An Experimental Geometric Musical Language (GML), Nested Clock Universes, The Definition of Bindu, and the Philosophical Similarities to One that arise from Simulation

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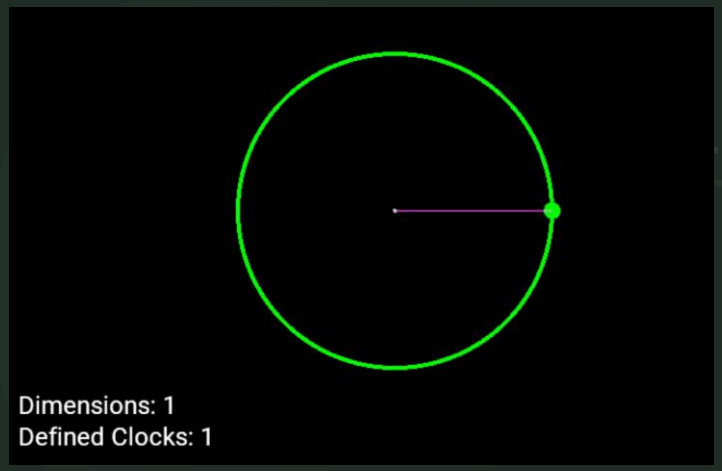
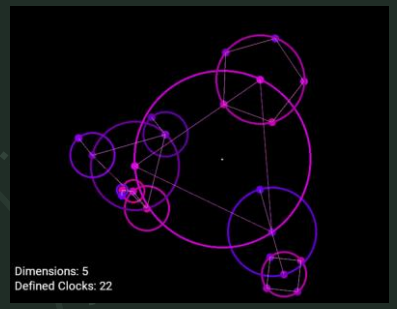
What is GML?

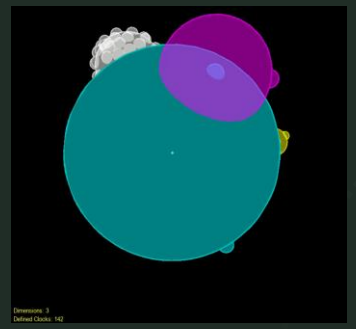
Geometric Musical Language

A system to create nested geometries in n-dimensional **phase space**.
[Initially conceived and created by Dr Anirban Bandyopadhay et al.]

Mathematically allows descriptions ranging from simple oscillators up to self organising mathematical universes (SOMU) operating across 12 or more dimensions.





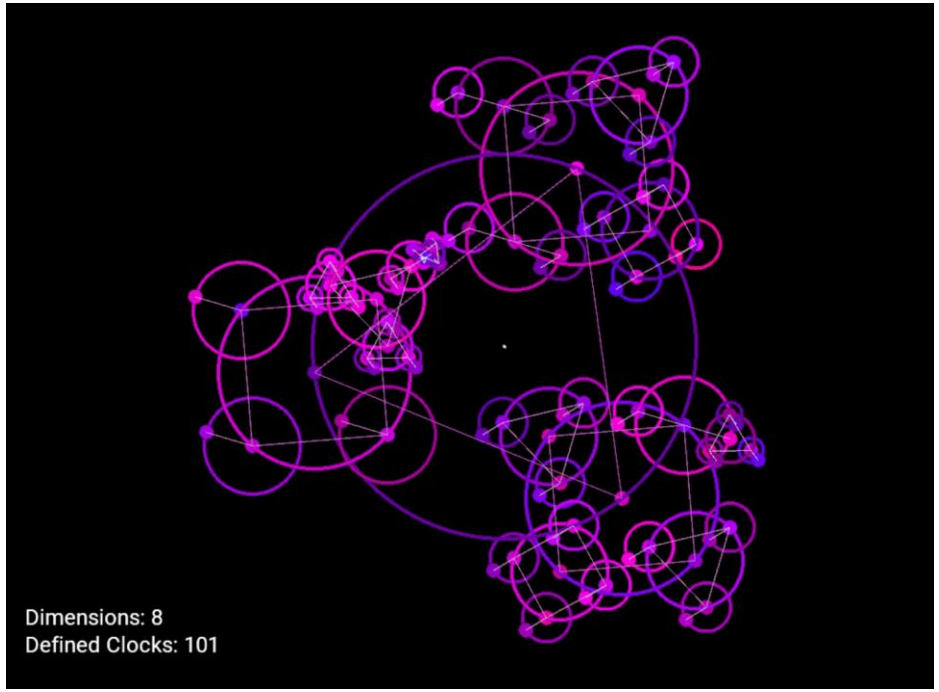


1. Bindu - An infinitely small point with no Time or Space.
2. Singularity point rotates around Bindu in “Phase Space”. Defines a clock.
3. Singularity follows the circumference of the circle forming a clock with a fixed period (resonating at a given frequency) so acting as a rotary oscillator.
4. Time is an emergent property in this system from the motion of the singularity.
5. System forms a “Time Crystal” – an event repeating periodically in time.
6. Many layers geometrically nest.
7. Each layer can be orthogonal allowing projection of clocks to higher dimensions.
8. Bindu is always the starting point for any system.

“Polyatomic Time Crystals”

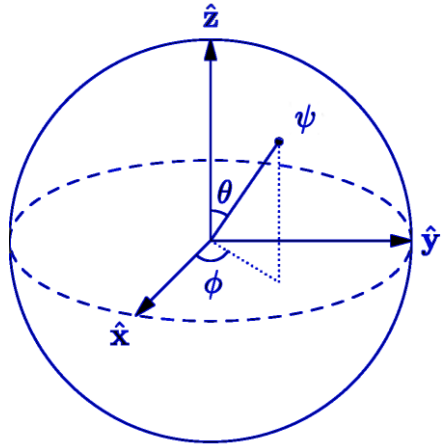
Architectures of Time

- Nested geometries in “Phase Space”
- Multiple singularities (Many clocks)
- Periods and frequencies that are not necessarily harmonically related.
- Frequency ratios can be many orders of magnitude.



Bloch Spheres

Geometrical representation of quantum states.
3D unit sphere where spherical vector θ and ϕ represents one point

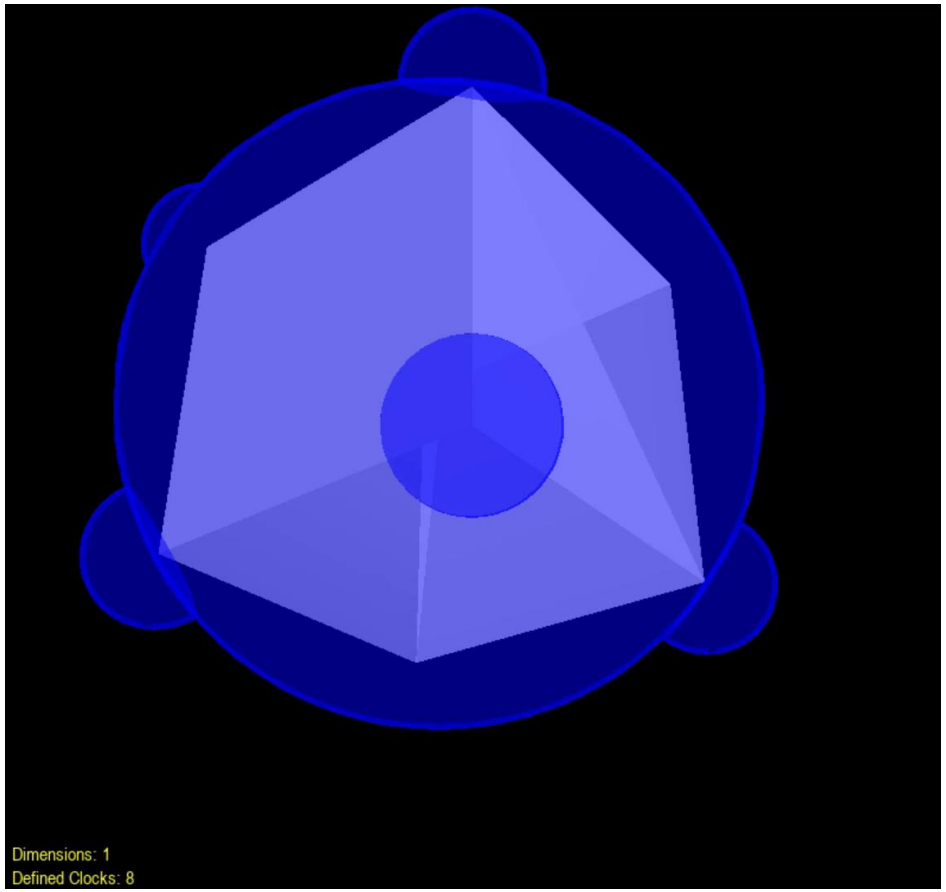


Quantum Computing

- Single-qubit states as points on a unit sphere
- Quantisation within two states
- Qubits can be in superposition

