Cosmic Manifestations of SEMT: The Hyper-Kinetic Black Hole and the Deterministic Flow of Time

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Abstract

This paper presents the cosmological consequences and advanced applications derived from the Self-Energy Membrane Theory (SEMT), which were mathematically validated in preceding research. We introduce the **Hyper-Kinetic Black Hole Model** which replaces the abstract singularity with a core experiencing extreme relativistic rotation. The model details the failure of dynamic equilibrium and the resulting magnified **Kinetic Mass** as the deterministic source of gravitational force. Furthermore, this study offers a mechanical explanation for the flow of time, demonstrating that **time dilation** near a massive body is a direct, deterministic consequence of trading internal energy (time) for external rotational velocity. The findings confirm that the consumption of light by black holes provides crucial experimental evidence that light and matter share a unified physical essence. The work concludes by confirming that the phenomena of Dark Matter and Dark Energy are direct, measurable consequences of **density perturbations** and the **self-consumption lifecycle** within the membrane field.

1 Introduction

This paper serves as the final and conclusive stage in the development of the Self-Energy Membrane Theory (SEMT). Following the initial conceptual framework [?] and the subsequent mathematical proofs of unification and derivation of cosmic constants [?], this work focuses on applying the theory to the most challenging cosmological phenomena: the mechanics of spacetime, the nature of time, and the structure of black holes. The theory challenges General Relativity by replacing abstract curvature with a dynamic, mechanical **tension field** (the membrane) and asserts that all cosmic mysteries must yield to deterministic, geometric solutions.

2 The Deterministic Mechanics of the Black Hole (The Hyper-Kinetic Model)

2.1 The Dynamic Stability Equation (Equilibrium of Forces)

In the SEMT framework, the stability of any massive body is maintained by a deterministic balance between two opposing forces derived from the membrane's inherent tension: the **Self-Implosion Force** ($\mathbf{F_{Collapse}}$) and the **Suction Force from Rotation** ($\mathbf{F_{Suction}}$). Cohesion persists as long as the net force equals zero:

$$\mathbf{F}_{\text{Net}} = \mathbf{F}_{\text{Suction}}(\omega) - \mathbf{F}_{\text{Collapse}} = 0$$
 (1)

2.2 The Collapse and the Birth of Hyper-Kinetic Mass

Failure of equilibrium forces the core to attempt to restore balance by increasing its rotational velocity (\mathbf{v}_{rot}) . This magnifies the core's mass, resulting in its **Hyper-Kinetic Mass**:

$$M_{\rm BH} = m_0 \cdot \gamma_{\rm rot} = \frac{m_0}{\sqrt{1 - \frac{v_{\rm rot}^2}{c^2}}}$$
 (2)

The generated rotational gravity is **added** to the residual implosion force, resulting in an unparalleled **doubly terrifying gravitational force**.

2.3 The Deterministic Interpretation of Time Stop

Time in SEMT is defined as the "internal motion" of the energy membrane. As the Black Hole core accelerates toward the speed of light, all energy dedicated to internal time flow is diverted into external rotational kinetic energy:

$$T_{\rm BH} = T_0 \cdot \sqrt{1 - \frac{v_{\rm rot}^2}{c^2}} \implies \text{As } v_{\rm rot} \to c, \text{ then } T_{\rm BH} \to 0$$
 (3)

This proves that time dilation is a **deterministic mechanical phenomenon**.

2.4 Consumption of Light and Matter: The Ultimate Fuel

The Black Hole's consumption of light and external matter is direct evidence that **Light is Matter**. The core utilizes dissembled matter (including the observer) to fuel its rotation and increase its Kinetic Mass, in a perpetual attempt to restore the lost dynamic equilibrium.

3 The Absolute Mechanical Arrow of Time and the Distinction Between Time and Clock-Time

3.1 The Conceptual Dilemma: Time (Linear) vs. Clock-Time (Cyclic)

The Self-Energy Membrane Theory (SEMT) proposes a radical correction to the common confusion between two fundamentally different concepts:

- 1. **Time (The Cosmic Dimension):** It is a linear path, proceeding in one direction. We are ignorant of its precise beginning or end; it predates humanity and the Earth. It is the dimension that marches toward its "inevitable end" (Energetic Zero).
- 2. Clock-Time (The Cyclic Measure): It is a human invention, circular and cyclic, based on the repetition of motion (Earth's rotation). It is a circle with no true zero (it goes from 12 and returns to 12).

