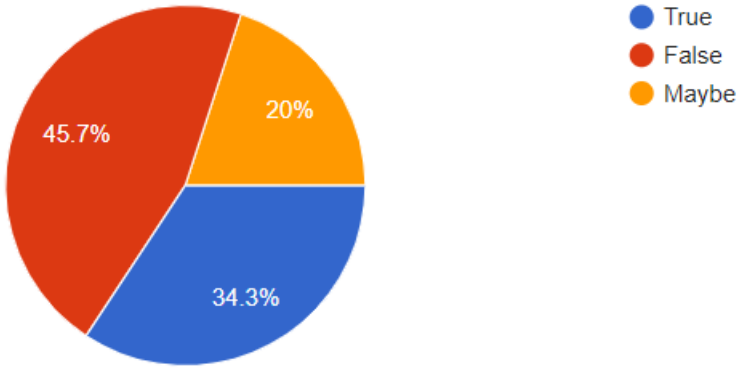
What is the nature of light ?

35 responses



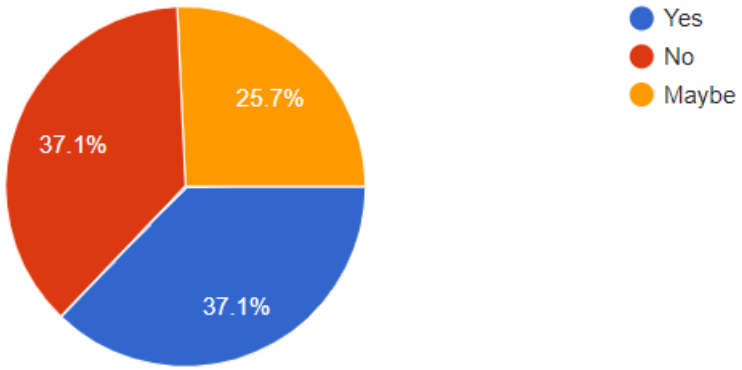
Can light be used to see past?

35 responses



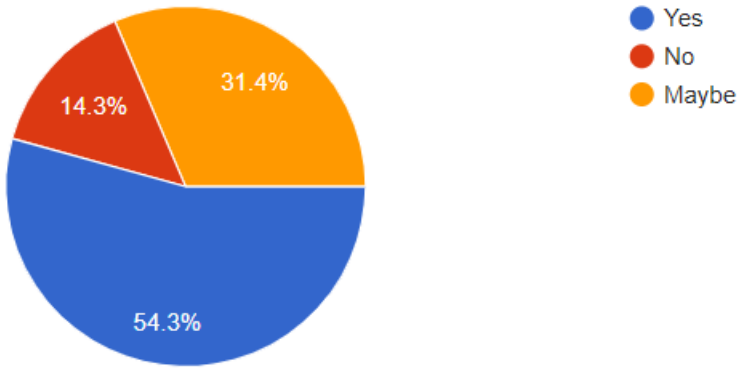
Do you know that moons surface temperature is -10°, and 10 cm below the moon surface the temperature is 50°.

35 responses



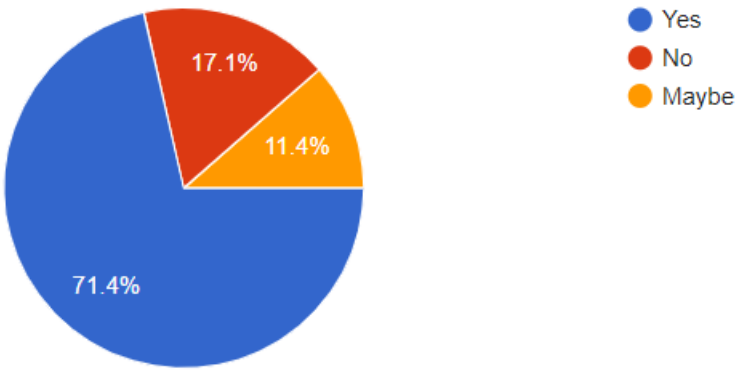
When atoms are united can they transport EM wave (electromagnetic wave)?

35 responses



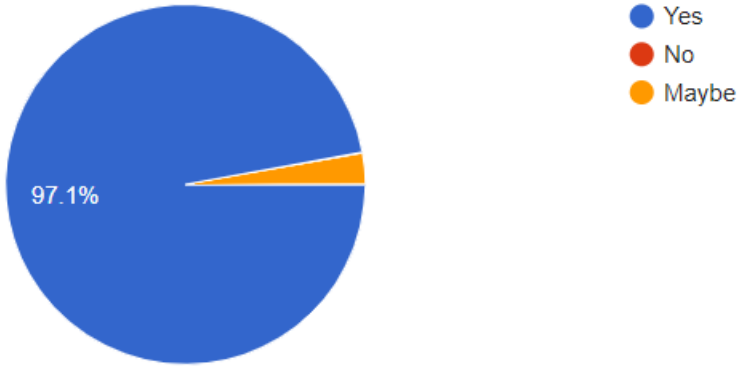
Can EM waves (electromagnetic wave) pass through human body?