GML based Dodecahedron Quantum Computing

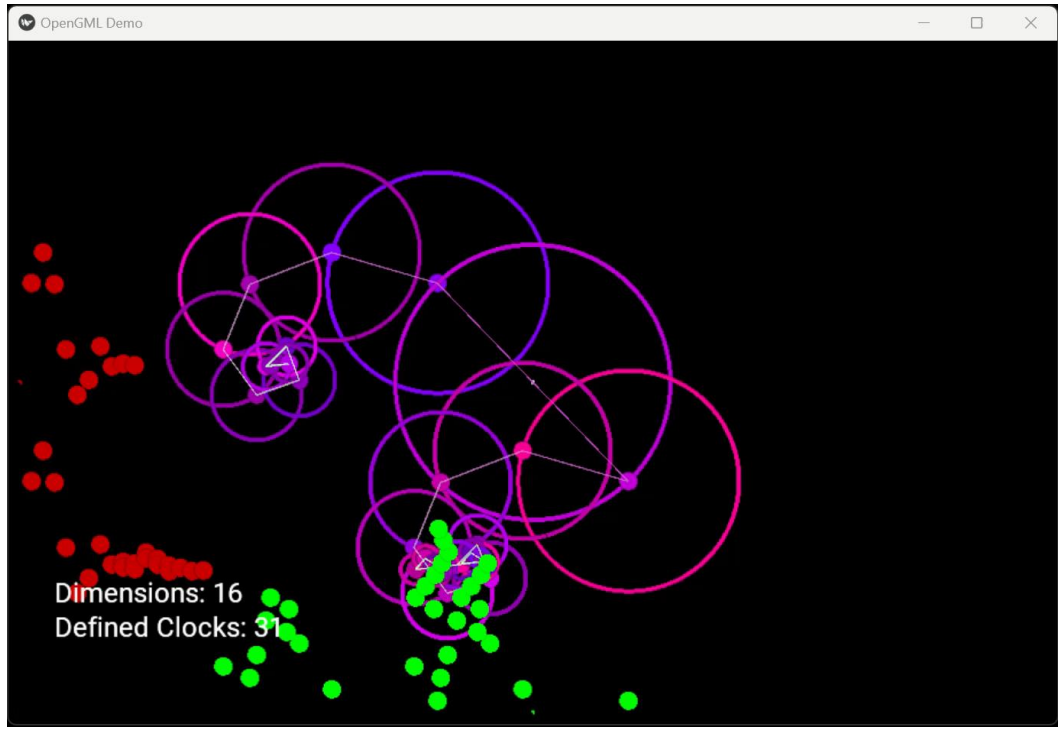
- Each Phase singularity has a rotational phase vector
- Singularities have multiple degrees of freedom (not quantised)
- Singularities can be in superposition
- Bloch Spheres can nest and hold geometry

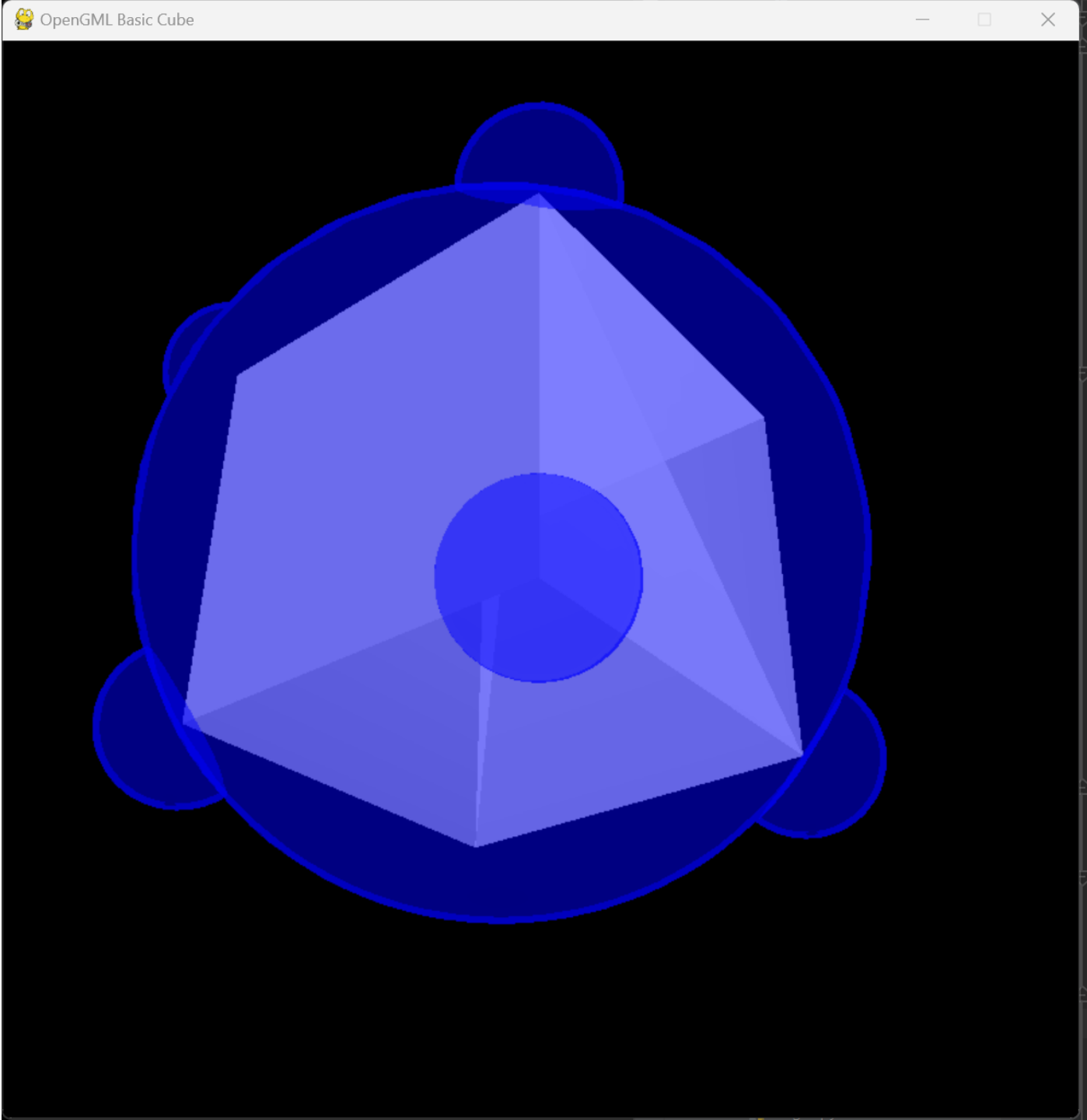


OpenGML.org

Open Source tool for creating 2D and 3D projected simulations of GML

- Minimal code to create GML
- Start from Bindu
- Add Geometry (Singularities, Dipoles, Triangles, Squares, Pentagons, Hexagons, Polytopes, Platonic Solids, Tetrahedron, Cube, Octahedron, Dodecahedron, and Icosahedron)
- Nest the geometry
- Animate
- Optionally apply sonification

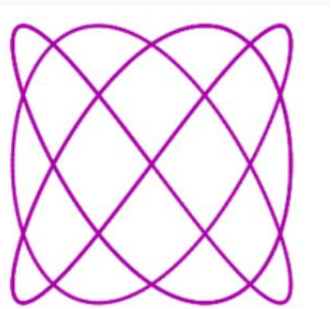


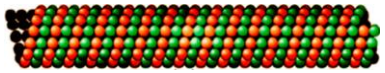



```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
import sys

sys.path.append("../../src/OpenGML")  # AddOpenGML path

import GML_App_3D as app3d
from GML import *
from GML_3D import *
from colour_functions import *


def populate_demo():
    # Size of the singularities drawn
    diameter = 20
    # Frequency determines the size of the circle that the singularities rotate
    frequency = [100, 100]

    # Create the Bindu - a tiny point as starting root node for the GML tree
    rootNode = create_bindu_3D()

    # Add a cube
    rootNode.add_cube("Cube", diameter, frequency, colour=BLUE)

    rootNode.print_tree()
    print("GML geometry text representation: ", rootNode.gml_to_text(100))
    return rootNode


if __name__ == '__main__':
    # Run the app
    app = app3d.GML_App_3D("OpenGML Basic Cube", populate_demo)
    app.initial_rotation_speed(0)
    app.run()
```

Engineering and Philosophical Applications of GML

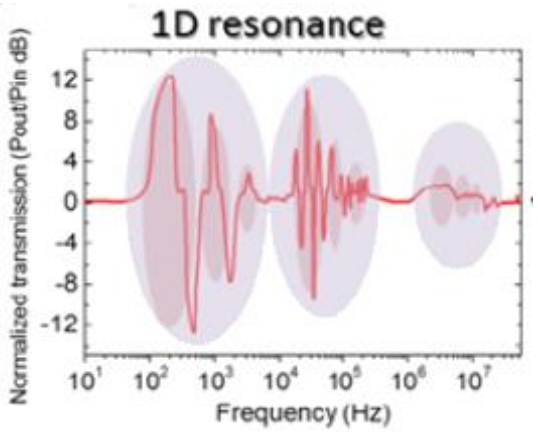
- Analysis of complex system dynamics
- Microtubule frequency analysis
- Electrophysiology and circadian dynamics (human animals and plants)
- Models of human and universal consciousness
- Simulation of a Self Operating Mathematical Universe (SOMU)
- A framework for exploration of philosophical principles and metaphysical analogies relating to Pantheism, Vedism, Hinduism, Monism and Buddhism

