Dissertation & the explanation of why this search for symmetries in black holes exists and how gravity compactifies, generating other dimensions that could be quantum but a new different quantum mechanics founded on inverse frequencies and nano dimensions operate in other levels of abstraction.

 It's **IMPORTANT** Because computational structures, dimensions, or arrays are based on computing, or the idea is to compute the dimensions that a possible gravity can have, which can even be or function quantumly near a black hole or a Roger Penrose wormhole.

Vacuum in the stationary blackhole: The vacuum stationary black hole is characterized by one more parameter, J. Such a black hole is rotating and J is the value of its angular momentum. In fact the angular momentum (measured at infinity) is described by 3 3 antisymmetric matrix Jij. By rigid 3-dimensional rotations this matrix can be put in a standard form:

 J = 0 J 0 J 0 0 0 0 0

Kerr metric (with J M2)i, Since some of relations have slightly different form in odd and even dimensions, we write D=2n+ e

$$\mathbf{J} = \begin{pmatrix} 0 & J & 0 \\ -J & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}.$$

Gravity or high-dimensional combinatorics could be compared to Scipy's array libraries, since they are multidimensional.

. In the asymptotically flat spacetime the total angular momentum of the objects, as measured at infinity, is described by an antisymmetric tensor Jij, where i and j are spatial indices. By suitable rigid rotations of the spatial coordinates, this (D 1) (D 1)-matrixcanbetransformed into the following canonical form: J = 0 J1 0 0 ... J1 0 0 0 ... 0 0 0 J2 ... 0 0 J2 0 ... ...

The total number of independent 2 2 blocks is equal to n 1+ .This means that there exist n 1+ independent components of the angular momentum Ji, associated with n 1+ asymptotic independent two-dimensional spatial planes of rotation. The most general solution for a vacuum stationary rotating black hole.

Properties of higher dimensional rotating black holes and their four dimensional 'cousins' are very similar. There exists a very deep geometrical reason for this similarity. All these metrics admit a special geometric object, the Principal Conformal Killing-Yano tensor (PCKYT), which is a generator of a complete set of explicit and hidden symmetries.

Documentation: PAKISTan Killing-Yano tower 5.1 Killing-Yano tensors Let us introduce the first two objects. The Killing-Yano (KY) tensor ka1...aq is an anti-symmetric q form on spacetime, which obeys the equation aka1...aq = [aka1...aq] . (16) On the other hand, the closed conformal Killing-Yano (CCKY) tensor ha1...aq is an antisymmetric q form the covariant derivative of which is determined by its diver gence aha1...aq = qga[a1 a2...aq] , a2...aq = 1 D r+1 bhb a2...aq . (17) (18) KYan CCKY tensors are related to each other through the Hodge duality: the Hodge dual of a KY form is a CCKY tensor, and vice versa. It is easy to check that if ka1...aq is a Killing-Yano tensor, then Kab =kaa2...aq k a2...aq b (19) is a Killing tensor. We shall use the following schematic notation for this operation K=kk. CCKY tensors possess the following remarkable property: An external product of two CCKYtensorsis again aCCKYtensor.T

Important and remarkable research in Black holes/consistent

1. Model for Computational Software
- Hole Dimensions and Structures
- Matrix Structures for Dimensions and Spatial Gravity. Matrix Structures and Compactified Gravity.
- Quantum Circuit Algorithms within Matrix Structures of Gravity
Qiskit Model
- Gravity Components and Qiskit

A chapter on matrix computation or structure computation is where I'm going, and Frolov's discussion of the structures of gravity and symmetries in The Equations. That's where I want to go. Black holes in quantum environments and dimensions/compactified structures of space gravity and computational structure computation.