35 responses



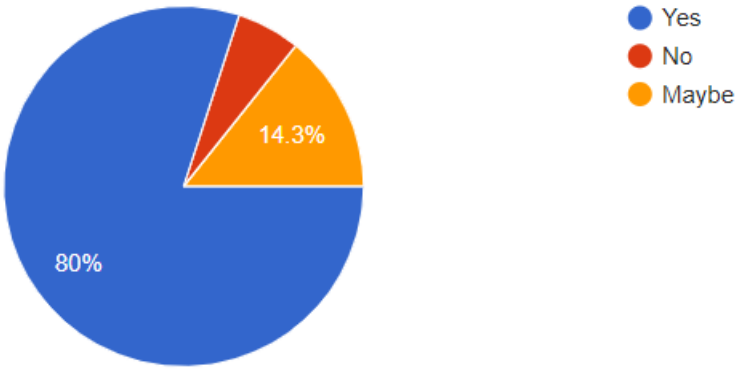
Does enhancement in physics, help you in your day to day life?

35 responses



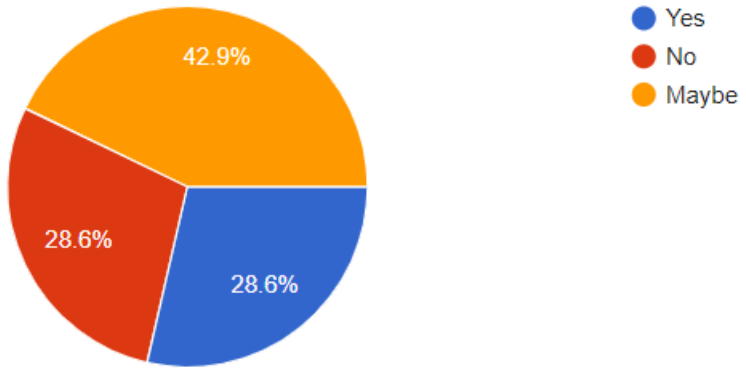
Do you know that ancient Bharat text, pre know about astronomical happenings?

35 responses



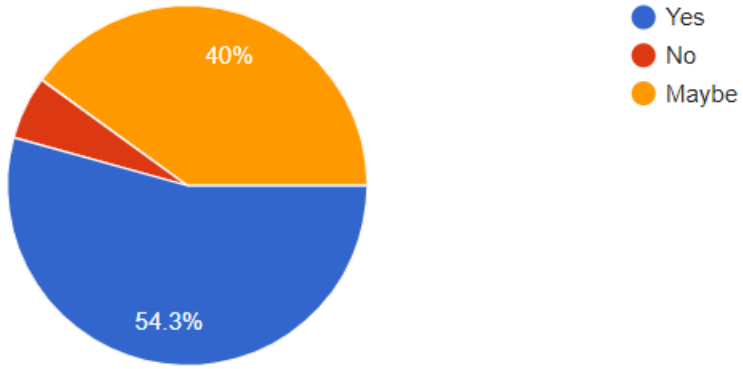
Can heat of an object, tell you its past?

35 responses



Movements of electrons produce current. Current carrying wire produces heat. That heat is being experienced by objects which are there in the surrounding. As EM (electromagnetic) movement is there, can we consider that the EM waves are being stored by the object at atomic level.

35 responses



Conclusion

This ambitious project aims to unveil precise depictions of gravitational fields surrounding astronomical entities. Integrating electromagnetism, we seek to elevate our grasp of celestial mechanics, with implications for astrophysics, space exploration, and satellite technology. It signifies a monumental leap in comprehending the cosmos's intricate gravitational interplays.

Harmonizing these forces promises unprecedented insights into celestial dynamics, reshaping our cosmic understanding. This transformative research refines universal principles, showcasing the power of interdisciplinary exploration. It stands as a beacon in gravitational research, propelling us towards a future of profound cosmic mastery and boundless technological potential—an era of scientific discovery and innovation for generations to come.

Future Scope of Work

In the near future, the research aims to integrate the Special Theory of Relativity, delving deeper into the interplay of gravitational and electromagnetic forces in celestial bodies. This addition promises not only refined insights into celestial mechanics but also the intriguing potential to glimpse into the future—an unexplored frontier. While investigating the past remains central, a significant focus will be on employing advanced infrared technology to uncover the historical narratives of specific Earthly locations, offering invaluable interdisciplinary insights. This forward trajectory holds great promise, revolutionizing our understanding of cosmic phenomena, opening new avenues for theoretical exploration, and potentially transforming practical applications, marking a significant leap forward in our comprehension of the universe.

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