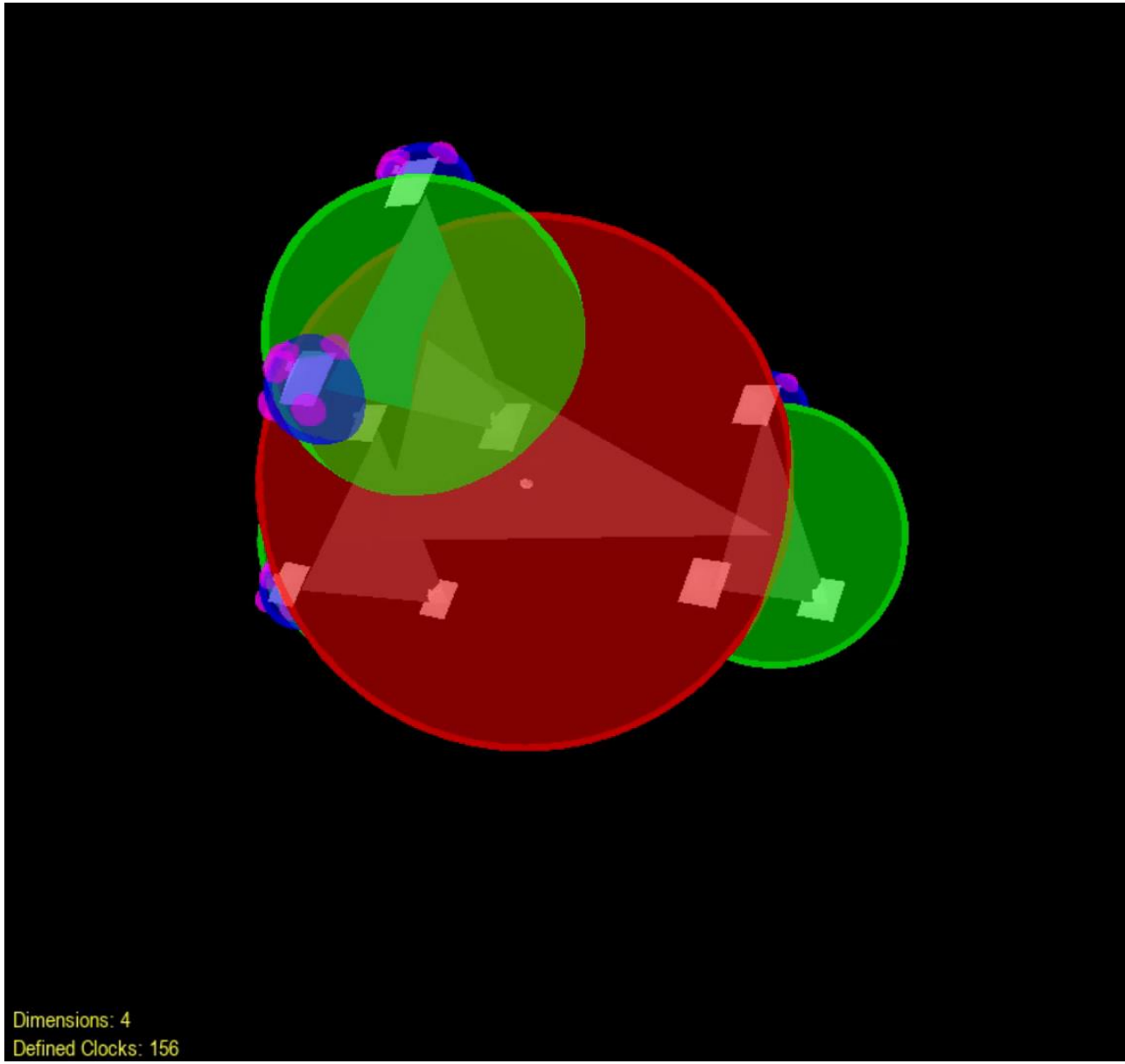




GML of Triplet of Triplet Resonance

"Triplet of Triplet" resonance was first observed and described in Microtubules by Dr Anirban Bandyopadhyay et al. The discovery lead to their team creating the Geometric Musical Language (GML) as a means of visualising and understanding the resonance patterns.

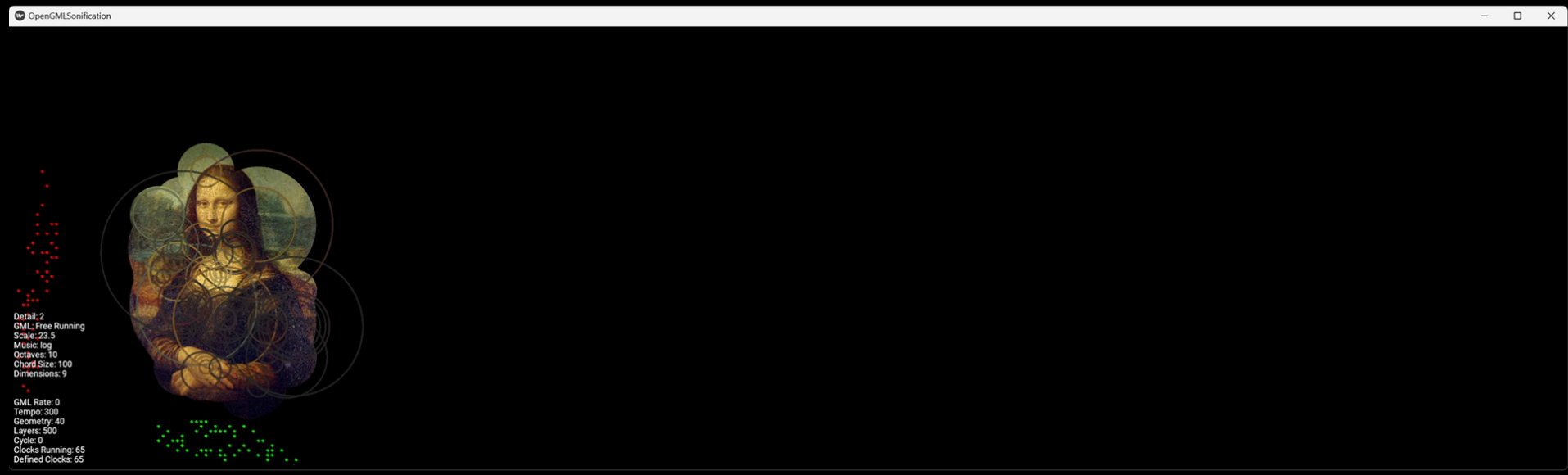


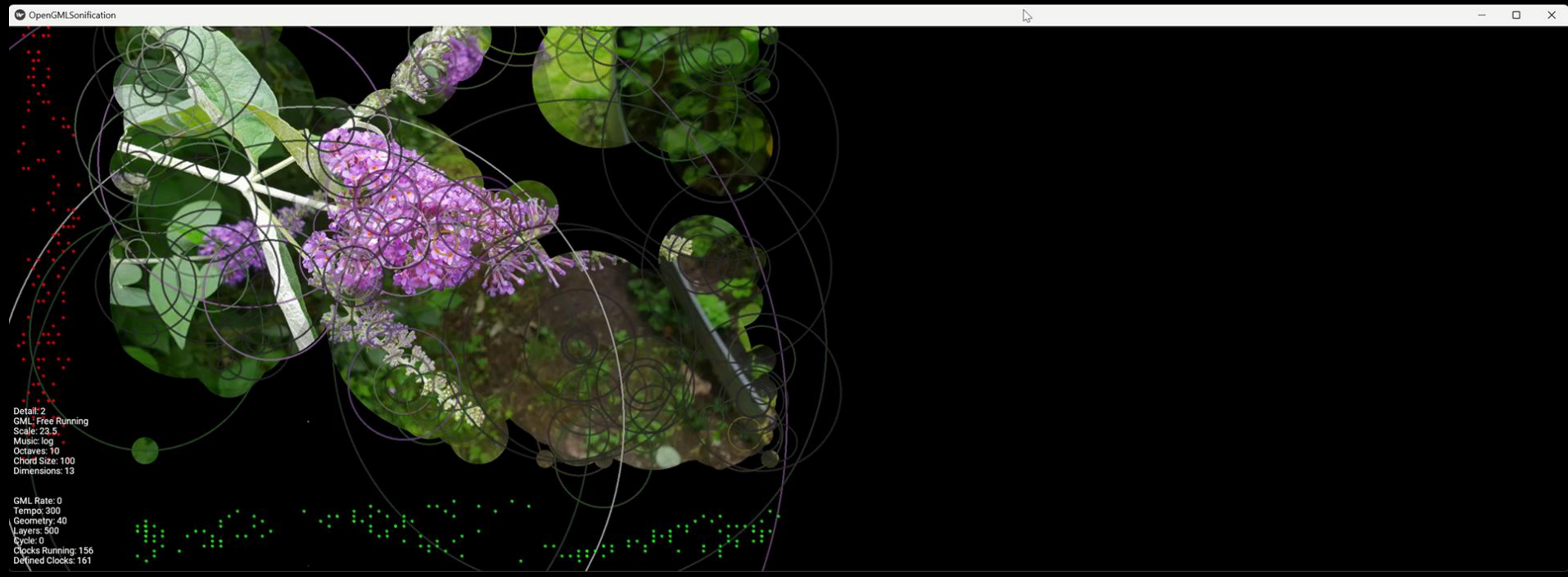


Bindu and the Infinite Circle as an Observer

(Demonstrated via Simplified Transformation of an Image to OpenGML)