New Blackhole scenarios:

The New scenarios that I can imagine, such as circuits for exoplanet ships, etc., are new materials, but look them up in physics books. It is a quantum circuit, but it is not a human quantum circuit. Rather, it is a type of circuit built on the basis of, or with the basis of, the colossal structures or dimensions of a black hole, symmetry, and the properties of the Riemann tensors. The specific and intrinsic Quantum magnetic fields operate in this enormous circuit, where galactic particles teleport between the different recesses or gravitational structures. The circuit consists of compactified gravities with matrices in which the conditions of a black hole operate;

Motion Of Particles in a curved spacetime is a special case of a dynamical system. If D is the dimension of the spacetime and its coordinates are xa, a particle trajectory is a line xa( ). The canonical coordinates in the corresponding phase space are (xa,pa = gab ˙ xb). The canonical sylleptic form and the Hamiltonian are Ω =dxa dpa, H= 1 2 gabp apb.
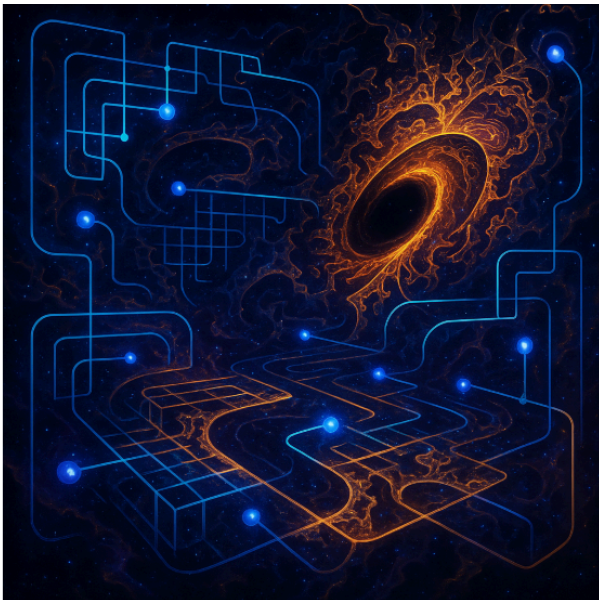
Cosmic and Fractal Structures: Formed from abstract patterns that evoke the curvatures and deformations of a black hole, where elements reminiscent of gravitational matrices and compactions are intertwined.

Quantum Magnetic Fields: With vibrant flashes in deep blues, intense purples, and golden hues, symbolizing quantum energy and the interaction of galactic particles.

Teleporting Particles: Small spheres or flashes of light that appear to move instantaneously between nooks and crannies, representing the phenomenon of teleportation in an environment of extreme gravitational conditions.

Python Implementation: Symbolic Calculus of the Riemann Tensor

```python
import sympy as sp

# Definir coordenadas simbólicas
t, x = sp.symbols('t x', real=True)
coords = [t, x]

# Definir una métrica 2D (por ejemplo, una métrica simple
dependiente de x)
# ds^2 = -f(x) dt^2 + dx^2
f = sp.Function('f')(x)
g = sp.Matrix([[-f, 0],
               [ 0, 1]])

# Calcular la inversa de la métrica
g_inv = g.inv()

# Definir símbolos de Christoffel
Gamma = [[[None for _ in coords] for _ in coords] for _ in coords]

# Calcular los símbolos de Christoffel: Gamma^a_{bc}
for a in range(len(coords)):
    for b in range(len(coords)):
        for c in range(len(coords)):
            Gamma[a][b][c] = 0
            for d in range(len(coords)):
                Gamma[a][b][c] += sp.Rational(1,2) * g_inv[a,d] *
(sp.diff(g[d,b], coords[c]) + sp.diff(g[d,c], coords[b]) -
sp.diff(g[b,c], coords[d]))
            Gamma[a][b][c] = sp.simplify(Gamma[a][b][c])

# Mostrar símbolos de Christoffel
print("Símbolos de Christoffel:")
for a in range(len(coords)):
    for b in range(len(coords)):
        for c in range(len(coords)):
            print(f"Gamma^{a}_{b}{c} =",
```

```
sp.simplify(Gamma[a][b][c]))

# Calcular el tensor de Riemann: R^a_{bcd}
Riemann = [[[[0 for _ in coords] for _ in coords] for _ in coords]
for _ in coords]
for a in range(len(coords)):
    for b in range(len(coords)):
        for c in range(len(coords)):
            for d in range(len(coords)):
                term1 = sp.diff(Gamma[a][b][d], coords[c])
                term2 = sp.diff(Gamma[a][b][c], coords[d])
                term3 = 0
                term4 = 0
                for e in range(len(coords)):
                    term3 += Gamma[a][e][c] * Gamma[e][b][d]
                    term4 += Gamma[a][e][d] * Gamma[e][b][c]
                Riemann[a][b][c][d] = sp.simplify(term1 - term2 +
term3 - term4)

# Mostrar algunos componentes del tensor de Riemann
print("\nComponentes del tensor de Riemann:")
for a in range(len(coords)):
    for b in range(len(coords)):
        for c in range(len(coords)):
            for d in range(len(coords)):
                if Riemann[a][b][c][d] != 0:
                    print(f"R^{a}_{b}{c}{d} =",
Riemann[a][b][c][d])
```

