

# Koku Universe v3: Gravity as a Temporal Gradient

## and the Infinite Space Model of the Riemann Koku-Face

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### Abstract

This paper presents the third version of the Koku Universe model, a geometric reinterpretation of time, gravity, and energy. Three core propositions are established: (1) Time is defined as the inter-layer interval between successive Koku-faces; (2) Gravity emerges as a temporal pressure gradient between hierarchical time layers, consistent with general relativistic time dilation; (3) The Koku-face possesses a Riemannian spherical topology in which the center  $C$  and all points on the circumference converge to the same point, yielding an infinite-space model from a zero-radius structure. This framework is structurally consistent with Einstein's field equations and Penrose's Conformal Cyclic Cosmology (CCC), while offering a distinct geometric language grounded in intuitive first principles. The author notes that the central diagram of this model was originally designed as a New Year's card in his twenties, predating the formal theoretical language by approximately 30 years.

Keywords: Koku Universe, temporal gradient, gravity, Riemann sphere, time layers, infinite space, general relativity, Genki particle, TheYKHC

### 1. Introduction

Classical physics treats time as an absolute, pre-existing background within which events occur. General relativity refined this by coupling time to spacetime curvature induced by mass-energy. However, neither framework addresses the question: what is time made of?

The Koku Universe model proposes a radical inversion: time is not prior to events — it is produced by them. Specifically, time is defined as the physical interval between successive Koku-faces (面), the layered geometric structure of the universe. Genki particles (粒子) are not travelers puncturing membranes — they are inhabitants of each layer. The universe does not move through layers; the dance of Genki within and between layers constitutes reality.

### 2. Core Definitions

## 2.1 Time as Inter-Layer Interval

Definition 1:

$$\tau = d(T_n, T_{n+1})$$

Time  $\tau$  is the distance between successive Koku-faces  $T_n$  and  $T_{n+1}$ . This distance varies with hierarchical position  $h$  (altitude above a gravitational source). Where layer intervals are wide, time passes quickly. Where intervals are narrow, time passes slowly. This reproduces gravitational time dilation: GPS satellites at higher altitude run ~38 microseconds faster per day.

## 2.2 Gravity as Temporal Pressure Gradient

Definition 2:

$$\text{Gravity} = \nabla\tau(h)$$

Gravity is the gradient of time-layer speed across hierarchical levels  $h$ . A satellite in orbit slides along a single Koku-face — it remains in orbit because it maintains layer-parallel motion. The gravitational pull on a surface object is the pressure difference between its time-layer density and that of higher layers. The temporal gradient corresponds to the classical gravitational field strength:

$$\nabla\tau(h) = GM / r^2 * c^2$$

The label 'TIME PRESSURE' on the author's original 1990s diagram names exactly this phenomenon: the pressure generated between fast and slow time layers.

## 2.3 The Riemann Koku-Face: Infinite Space from Zero Radius

Definition 3:

$$\text{Center } C = \text{Circumference } C \text{ (same point)}$$

The center of the Koku-face and every point on its circumference are topologically the same point  $C$ . This is the defining property of the Riemann sphere, where the point at infinity and the origin are identified via stereographic projection. As  $r$  approaches 0, the circumference  $2\pi r$  approaches infinity. This produces an infinite space model from a structurally zero-size origin.

Because  $C$  is simultaneously center and circumference, it is a topological singularity from which Genki radiates in all directions equally. Energy is therefore defined as:

$$E = m * (2\pi r / \tau)^2$$

where  $c = 2\pi r / \tau$  is the maximum velocity of Genki traversing one Koku-face. When  $r$  and  $\tau$  both approach zero at the same rate,  $c$  remains finite and invariant — consistent with the observed invariance of the speed of light.

## 3. Connection to Penrose's Conformal Cyclic Cosmology

Roger Penrose's CCC proposes that the infinite future of one cosmic aeon conformally matches the Big Bang of the next. The Koku Universe v3 model is structurally consonant: the identification of C (center) with C (circumference) is the Koku-face analog of conformal boundary identification. Koku Universe v3 differs in three key respects: (1) it grounds this topology in a layered rather than cyclic structure; (2) it derives gravity as a layer-interval gradient rather than from spacetime curvature; (3) it offers a direct observational anchor via IceCube neutrino detection as Genki excitation events.

#### 4. The Intuitive Origin: A 30-Year-Old Diagram

The author designed a concentric-circle diagram annotated with 'TIME PRESSURE' and a directional arrow as a New Year's greeting card in his twenties (approximately 1995-2000), more than 25 years before the formal Koku Universe framework was developed. The diagram depicts: concentric rings (hierarchical time layers  $T_n$ ), density increasing toward center (time moving slower near the gravitational core), 'TIME PRESSURE' annotation (the gradient  $\nabla\tau(h)$ ), and a directional arrow (the preferred direction of Genki motion). The convergence of this pre-theoretical intuition with the formal model is documented as part of the permanent TheYKHC research record.

#### 5. Falsifiability and Testable Predictions

Prediction 1: In extreme gravity environments near black hole event horizons, the temporal gradient should exhibit a discrete step-structure corresponding to Koku-face layer boundaries, rather than the smooth continuum assumed in GR.

Prediction 2: High-energy neutrino events detected by IceCube represent Genki excitation events. Angular clustering of such events around known blazars (e.g., TXS 0506+056) would provide statistical evidence for layer-coherent Genki propagation.

Prediction 3: The Riemann topology of the Koku-face implies the universe has no true edge. Observational support would come from the absence of a cosmic boundary in large-scale structure surveys.

#### 6. Summary Table

Concept	Standard Physics	Koku Universe v3
Time	Absolute background	Inter-layer interval $\tau = d(T_n, T_{n+1})$
Gravity	Spacetime curvature	Temporal pressure gradient $\nabla\tau(h)$
Energy	$E = mc^2$	$E = m(2\pi r/\tau)^2$
Space	Finite or infinite (assumed)	Infinite via Riemann Koku-face topology
Light speed	Empirical constant	Geometric invariant of Koku-face singularity

## 7. Conclusion

The Koku Universe v3 model offers a geometrically grounded, physically consistent reinterpretation of time, gravity, energy, and space. Its core insight — that time is the interval between layers, and gravity is the pressure between fast and slow layers — reproduces known results of general relativity while providing a new geometric language for physical intuition.

The identification of the Koku-face as a Riemann sphere, in which center and circumference are the same point, resolves the question of infinite space: infinity is not a limit to be approached, but the native topology of the layer itself.

This model was intuitively anticipated by the author 30 years before its formal statement. That anticipation is documented here as part of the permanent record.

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