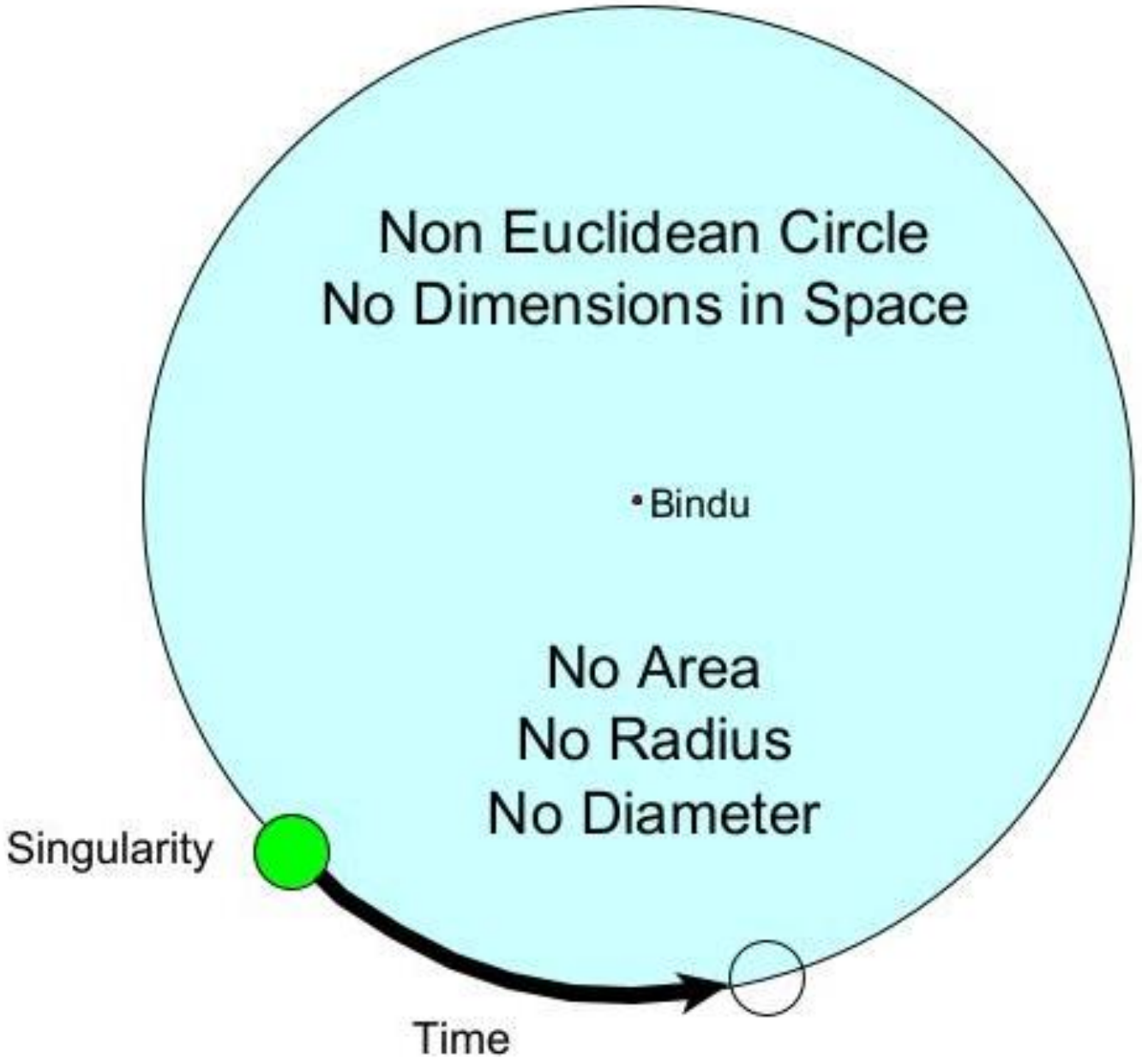
- “Tending towards infinity“
- Analogy of hyperfocal distances in optics
- Tangent becomes parallel to the circumference