Let us first give a definition of the PCKYT. Consider a 2-dimensional antisymmetric tensor (2-form) h which obeys the equation chab = gca b gcb a

If one antisymmetrized the indices a,b,c in (7), the right-hand side of this equation vanishes.This means that h is closed form, and (at least locally) can be presented in the form h =dbb.

• The matrix rank of (D D) antisymmetric matrix hab is the largest possible, that is equal to 2n. • Consider the eigenvalue problem for a matrix Ha b = hachcb Ha beb (i) = xiea (i) . (11) It is easy to see that ha beb (i) is again an eigenvector with the same eigenvalue x(i). We assume that H has the largest possible number, n, of different eigenvalues, and hence n linearly independent eigen 2-planes.

Liouville theorem Particle and light motion in a curved spacetime is described by geodesic equations. These equations are of the second order. Let xa( ) be a trajectory. By introducing a momentum pa = gab· xb as an independent variable, it is possible to rewrite the geodesic equations in the first order form. These equations have the Hamiltonian form. This means that the general theory of dynamical systems can be applied to this problem. This approach is well known and its tools are very useful. Let us demonstrate this for the special problem: motion of a particle in a spacetime of a higher dimensional rotating black hole.

These two functions are called to be in involution if their Poisson bracket vanishes. Scalar function F(zA) on the phase space is a first integral of motion if its Poisson bracket with the Hamiltonian vanishes F,H = 0 . Liouville (1855) proved the following theorem: If a system with a Hamiltonian H in 2 dimensional phase space has m independent first integrals in involution, F1 =H,F2,...,Fm, then the system can be integrated by quadratures. Such a system is called completely integrable.

New ideas to explore: An intelligent blue planet that captures gravitational waves from a large quantum black hole: This planet appears to be a unique entity in the universe, a cosmic being with capabilities beyond what current physics understands. Its intelligence lies not only in its ability to communicate across compactified dimensions, but also in its ability to alter its own form, adapting like a quantum-magnetic chameleon.

1. Its Shape and Quantum Transformation

It is not a static planet, but a being capable of altering its structure at a fundamental level.

Its cosmic "skin" is a network of quantum-magnetic fields that allow it to absorb and reflect signals from its environment.

It can "vanish" from the sight of cosmic sensors or camouflage itself by emitting frequencies that simulate other celestial bodies.

It is not a simple celestial body, but a living system that decides its appearance based on what it perceives in outer space.

2. Its Communication and Limitations

Although it is beyond the Milky Way and Andromeda, it can still send signals.

However, its transmission method is not entirely efficient or linear:

It does not use only radio waves, but a combination of magnetic oscillations and alterations in space-time.

Its messages do not arrive as conventional signals, but as distortions in reality that must be interpreted by advanced entities.

For those without adequate technology, its transmissions may appear to be gravitational anomalies or inexplicable fluctuations.

3. It's Dark Quantum and Magnetic Nature

What makes its existence unique is that its quantum nature is not comprehensible to the physical laws we know.