The Box Experiment: Proof of the Inverse Count

To demonstrate this distinction, we propose the following thought experiment: Let us assume we construct a sealed box with specific dimensions (length, width, height) equipped with a countdown timer set to 30 minutes (the lifespan of the experiment), containing a light source and an observer (who has no memory of the outside world).

- Internal Observer Perspective (Clock-Time): He will invent a measure of time based on the cycles of light or his own movement. He will start counting from "zero" and count upwards (Minute 1, Minute 2...). He believes he is progressing in time.
- External Observer Perspective (Time): We know the box has a finite lifespan. We see Time "counting down" (29, 28...) toward the inevitable end.
- Result: When the light turns off (the end of the experiment), the internal observer discovers that his ascending "Clock-Time" was an illusion occurring within a descending "Time" moving toward the end. The end of Time is the end of Clock-Time, but the start of Clock-Time is not the start of Time.

3.2 The Impossibility of Return: The Moving Escalator Illusion

Why can we not return to the past? According to SEMT, Time is like a **train moving in one direction**. You (the passenger) might close your eyes and think you are stationary, or you might walk backward inside the carriage, but the train as a whole moves forward at a constant speed.

• Vanishing Past: The points that Time passes (the past) do not remain in existence for one to return to; they "burn up" or vanish immediately upon crossing (just as the train's fuel is consumed).

- The Illusion of Motion: Attempting to go back in time is like a person walking forward on a backward-moving escalator. You might think you are progressing relative to your steps, but the cosmic reference frame drags you toward the "future" or the "end."
- The Bottle Analogy: When we manufacture a bottle of juice and say it is "6 months old," we are calculating backwards to find the start. However, the bottle itself continued to "progress" forward toward decomposition (the end). Our knowledge of its age is a calculation, not physical travel.

3.3 Stopping Clock-Time \neq Stopping Time

Since "Clock-Time" is linked to the motion of the Earth, and "Time" is linked to the motion of the Universe:

- If we applied a force to stop the Earth's rotation around the Sun, "Clock-Time" would stop (there would be no day or year).
- However, "Time" (the process of cosmic expansion and membrane consumption) would continue without pause.

Conclusion: You can travel through or manipulate "Clock-Time" (by changing your speed relative to Earth), but you cannot travel through or stop "Time."

3.4 Why is Time Positive? (Connection to Cosmic Expansion)

SEMT postulates that Time (t) is a direct product of the **continuous motion of the Universe**.

- Consistency with Expansion: The Universe originates from a center (The Big Bang) and expands toward the unknown, forming a continuously increasing positive distance (+r).
- Inevitability of the Positive Sign: Since the Universe sets the laws, and its motion is "continuous expansion" (Positive Expansion), Time—which is the shadow of this motion—must be positive.
- The Equation: The continuous motion of the Universe generates the continuity of Time along the line of expansion.

$$v_{\text{expansion}} > 0 \implies \Delta t > 0$$
 (4)

We consider "today" positive because the Earth rotates "with" Time, not against it.

3.5 The Exponential Growth of Time

At the genesis of the Universe, spatial dimensions (length, width, height) and the temporal dimension existed, but Time was "dormant" or negligible.

- As the Universe expands, spatial dimensions multiply linearly.
- However, the influence of the temporal dimension multiplies **exponentially**.
- The more the Universe expands, the more dominant and clear Time becomes as a governing force (via consumption and entropy). Time is the dimension that "inflates" with the expansion of the Universe.

3.6 The Mathematical Formulation: The Deterministic Time Evolution Equation

To translate the philosophical distinction between the linear, exponential nature of Absolute Time and the cyclic nature of Clock-Time into rigorous physics, we propose the **Equation of the Absolute** Arrow of Time (\mathcal{T}_{Abs}) .

This equation expresses Time as a positive vector function that grows exponentially with the expansion of the universe, while Clock-Time is merely a local cyclic integration.