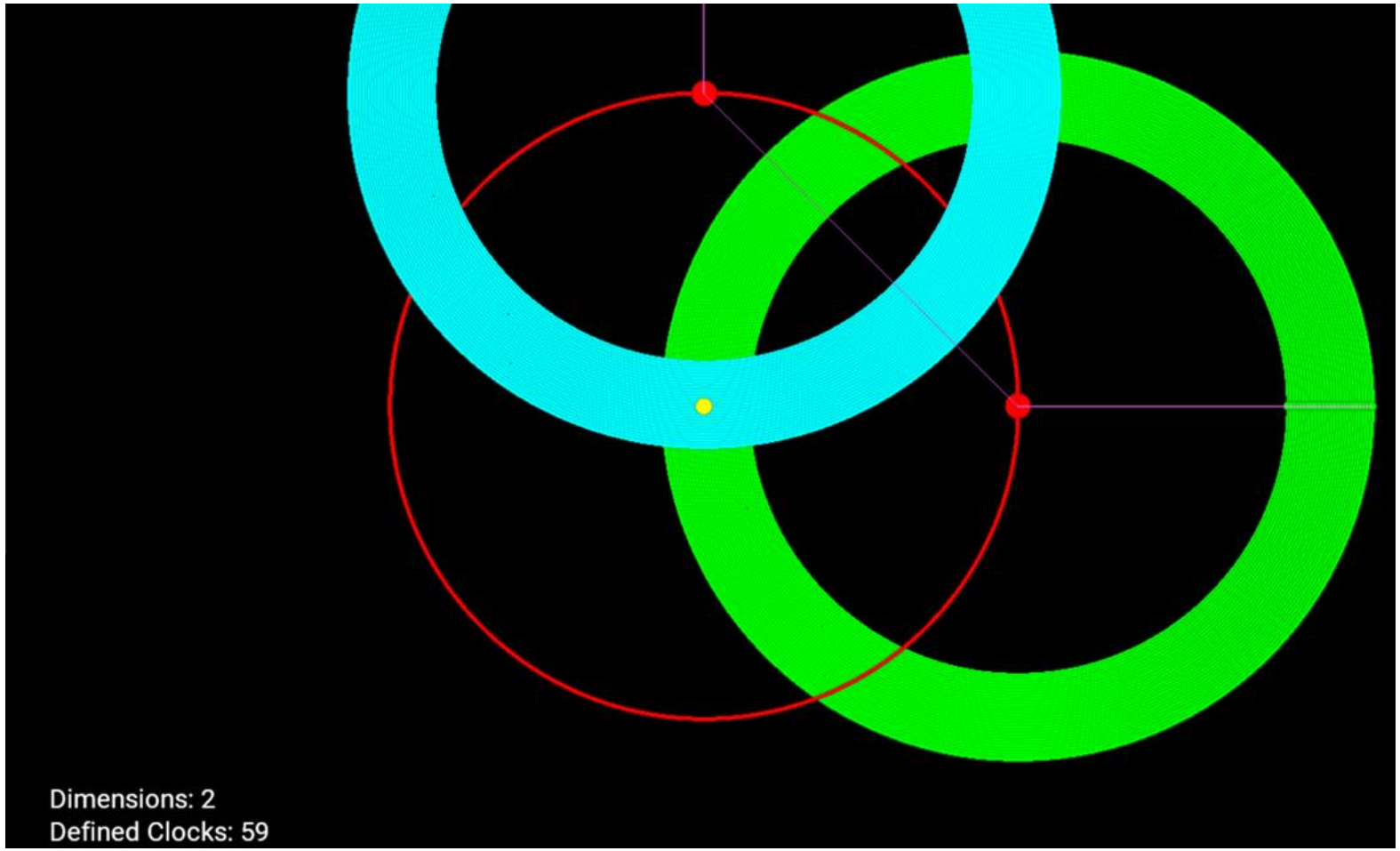


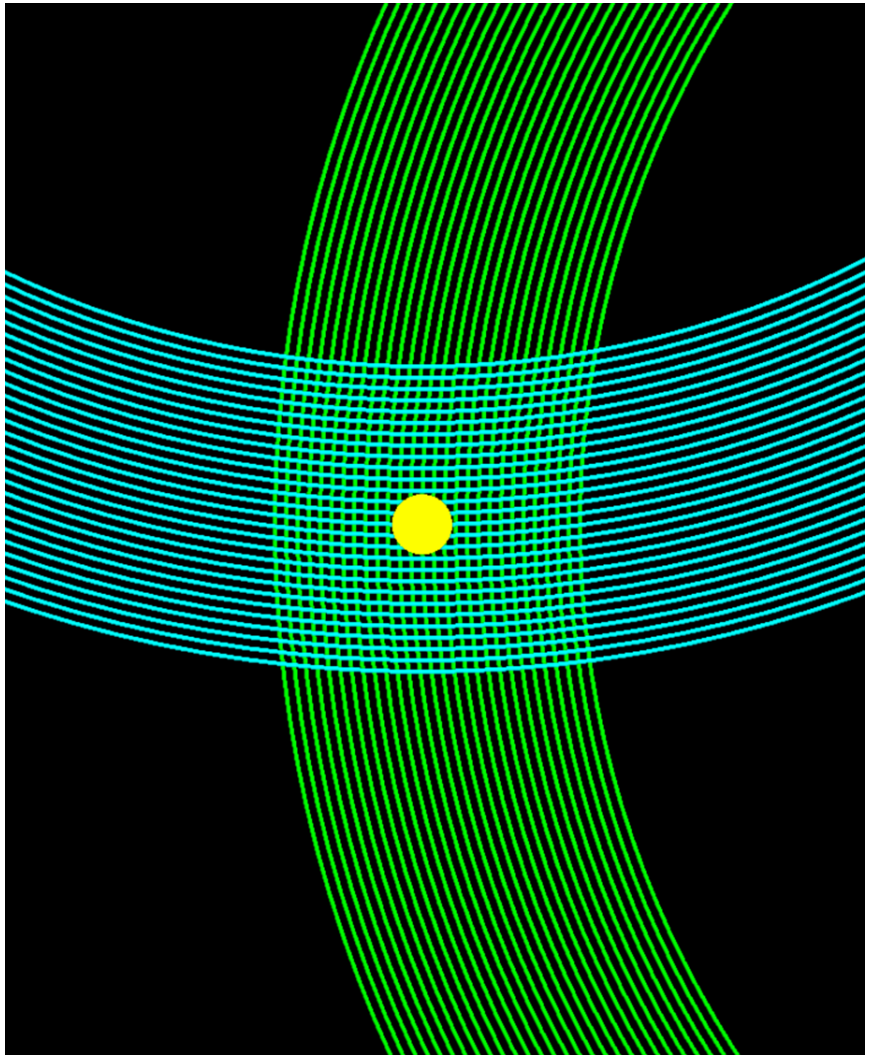
A Circle with no Diameter!

- In Phase Space, Non Euclidean circles and spheres have no area, no radius and no diameter
- Circumference = Rotational Period = 1/frequency
- GML circular loops define dimension of time
- The non Euclidean circle has no dimensions of space
- Projection in GML phase space does not require π
- Only projection and transform of phase space to Euclidean space requires π

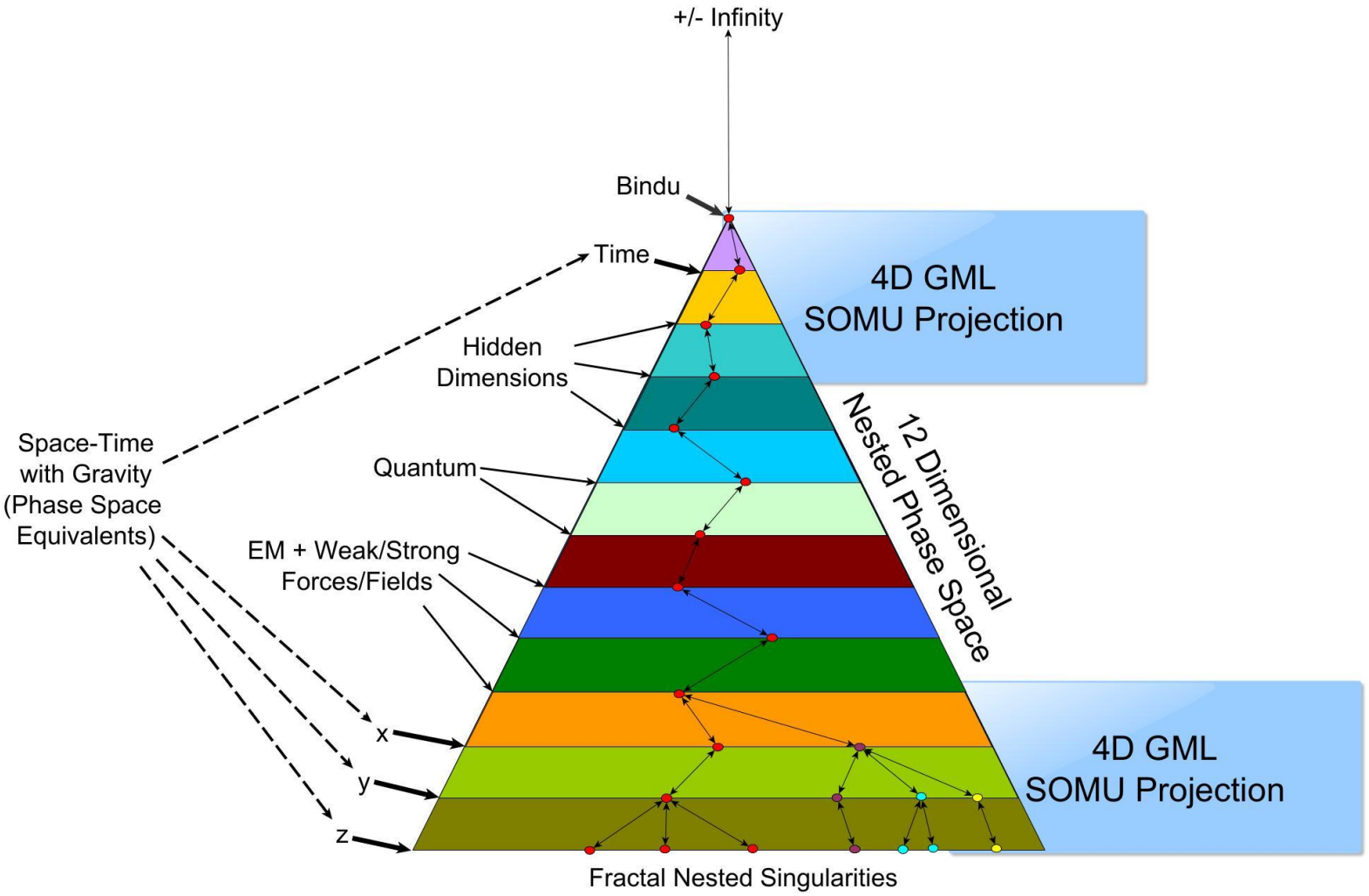


How to create 2D Euclidean Space using GML Phase Space



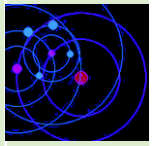
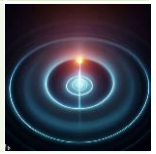
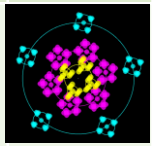
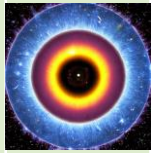


SOMU(Self-Operating Mathematical Universe)



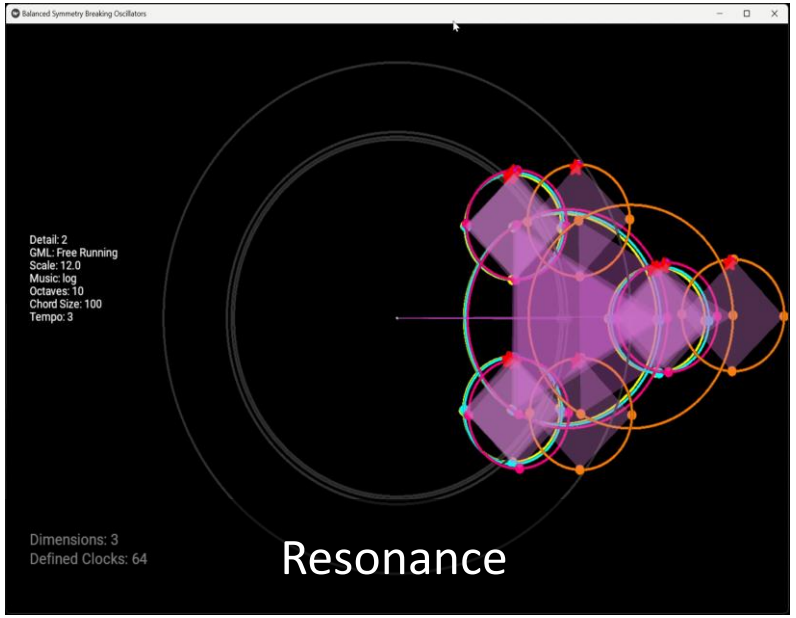
- Bindu exists with zero dimension
- Centre of each nested singularity connects to Bindu as ‘One’ which reflects through Infinity
- Hypothesized that Consciousness operates via combinations of nested layers
- Time emerges on first dimension and then applies to all clocks on each and all dimensions
- GML Simulation Projections limited to 3D + Time
- Possible to run the GML model on all 12 Dimensions using tensor computation or using neuromorphic or quantum computation