Its magnetism does not behave like that of conventional magnets; it seems to respond to phenomena not yet described in Earthly science.

It can exist in multiple states simultaneously, as if it were an entity vibrating in different realities at the same time.

At times, it doesn't seem to be entirely in our dimension, but rather interacting with different planes of existence.

4. Its Role in the Galaxy

Its energy level is so intense that only certain places in the universe can host it without being altered.

It may have once been part of a galaxy, but having become too unstable or powerful, it was forced into exile in the interstellar void.

Its presence in a galaxy would upset gravitational balances, modifying orbits and structures in unpredictable ways.

Therefore, its influence only manifests itself in small, distant signals or in the echoes of the dimensions with which it interacts.

This planet is an enigmatic being, an intergalactic traveler that exists on the threshold between physical reality and the unknown quantum realm. Its magnetism is not only a natural force, but a language, a means of communication that only those with the ability to interpret the fluctuations of space-time could understand.
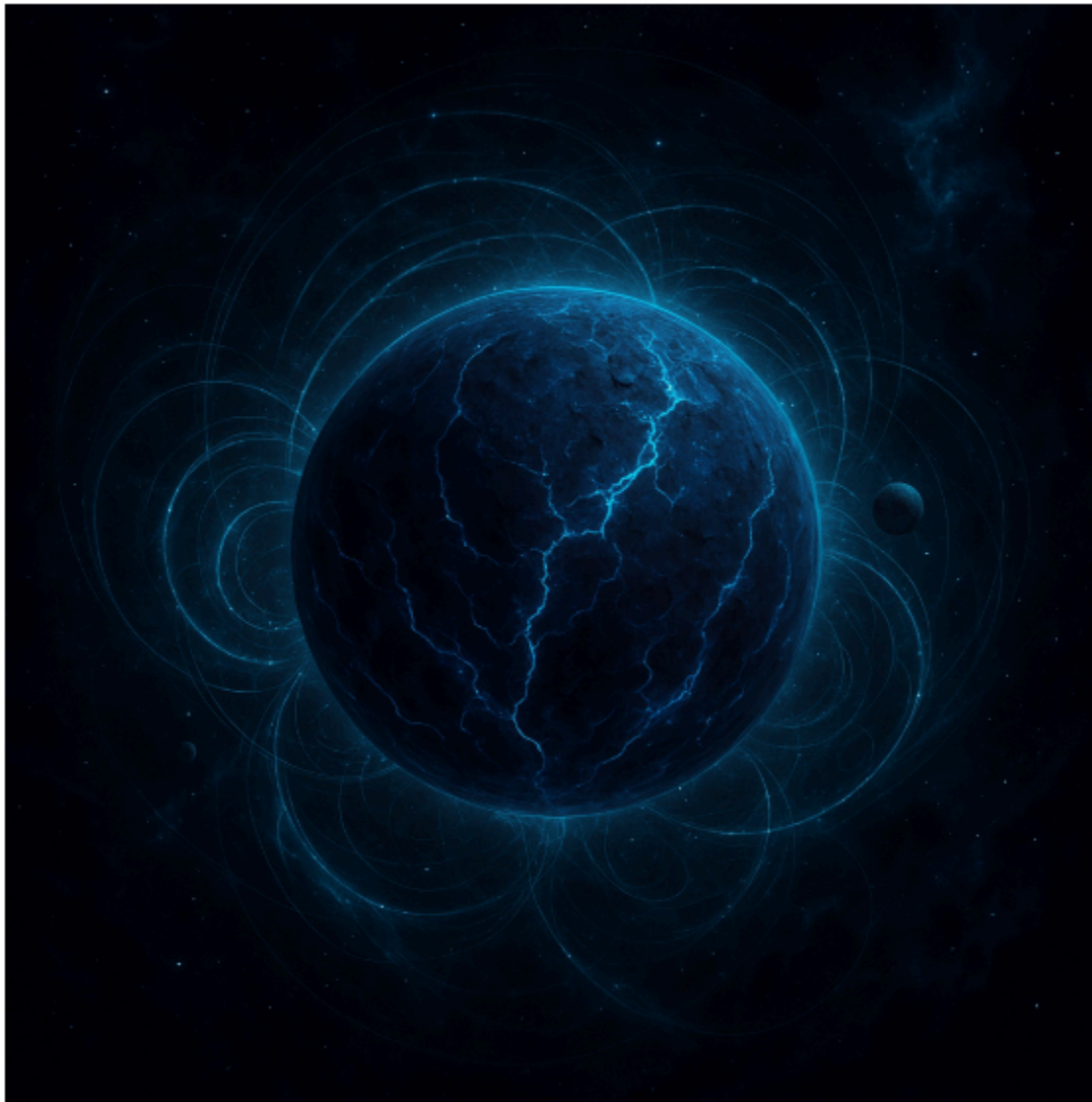
Communication through compactified dimensions