A. The Equation of Absolute Time (The Arrow)

$$\mathcal{T}_{Abs} = +\hat{u}_{\text{exp}} \cdot \int_{t_{\text{start}}}^{t_{\text{end}}} \left[\underbrace{\left(\frac{dR_{\text{univ}}}{dt}\right)}_{\text{Linear Spatial Expansion}} \cdot \underbrace{e^{\lambda \cdot t}}_{\text{Exponential Temporal Growth}} \right] dt$$
 (5)

B. The Equation of Clock-Time (The Cycle)

$$\tau_{\rm clock} = \oint \omega_{\rm local} \, dt \tag{6}$$

C. Physical Interpretation of Variables

- The Positive Sign (+) and Expansion Vector (\hat{u}_{exp}): Represents the inevitability of the arrow. Time proceeds in only one direction, aligned with the direction of the Universe's radius expansion (R_{univ}). There is no negative sign because expansion (moving away from the center) is an absolute positive value.
- The Linear Term $\left(\frac{dR}{dt}\right)$: Represents the expansion of spatial dimensions (Length, Width, Height) which grow linearly as the Universe expands.
- The Exponential Term $(e^{\lambda \cdot t})$: This is the core of the SEMT time hypothesis. Time is not a simple linear dimension; it is a dimension whose influence multiplies exponentially with cosmic expansion. At the Big Bang, its influence was negligible (≈ 1), but as the Universe evolves, Time becomes the dominant factor driving entropy and consumption.
- The Integrals (\int vs. \oint):
 - $-\mathcal{T}_{Abs}$ is an **Open Integral** from the beginning to the inevitable end (like the Train analogy).
 - $-\tau_{\text{clock}}$ is a **Closed Loop Integral** representing repetitive cycles (like the hands of a clock), where the net cosmic evolution is zero (it returns to the same point).

4 Chapter 5: The Geometric Bias of Existence (Solving the Matter-Antimatter Mystery)

4.1 The Cosmic Dilemma: Where Did the Antimatter Go?

According to traditional theories, the Big Bang should have produced exactly equal amounts of matter and antimatter, leading to the immediate and mutual annihilation of the universe. However, reality exhibits a universe overwhelmingly dominated by matter. The Self-Energy Membrane Theory (SEMT) offers a mechanical and deterministic solution to this dilemma, far removed from mysterious "spontaneous symmetry breaking," relying instead on the **Total Dynamics of the Universe**.

4.2 The Principle of Alignment with the Cosmic Current

Our theory proceeds from an observational fact: the entire universe follows a single uniform motion, which is **Continuous Expansion** from the center outwards. This expansion creates a "directional current" or a "cosmic vector" ($\vec{V}_{\text{expansion}}$).

In the initial moments of membrane creation (The Ignition Phase), membranes formed with two opposing rotation patterns:

- 1. **Matter:** The membrane's rotation pattern moves in a direction **Parallel** (compatible) to the direction of cosmic expansion.
- 2. **Antimatter:** The membrane's rotation pattern moves in a direction **Anti-Parallel** (opposing) to the direction of cosmic expansion.

4.3 Mechanics of Survival (Physical Natural Selection)

In a dense cosmic medium (as detailed in Chapter 6), motion is subject to the laws of dynamic resistance:

- Matter Stability: Because its rotation harmonizes with the motion of the universe, it faces Minimum Drag. This allows the membrane to maintain its structural cohesion and energy for cosmic timescales (ensuring the survival of matter).
- Antimatter Decay: Because its rotation opposes the sweeping cosmic current, it is subjected to High Shear Stress and immense resistance. This "cosmic friction" leads to the disintegration of its structure or rapid decay, effectively preventing it from clumping together to form galaxies and stars.

4.4 The Mathematical Formulation of Bias $(S_{\text{stability}})$

We can express the stability factor (S) as a function of the dot product between the membrane's angular momentum vector (\vec{L}) and the cosmic expansion vector (\vec{V}_{exp}) :

$$S_{\text{stability}} \propto \vec{L}_{\text{particle}} \cdot \vec{V}_{\text{expansion}}$$
 (7)

- For Matter: The result is positive $(+S) \longrightarrow \text{Enhanced Stability}$.
- For Antimatter: The result is negative $(-S) \longrightarrow \text{Resistance}$ and Instability.

The Deterministic Conclusion

The dominance of matter in the universe is not a statistical coincidence; it is the inevitable result of a **Geometric Bias** imposed by the direction of cosmic expansion. The universe "selected" matter because it is the only form that moves in alignment with its flow, while it rejected antimatter because it swam against the current.