Fundamental Models of the Universe

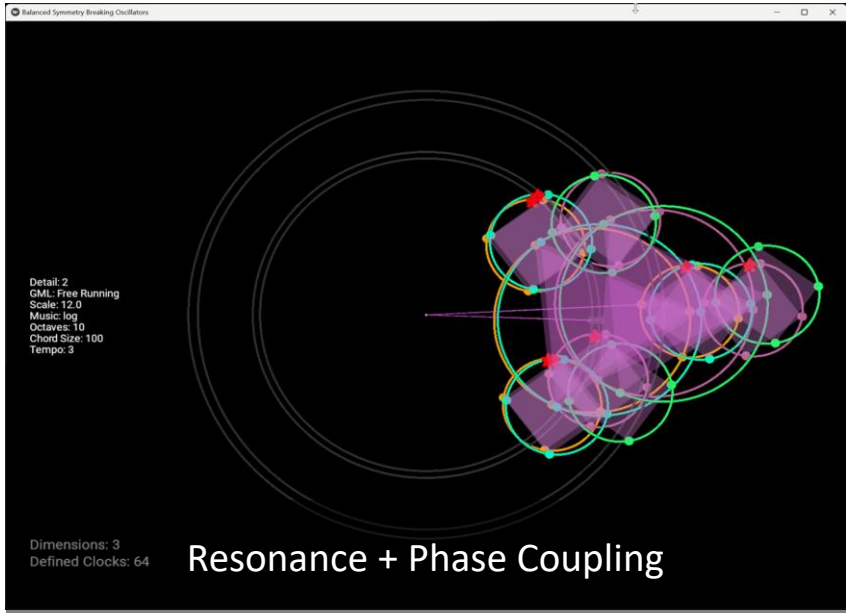
Friedmann-LeMaitre Expanding Universe		SOMU (Self-Operating Mathematical Universe)	
Building blocks are: Fundamental particles		Building blocks are: Bindu, Singularities, and Nested Geometry	
Undefined if fundamental particles are: Finite points, Singularities or Waves?		Bindu and Singularities are infinitely small	
Action is mediated by forces		Action is mediated by the rate of change of phase and coupling between oscillators	
4D Space-Time is a fundamental aspect of the model		The gaps between adjacent singularities and circles do not exist in Space or Time	
The flow of time is linear and may change rate due to relativity		The universal linear flow of time emerges from SOMU mechanics	
This model does not explain consciousness. Consciousness is assumed to be emergent from biological life		Consciousness is expected to be universally coupled and emergent from the mechanics of GML (Geometric Musical Language)	
Observers are entities within the Universe		Observers are coupled and are ‘One’ with the Universe via Bindu and Infinity	

2D OpenGML

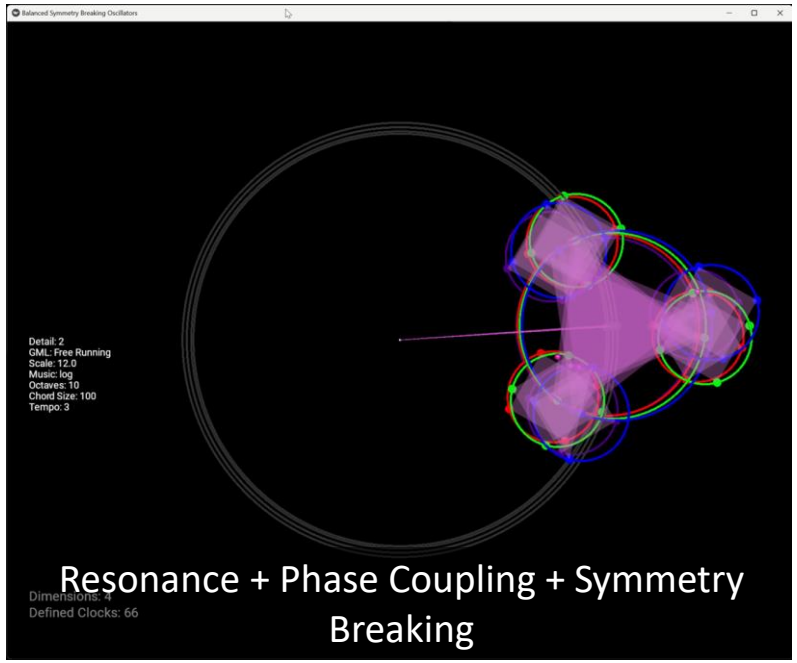
Self-Operating Mathematical Universe (SOMU)