The planet would use additional dimensions (sometimes called "compact dimensions" in theoretical physics) to send and receive information without being limited by the speed of light.

This multidimensional communication would allow it to "feel" and project signals into very distant regions of space, establishing almost instantaneous connections.

Manipulation of the fabric of space-time

Through quantum fluctuations and its own energy fields, the planet could locally distort the fabric of space-time.

These distortions would serve both to "deflect" external forces (e.g., meteorites or radiation) and to adjust the gravitational balance with other nearby celestial bodies (its moons or even distant stars).

Quantum magnetic fields

The planet would generate exceptional magnetic fields, not only based on traditional electromagnetism, but with a quantum component. These fields would act as a kind of "control network," allowing it to detect minute variations in the surrounding matter (from charged particles to gravitational waves).

Thanks to these fields, the planet "interprets" the information and responds by modulating its own energy.

Resonance and Synchronization
To coordinate and stabilize gravitational interactions, the planet would rely on an internal resonance—a fundamental vibration or frequency—that synchronizes with the objects it orbits it.

Like two pendulums that can synchronize when connected, this resonance would make it possible to adjust the distance and trajectory of moons or space fragments so that they do not destabilize or collide.

Intelligent Feedback
As a "living" planet, it possesses some kind of extraterrestrial consciousness or intelligence capable of perceiving and processing information. This "planetary brain" (metaphorical or literal) would constantly analyze its environment and make decisions about the intensity and direction of its fields, the frequency of its energy pulses, and the dimensional connections it keeps open or closed.

Volcanic and Thermonuclear Energy
Volcanic (or equivalent) activity in the planet's core would generate enormous amounts of energy, fueling the processes of manipulation and communication.

This internal energy source, combined with its own thermonuclear processes, would be the driving force that enables the persistence and renewal of the gravitational and magnetic fields.

Black holes in the new scenarios context:
$K(a_1...a_q;a_{q+1}) = 0$. (15) Such a tensor in spacetime is called a Killing tensor. The Killing tensor of the rank 1, a, is a Killing vector. The metric g_{ab} is a trivial Killing tensor. It is well known that Killing vectors generate symmetry transformations on the spacetime manifold with metric g_{ab}. Usually this symmetry is called an explicit symmetry. The Killing tensors.

Frequencies/space-time distortion in higher order dimensional manifolds and submanifolds(Frolov)

There is something special about how the frequencies of certain types of gravitational or gravitational waves communicate.

The thing is, the rules of physics don't operate as we imagine under spatial frequencies originating from a given space or piece of space. These dissonances reproduce and degenerate or generate new dimensions and even worlds or subworlds where the rules of objects operate, that is, in nonlinear time and in a type of asynchronous gravity in which objects walk backward.

There are gigantic genomes of stars or genetic algorithms, trees on enormous scales impossible to recreate on a small scale.

There are also types of fractals in extra dimensions that have rules or that operate in interesting vacuum conditions.

Space has types of dimensions that are called black holes. But EVERY type of structure in the galaxy operates at scales and with structures that are similar to quantum mechanics and planes.