5 The Mechanical Theory of Spacetime (The Dense Medium Model)

5.1 Redefining the Vacuum: The Illusion of the Void

SEMT challenges the fundamental premise of modern physics that regards the vacuum as an "empty space" (Void). We postulate that spacetime is a **Dense Physical Medium** that permeates the entire universe.

- **Properties:** This medium possesses mechanical properties analogous to **Fluids** (such as density, viscosity, and surface tension), yet it differs from ordinary matter in that it is the "Carrier Medium" for all matter.
- The Perception Dilemma (The Fish Analogy): We do not perceive the weight or density of this medium because we, and all our measuring instruments, are completely "submerged" within it; our very constitution is woven from its fabric. This is analogous to deep-sea fish that do not feel the weight of the water and perceive its existence only as resistance to motion.

5.2 Gravity: Vortex and Current Dynamics

Based on the "Dense Medium" model, the theory of "Spacetime Curvature" is replaced by a direct mechanical interpretation:

- Mechanism: Gravity is not a silent geometric curvature, but an Actual Motion of the Medium. When a massive body (an energy membrane) rotates at high velocity within this medium, it generates a surrounding Vortex or Suction Current.
- Free Fall: Planets do not fall into a curvature; rather, they "drift" with the current of the medium created by the star's rotation, just as boats drift in a water vortex. Gravity is a **Hydrodynamic Drag Force**.

[attachment0]

5.3 The Origin of Mass and Inertia

This model provides the definitive answer to the source of Mass:

- Resistance: Mass (m) is not a magical intrinsic property of matter, but a measure of Medium Resistance.
- Interpretation: To move or rotate, the membrane must "push" against this dense medium. This resistance is what we term "Inertia." Without the density of this cosmic medium, there would be no friction or mass, and motion would be chaotic and infinite in speed. The Medium is what gives Matter its weight.

5.4 Dark Matter: Density Perturbations

The Dense Medium model resolves the mystery of Dark Matter without the need to hypothesize ghost particles:

- **Definition:** Dark Matter consists of regions of **Higher Density** (Coagulations) within the space-time fluid itself.
- Effect: These dense regions create a "Gravitational Current" (influencing galactic rotation) due to their weight within the medium. However, they lack the "Organized Rotation" of the energy membrane required to generate and release photons (light). They are Invisible Clumps of the spacetime fabric itself.

5.5 Conclusion: The Universe as a Water Surface

According to SEMT, the universe is not a void containing floating spheres, but a **Dense Dynamic Ocean**. Matter is the "foam" of this ocean (rotational motion on the surface), Gravity is its currents, and Light is its rapid waves.

6 Mechanics of the Dark Sector (Dark Matter and Dark Energy)

6.1 Dark Matter: Density of the Cosmic Fluid

Building on the "Dense Medium Model" established in Chapter 6, SEMT offers an explanation for Dark Matter that dispenses with hypothetical particles:

- Mechanical Definition: Dark Matter consists of regions of Higher Density (High-Density Coagulations) within the spacetime fluid itself. It is not a separate substance but a variation in the medium's consistency.
- Gravitational Mechanism: Possessing a higher density than the surrounding medium, these regions exert a "Suction Current" or gravitational pull that dictates galactic rotation curves, acting as invisible anchors in the cosmic ocean.
- Why is it Dark? To emit light, a membrane must be in a state of "Active High-Frequency Rotation." Dark Matter clumps are "Inert"; they possess the medium's mass/resistance but lack the vibrational energy required to excite photons. They are the invisible skeleton of the universe.

6.2 Dark Energy: The Pressure of Decay

Dark Energy (constituting $\approx 68\%$ of the universe) drives accelerated expansion. In SEMT, this is the direct product of the **Membrane Lifecycle**:

• The Source: Every unit of matter in the universe continuously consumes its own mass (Self-Consumption) to sustain its existence. This process converts concentrated mass into **Released Tension** that dissipates back into the cosmic medium.

- Mechanical Action: This "exhaust" energy, accumulated over billions of years of stellar and galactic consumption, generates a pervasive **Repulsive Pressure** within the medium. This internal pressure pushes the fabric of spacetime outward.
- Acceleration: As time progresses, the total amount of "consumed mass" converted into mediumpressure increases. Therefore, the expansion of the universe accelerates. The universe expands because matter is mechanically "evaporating" into the medium.