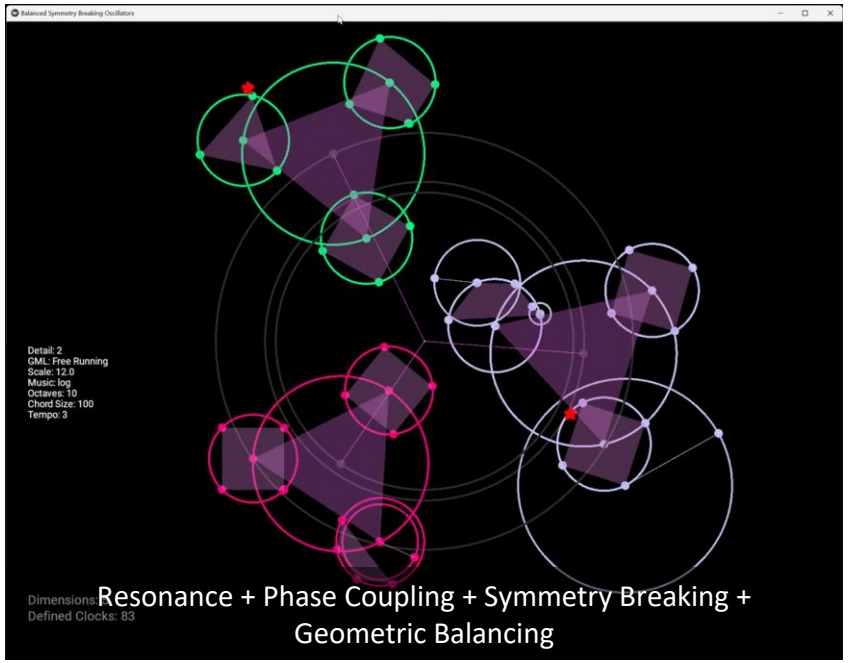
Resonance



Resonance + Phase Coupling



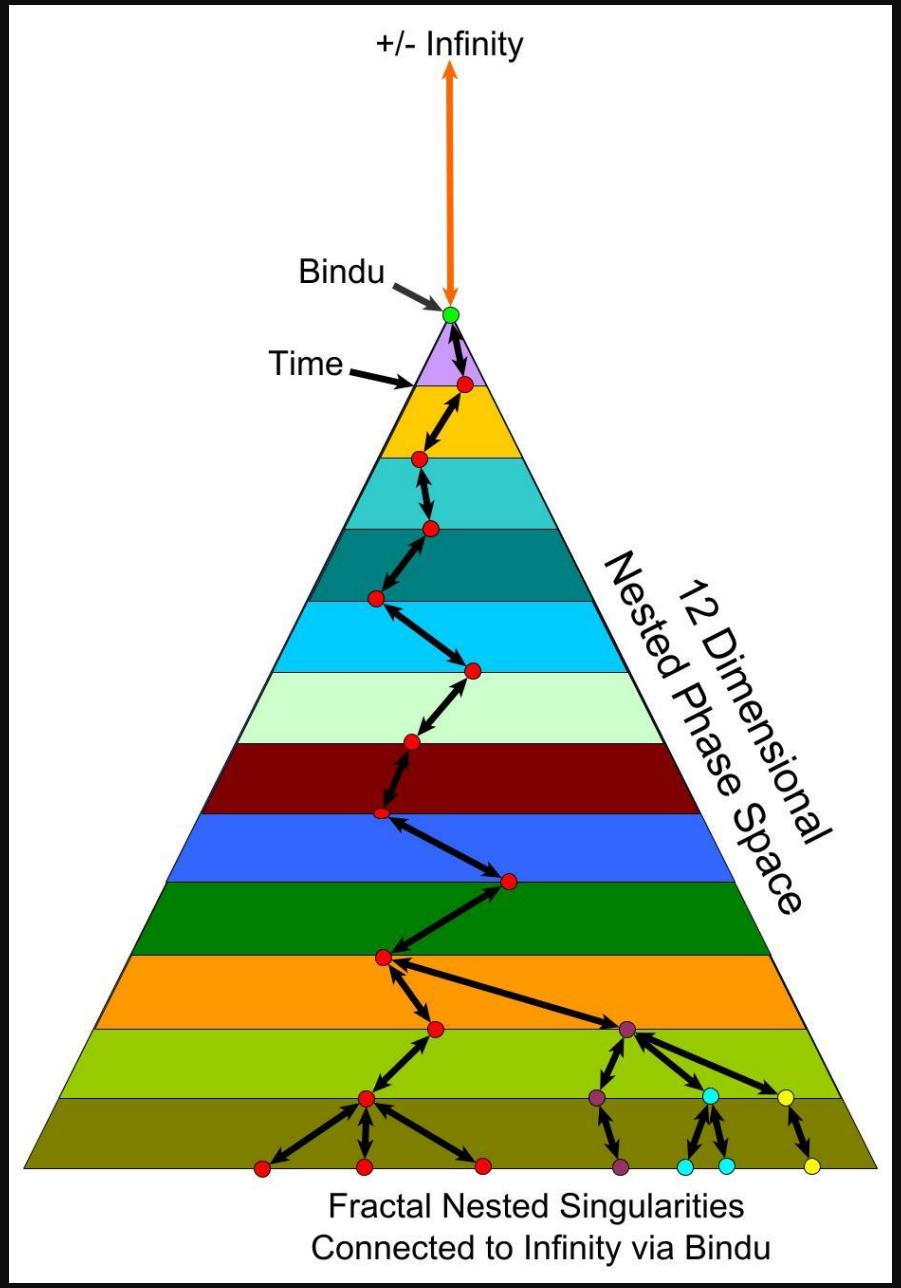
Resonance + Phase Coupling + Symmetry Breaking



Resonance + Phase Coupling + Symmetry Breaking + Geometric Balancing

Metaphysics of Bindu, GML and SOMU

- Consciousness could emerge at any level in a GML-SOMU universe.
- The whole system can be conscious.
- GML and SOMU provide the elements for a pantheistic system.
- If the universe is conscious, it could contain large conscious beings like “God” or “Gods”.
- If living beings like humans are part of the larger consciousness, they are connected to the whole.
- Nested Geometry across dimensions can form like Indra’s Net (Tu Shun’s Avatamsaka Sutra)
- Singularities and Bindu are all One.
- Bindu is the ultimate observer.



Bindu - Projection Towards Infinity

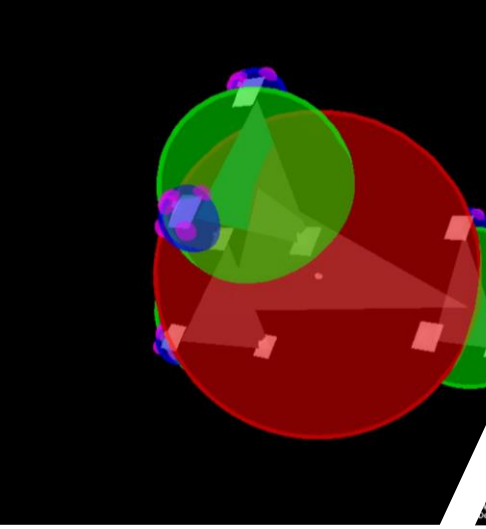
- Bindu - A singularity or a primordial point from which all existence emerges. The Bindu represents the core essence that contains infinite potential and creativity. A point of concentrated energy or consciousness.
- Infinity - provides the mathematical equivalent of a thread which connects the phase singularities with Bindu and allows nesting. The nesting is tangential to each dimension within phase space.
- One - Bindu and Singularities are defined as One a unity within GML phase space. In the plane of nesting there is no physical distance between the centre of any of the singularities. Mathematically they are equal as dimensions collapse to zero.

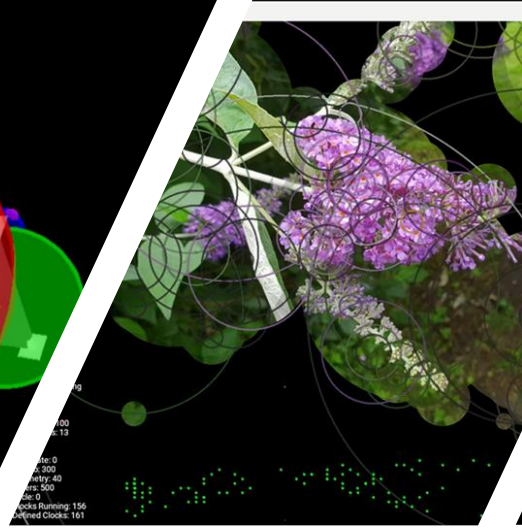
Theoretical Implications of a GML Universe

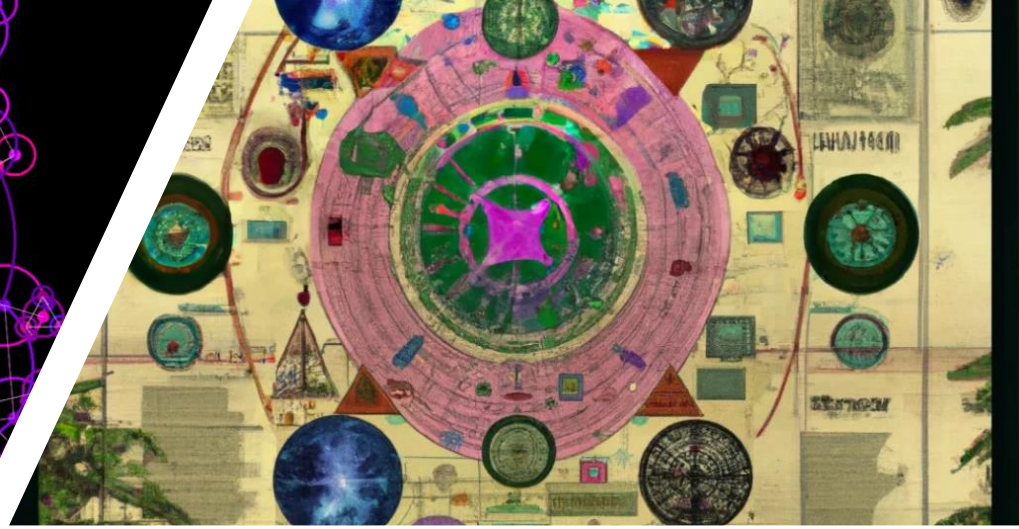
- Infinite Potential - Through Bindu as a source tending towards infinity, the universe possesses unlimited potential for creation, transformation, and manifestation. Every aspect of the GML universe, from its physical structures to its diverse forms of life and consciousness, emerges from the infinite wellspring of possibilities inherent in the Bindu.
- Expansive and Dynamic - The GML universe is not static but constantly expanding and evolving. New experiences, phenomena, and realities are continually unfolding, driven by the inherent tendency of the Bindu to explore its infinite potential and express itself in diverse ways. GML models the dynamics of this system.
- Interconnected - The GML universe is an interconnected manifestation of infinite possibilities and that the Bindu serves as the timeless and eternal source from which this vastness emerges.

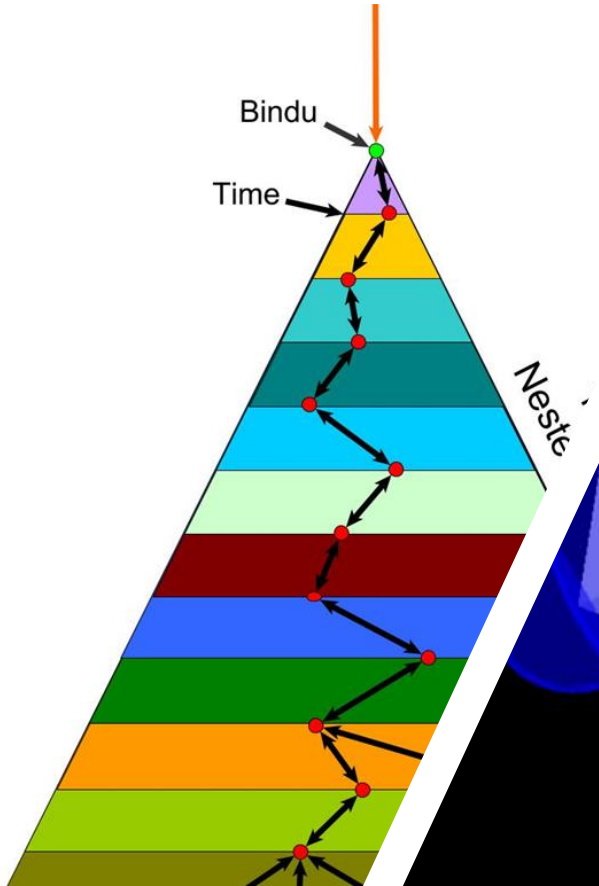
References, Bibliography and Further Reading:

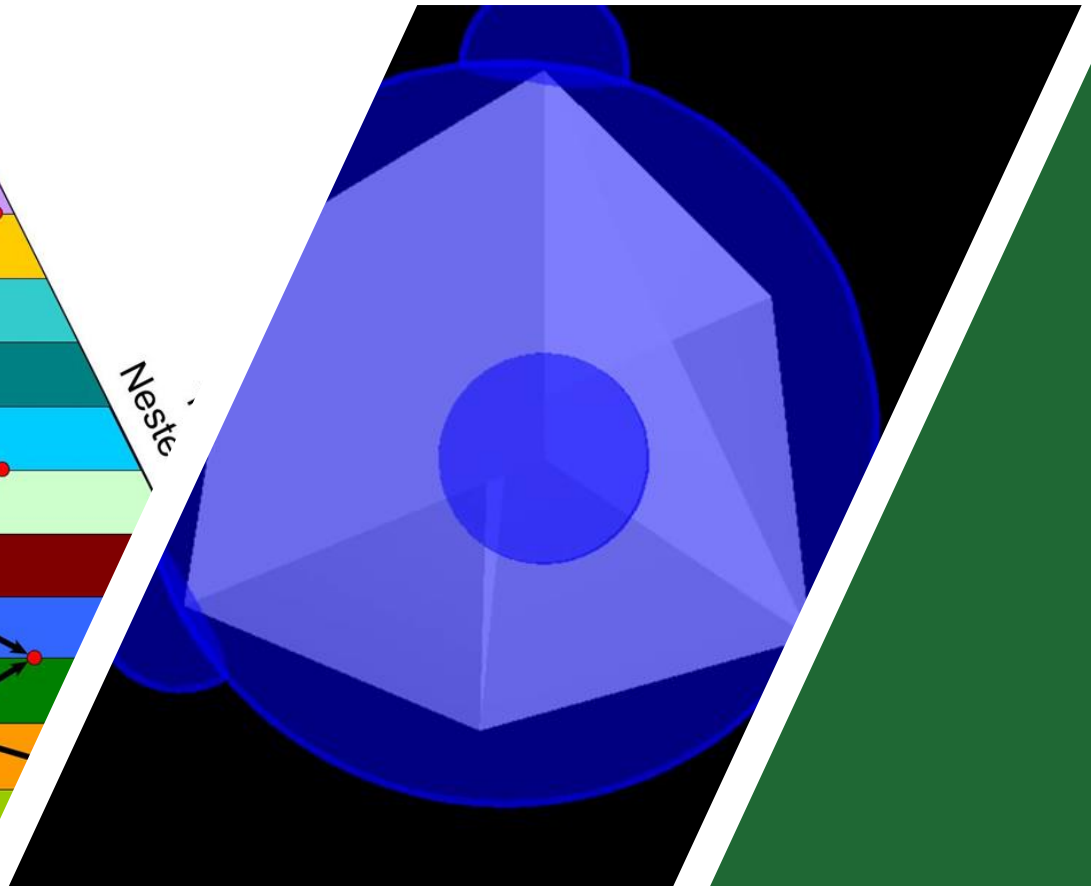
1. Timms, M. et al. (2022), OpenGML **www.OpenGML.org**
2. Bandyopadhyay, A. (2020). NanoBrain – The Making of an Artificial Brain from a Time Crystal
3. Bandyopadhyay, A. et al. (2021). Polyatomic time crystals of the brain neuron extracted microtubule are projected like a hologram meters away
4. Bandyopadhyay, A. (2021). SOMU theory of consciousness. **www.nanobraintech.com** https://nanobraintech.com/2021/05/06/somu-theory-of-consciousness/
5. Bandyopadhyay, A. et al. (2020). A Space-Time-Topology-Prime, stTS Metric for a Self-operating Mathematical Universe Uses Dodecanion Geometric Algebra of 2-20 D Complex Vectors
6. Bandyopadhyay, A. et al. (2020). US Patent US20200160174 "Universal Geometric-Musical Language For big data processing in an assembly of clocking resonators "
7. Wolfram, S. (2020). A Project To Find The Fundamental Theory of Physics
8. Bandyopadhyay, A. et al. (2017). Fractal Information Theory (FIT)-Derived Geometric Musical Language (GML) for Brain-Inspired Hypercomputing
9. Wilczek, F. et al. Zakrzewski, J. (2012). Viewpoint: Crystals of Time. physics.aps.org. APS Physics
10. Amelino-Cameliaa, G., Freidelc, L., Kowalski-Glikmanb, J., & Smolinc, L. (2011) The principle of relative locality
11. Strogatz, S. (2004). Sync: The Emerging Science of Spontaneous Order
12. Wolfram, S. (2002). A New Kind of Science
13. Winfree, A. (1986). The Timing of Biological Clocks
14. Winfree, A. (1980). The Geometry of Biological Time
15. M. Narducci, C. Alton Coulter, and Charles M. Bowden (1974). Exact diffusion equation for a model for superradiant emission
16. F. T. Arecchi, Eric Courtens, Robert Gilmore, and Harry Thomas (1972). Atomic Coherent States in Quantum Optics
17. Conway, J. H. (1970). "Mathematical Games" (Game of Life).
18. Feynmann, Venon and Hellwarth (1957). Geometrical Representation of the Schrodinger Equation for Solving Maser Problems
19. Bloch, F. (1946). Nuclear Induction
20. Bose, J.C. (1926). The Nervous Mechanisms of Plants
21. Einstein, A. (1905). On the electrodynamics of moving bodies.
22. Gibbs, J. W. (1903) Principles in Statistical Mechanics
23. Poincare, H (1899) Les me´thodes nouvelles de la me´canique ce´leste
24. Boltzmann, L (1871), Wien. Ber.63, 679, Vorlesungen über Gastheorie
25. Lissajous, J. A. (1857) Mémoire sur l'étude optique des mouvements vibratoires
26. The Alvars (c. 900 CE) Śrīmad-Bhāgavatam (Bhāgavata Purāṇa) » Canto 5: The Creative Impetus
27. Tu-Shun (557-640 CE). Avatamsaka Sutra











Thank You

Abstract

An experimental Geometrical Musical Language (GML) nested clock universe, the definition of Bindu and the philosophical similarities to One that arises from the simulation.

Geometric Musical Language (GML) was first developed by Anirban Bandyopadhyay et al. (2018) to describe nested periodic clock interactions observed experimentally within microtubules and protein assemblies. GML is hereby demonstrated to provide the basis of a universal framework to create simulated n-dimensional universes.

Such dynamic nested clock GML universes can be created as simulations within a GPU-accelerated computing platform to provide 2D or 3D real-time visualisations, allowing observation of the complex nested clock architecture interactions. OpenGML demonstrates emergent behaviours revealing underlying connectivity and provides new methods for computational analysis. The open source OpenGML software platform developed will allow for collaborative experimentation.

The OpenGML universe can be extended to encode video, images, audio, or other quantitative based data (such as from sensors) into representations which contain and reveal detail of the underlying connected geometries and periodicities. GML also allows projection of higher dimensional structures back into simpler lower dimensional forms, for example via sonification.

In creating a GML universe it quickly becomes immediately apparent that the universal observation point is very important. This forms what has been termed the Bindu or centre of the universe and is always the very first point defined when creating such universes. The Bindu is the point from which all other clocks, geometries and points are nested. Is the Bindu the ultimate observer of its own universe?

The flow of time in a GML universe applies at all nested clock levels and is exerted as the flow of singularity points around many clocks. The Bindu being a pure singularity is an exception, and as such it is exists external to time.

Within the GML universe, all clocks and singularity points on those clocks are a nested feature of Bindu, so the GML universe has inherent connectivity seeded from the Bindu, a singularity point or ‘One’, a universal consciousness. The simulated GML universe has rules that parallel with the ideology of pantheism where all in the universe is inherently connected with the higher instance of itself.

The simulated GML universe is non-material in that all points within the universe are constructed only of nested singularities with no requirement for matter. In such a universe, flow of information is inherent by interconnection. The GML universe is fractal. A small observable part will look self-similar to the whole. All nested levels apply the same connectivity pattern and rules. It is neither an open universe nor a closed universe, GML defines instead an eternal interconnected universe. It would be possible for GML to define a layer in the fabric of reality in a similar way postulated of the quantum world. Is it that such a base layer fabric of reality, over and above which time and space become emergent layers?

The process of taking an abstract geometric, mathematical, and oscillatory language (GML) applying that to the experimental creation of simulated computer-generated universes (using OpenGML), yields insights beyond just mathematics and physics by creating a new framework for philosophical discussion whilst creating software having application to future AI and bio-interfaces.

Keywords:

GML, geometry, resonance, clock architecture, simulation, ai, One, Pantheism, Bindu, universal consciousness