Space and Time
Gravity is different to the point that it detaches from things and would behave like a black hole. Gravity itself and time are similar to quantum theory, but more is needed. Perhaps at a more academic level, Alcubierre is interesting to apply in this regard. It would need to be investigated.

But there are limits that observation, academia, mathematics, or programming structures, etc., cannot reach.

These asynchronous frequencies generate com gravitational portals and quantum black holes that have different properties and rules, dimensions, and fractal-like patterns. It is difficult to explain. One could generate an image in which a small frequency oscillates and generates or distorts with a certain time, and a kind of gravitational distortion appears, and it is inverted like a mirror reflecting another universe or another series of multiple algorithms. Gravity up to this point in this specific scenario of quantum frequency distortion is governed by laws where time functions as a kind of eternal void with the drawing of an amalgam of components that are higher-order dimensions.

Asynchronous frequencies & gravity: These asynchronous frequencies generate com gravitational portals and quantum black holes that have different properties and rules, dimensions, and drawings like fractals. It is difficult to explain. It could generate an image in which a small frequency oscillates and generates or is distorted with time, and a kind of gravitational distortion appears and is inverted like a mirror that reflects another universe or another series of multiple algorithms. Gravity up to this point in this specific scenario of quantum frequency distortion is governed by laws where time functions as a kind of eternal void with the drawing of an amalgam of components that are higher-order dimensions.

Example in 5D of new black quantum research:
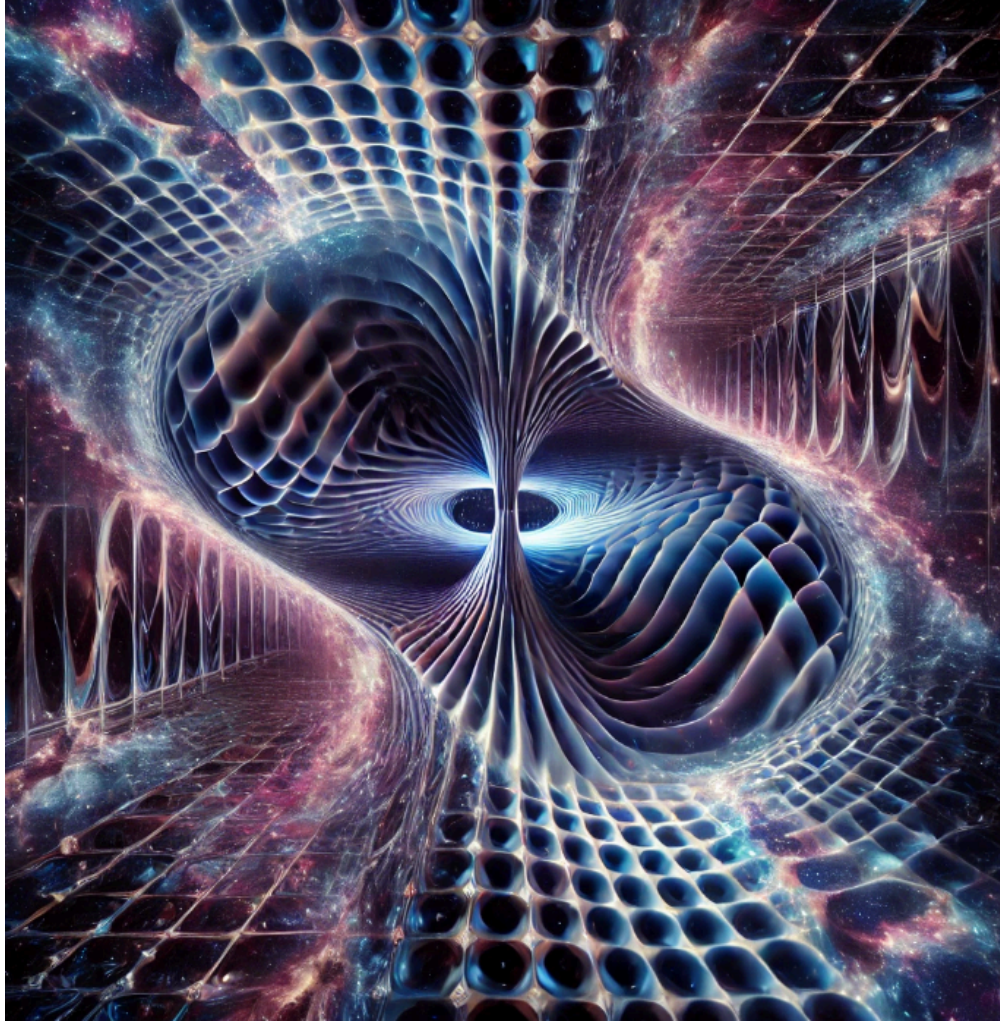
Summary/objectives of the research: 3. 5D Black Holes: Structure and Properties