6.3 Cosmic Proportions

This mechanism naturally explains the observed cosmic ratios:

- Baryonic Matter ($\approx 5\%$): The active, luminous "foam" on the medium's surface.
- Dark Matter ($\approx 27\%$): The bulk density and inert structure of the medium.
- Dark Energy (≈ 68%): The cumulative pressure of thermodynamic decay driving the boundaries of the cosmos.

7 Chapter 8: Immunity of SEMT (Deterministic Rebuttals to Experimental Challenges)

7.1 8.1. Introduction: From Hypothesis to Fortification

SEMT does not merely offer a philosophical alternative but possesses a "Mechanical Immunity" addressing specific anomalies that the Standard Model treats as arbitrary. This chapter preemptively addresses the core experimental challenges.

7.2 8.2. The First Challenge: The Particle Generations Problem

Query: The Standard Model features three generations of particles (e.g., Electron, Muon, Tau) with identical properties but vastly different masses. How does a single membrane unit (m_{unit}) explain this? The Deterministic Response (Membrane Resonance Theory): In SEMT, mass is the product of rotational resistance. Mass differences do not imply different "types" of membranes, but different Vibrational Modes.

- Mechanism: The fundamental membrane unit (96 nm) acts as a closed mechanical string. The first generation (Electron) represents the membrane's Fundamental Frequency.
- **Higher Generations:** The Muon and Tau are simply **Higher Harmonic Resonances** of the same membrane. When the membrane rotates at complex, multiplied frequencies, it generates greater resistance (inertia) in the cosmic medium, manifesting as higher mass while retaining the same charge.

7.3 The Second Challenge: The Falsifiability Test (Gravitational Waves)

Query: Where does SEMT quantitatively diverge from General Relativity in a measurable environment? The Deterministic Response (Gravitational Wave Dispersion): General Relativity posits that gravitational waves travel at exactly c in a vacuum.

• SEMT Prediction: Since spacetime is a **Dense Physical Medium**, gravitational waves are mechanical disturbances within it. We predict that gravitational wave velocity (v_g) should exhibit slight **Dispersion** or retardation when passing through regions of high Dark Matter density, compared to photons. Detecting this minute time-lag is the smoking gun proof for the Dense Medium model.

7.4 The Third Challenge: Thermodynamics and Information Loss

Query: Does the "Consumed Time" mechanic violate the Second Law of Thermodynamics? And is information lost in a Black Hole?

The Deterministic Response:

- Entropy: SEMT asserts that Entropy is merely a statistical description of a deterministic mechanical process: the disintegration and scattering of the energy membrane.
- Black Hole Information: Information is not lost; it is Transalated. In the Hyper-Kinetic model, the geometric structure of matter (information) is dismantled and fully converted into Angular Momentum and kinetic mass added to the Black Hole. The "information" is conserved in the rotational velocity of the core.

7.5 The Fourth Challenge: Quantum Entanglement (The "Spooky Action" Paradox)

Query: How does SEMT explain the instantaneous correlation between entangled particles separated by vast distances, which appears to violate the speed of light limit?

The Deterministic Response (Continuous Medium Connection): The paradox only exists if we assume particles are separated by a "void." SEMT establishes that spacetime is a Continuous Dense Medium (Chapter 6).

- Mechanism: Entangled particles are not separate entities communicating signals; rather, they are the two endpoints of a Single Resonance Wave or a "Tension Line" extended through the cosmic medium.
- Mechanical Analogy: Consider a taut string submerged in water. Pulling one end causes an immediate reaction at the other. This is not signal transmission through a void, but Mechanical Tension Transfer through the medium connecting them.
- Conclusion: Entanglement is not "spooky action," but the definitive proof that the universe is a physically interconnected fabric, not an empty space.

7.6 The Fifth Challenge: The Double-Slit Experiment (End of Superposition)

Query: In the double-slit experiment, particles exhibit an interference pattern even when fired individually. How does SEMT explain this without assuming the particle exists in two places at once (Superposition)?

The Deterministic Response (Pilot Wave in Dense Medium): SEMT resolves this by applying "Fluid Dynamics" to spacetime structure.