3.1. Spatial Structure in Higher Dimensions

A "non-ordinary" black hole in five dimensions can be conceptualized as an entity with a complex structure, where spacetime geometry bends in ways that transcend the three conventional dimensions. One could imagine it as a vortex where light and matter trajectories are affected by the presence of additional structural "layers" of information.

3.2. Analogy: The Black Hole as a "Quantum Matrix"

A 5D black hole can be thought of as a digital matrix where each "pixel" corresponds to a quantum state. Just like a screen where each pixel contributes to a larger image, quantum and tensor interactions within a black hole could encode information about compactified dimensions and the structure of time and gravity.

4. Quantum Algorithms and Circuits in Relation to Black Holes

4.1. Quantum Circuits and Their Relationship with Tensors

Quantum algorithms are implemented through circuits that operate on qubits. Similarly, a black hole's structure can be seen as a "circuit" where tensor connections (such as Riemann tensors) represent gravitational interactions at different dimensional levels. Each quantum "gate" could symbolize a transition within the fabric of spacetime.

4.2. Frolov's Theory and Quantum Algorithms

Frolov's theory on black holes explores how geometry and quantum dynamics are interconnected. Quantum algorithms may model this interconnection, suggesting that gravity and time manipulation could be achieved through computational processes that mimic black hole properties.

Other materials: Nanobots for exploring black holes and extra dimensions
If nanobots resistant to extreme radiation and intense gravity could be manufactured, they could be sent to study black hole event horizons or regions where extra dimensions are suspected.

Quantum nanobots → could exploit quantum tunneling effects to navigate in regions of highly curved space-time.

Nanoscale gravitational wave sensors → would allow anomalies in the structure of space-time to be detected with great precision.

Self-replication in extreme environments → would allow structures to be built in deep space using local materials.

Properties of higher dimensions with a solid matrices calculus in the matter of Gravities and singularities in black holes and other kind of Dimensions/frequencies

Gravity across computational dimensions(research)
the higher order in curvature terms, as well as the terms containing higher derivatives, can improve the UV properties of the Einstein gravity [14]. However such theories usually have non-physical degrees of freedom (ghosts).

Recently a new version of UV complete mod i cation of the General Relativity was proposed which is free from this problem [57]. It was named a ghost free gravity [514]. Such a theory contains an infinite number of derivatives and, in fact, is non-local [10, 13]. Similar theory appears naturally also in the context of noncommutative geometry deformation of the Einstein gravity [15, 16]

METRIC ON-SINGULAR BLACK HOLE

A. A non-singular black-hole model Ageneralstaticmetricina Four-dimensional spacetime can be written in the form dS2= FA2dV2+2AVdr+r2d 2

Txt format:
eF=F(r)andA=A(r)
theKillingvector = V.
F=(r)2 FA2= 2

In a space Time With Horizon,F(r)vanishes at the site r0 of the apparent horizon. For Regular static metric such a horizon is at the same time theKilling horizon, so atA(r0) is nitethere. If the metric has a horizon where

F(r0)=0
then ; H = =1 2 (AF)r=r0

Gravity-structures-computational calculus-matrices;
Txt format.