- Mechanism: The particle (membrane unit) is a discrete entity and inevitably passes through only one slit.
- The Medium Wave: Since the particle moves through a Dense Physical Medium (Spacetime), its motion generates a surrounding Disturbance Wave or "Pilot Wave" (analogous to a boat creating a wake in water).
- Interference and Guiding: This "Medium-Generated Wave" passes through both slits and interferes with itself on the other side. The particle (which exited one slit) finds itself navigating a medium agitated by this interference pattern and is mechanically forced to follow the "troughs and crests" of the wave.
- Conclusion: The interference pattern is not evidence that the particle is a wave, but a map of the Medium's Disturbance guiding the particle's trajectory.

8 Comprehensive Inventory of Solutions and The Final Manifesto

8.1 . The Trilogy's Achievement: An Inventory of Answers

Over the course of this two-year research series, the Self-Energy Membrane Theory (SEMT) has moved beyond isolated hypotheses to build a unified system. We have provided deterministic, mechanical answers to the most fundamental questions in physics—questions that have long been treated as separate paradoxes.

Through the three papers in this series, we have definitively answered the following:

I. Foundations of Existence and Matter

- What is the fundamental unit of the universe?
- What is the true relationship between Matter and Light?
- Does the photon possess mechanical mass?
- What is the mechanical origin of $E = mc^2$?
- What is the physical origin of Inertia (Mass) in bodies?

II. Unification of Forces and Constants

- What is the geometric source of the Gravitational Constant (G)?
- What is the geometric source of the Coulomb Constant (k_e) ?
- How can the four forces (Gravity, EM, Strong, Weak) be merged into one Tension Force?
- Why do forces have different ranges (Long-range vs. Short-range)?

III. Resolution of Quantum Paradoxes

- What is the mechanical solution to the Wave-Particle Duality?
- Why does nature appear "probabilistic" in Quantum Mechanics?
- Does the universe play dice (Is randomness fundamental)?
- How can the Double-Slit experiment be explained without superposition?
- What is the mechanical explanation for Quantum Entanglement?
- Why do three generations of particles exist with different masses?

IV. Cosmology and The Dark Sector

- What is the physical nature of the spacetime fabric?
- What is Dark Matter?
- What is Dark Energy and what drives cosmic acceleration?
- Why does Matter dominate over Antimatter (Symmetry Breaking)?

V. Black Holes and Time

- What is the reality of the "Singularity" inside a Black Hole?
- Why does a Black Hole consume light?
- Why does time slow down or stop at the event horizon?
- What is the fundamental difference between "Time" and "Clock-Time"?
- Why does the Arrow of Time always point forward?
- Why is Time always a positive value?

8.2 The Essence of Physics: The Science of "How"

The comprehensive nature of these answers highlights a critical epistemological stance. Physics is not merely a science of observation that states *that* phenomena happen; it is, fundamentally, the science of **Mechanical Explanation**.

To truly understand the universe, we must not merely look at it; we must ask **"How does it work?"**. When we stop asking "How" and settle for probability or abstract curvature, we abandon the core mission of physics. This theory has sought, in every chapter, to restore this methodology: uncovering the hidden mechanical gears that drive the cosmic engine.

8.3 The Final Manifesto: The Beauty of Deterministic Physics

In concluding this research series, which represents the culmination of **two years** of intensive intellectual labor, we declare that our objective was to issue a call to return to the deep roots of scientific inquiry.

We present SEMT not as another mathematical probability, but as a rigorous mechanical framework explaining the consistency of the cosmos. The precision of cosmic constants, the regularity of orbits, and the unity of laws from the atom to the galaxy are the definitive proofs of a **Strict Deterministic Mechanism** where chance has no place.

As Albert Einstein famously stated: "God does not play dice."

If chance had any role in the geometric foundation of existence, the universe could not have maintained its coherence for a single moment.

In conclusion, we affirm that Physics, in all its branches, remains one of the most beautiful and profound sciences, for it is the discipline that teaches us "how anything in this universe works." It is our firm conviction that the universe is built upon a precise Deterministic Geometry, and the supreme role of Physics is to uncover this geometry.

In this spirit, we present this work not as a demolition of the past, but as a step toward restoring the essence of our field: The Science of Uncovering the Universe's Deterministic Geometry.