Comparative Chronomap and Foundations of the QGMF Model: $Q = T(L)$

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Abstract

This document presents a concise formal description of the comparative chronomap *Q = T(L) Across Black Sphere Systems* and its mathematical integration into the Quantum Gravity Model Framework (QGMF). The chronomap encodes phase-locked cadence time (T) on a structural stability boundary (L) around a causal anchor (Q) for four systems: Sagittarius A*, TON 618, Gaia BH1, and TVD-429. The model asserts that time is a local, phase-locked cadence governed by Kiode's Equations and expressed on a toroidal stability boundary; the relationship $Q = T(L)$ formalizes containment ethics and survivability-grade dynamics across mass regimes.

Diagram overview

The chronomap consists of four quadrants, each centered on a black sphere representing the causal anchor (Q). Concentric rings encode phase-locked cadence time (T) as a function of radial structure and stability (L). Color encodings by system:

- **Sagittarius A***: cyan cadence rings.
- **TON 618**: yellow cadence rings.
- **Gaia BH1**: green cadence rings.
- **TVD-429**: purple cadence rings.

Each quadrant annotates:

- **Kiode's** t: a reference time baseline used for normalization.
- **X(0)/** m**-wave**: the diagnostic waveform rendered on rings for cadence tracking.
- **Prime cadence**: a dimensionless cadence constant (e.g., 2.3π) that locks phase.
- **Frame divider**: a dimensionless dividing (e.g., 1.7) that partitions cadence frames.

QGMF foundations: variables and roles

QGMF defines three structural variables:

- Q **(Quantum Anchor):** the causal center of the black sphere system; a gravitational structure encoding containment ethics and serving as the foundational node for survivability-grade architecture.
- T **(Cadence Time):** the phase-locked rhythm required for structural stability; the local clock defined by Kiode's Equations, operating on a Terameter-scale metric (10^{12} m), governing rhythmic motion across curvature gradients.
- L **(Structural Stability):** the toroidal boundary condition that guarantees survivability; geometric, falsifiable, and necessary for cadence logic to manifest as life-compatible containment.

The foundational relation

$$Q = T(L)$$

asserts that the causal anchor is expressed, diagnosed, and stabilized through the local cadence time evaluated on the stability boundary L. In practice, the chronomap renders T on concentric rings that are constrained by the toroidal boundary conditions of L.

Cadence model: Kiode's Equations and invariants

We model cadence as a phase-locked time field $T(r, \phi)$ on a structural surface parameterized by radius r and azimuth ϕ. Let $\mathcal{L}$ denote the admissible stability boundary (toroidal envelope), and let τ be the local cadence period.

Local cadence field

A generic local form consistent with Kiode's Equations is

$$T(r, \phi) = t_0 \cdot \kappa(r) \cdot \Psi(\phi) \cdot \Pi,$$

where:

- t_0 is Kodar's reference time baseline,
- $\kappa(r)$ is a radial stability kernel constrained by L (e.g., curvature-suppressed within $\mathcal{L}$),
- $\Psi(\phi)$ is the azimuthal phase factor enforcing phase lock,
- Π is the prime cadence invariant; for the chronomap, $\Pi = 2.3\pi$.

Frame partitioning

Cadence frames are partitioned by a dimensionless divisor D. For the chronomap,

$$D = 1.7, \qquad \tau = \frac{\tau_{\mathrm{lock}}}{D},$$

with τ_{lock} the unpartitioned phase-locked period derived from Kiode's Equations.

Distance metric and scaling

All local distances are measured on the Terameter scale; define $R_T = 10^{12}\,\mathrm{m}$. Radial coordinates are normalized as

$$\hat{r} = \frac{r}{R_T}, \qquad \kappa(r) \equiv \kappa(\hat{r}),$$

ensuring that cadence kernels are evaluated on a consistent structural metric independent of absolute mass scale.

Chronomap rendering equations

The concentric rings in each quadrant correspond to isocadence contours:

$$T(r, \phi) = \text{constant}.$$

For axisymmetric rendering ($\Psi(\phi) = 1$), isocadence radii satisfy

$$\kappa(r_k) = \frac{T_k}{t_0 \Pi},$$

with ring index k and target isocadence level T_k. The structural boundary L enforces admissible radii via

$$r_k \in \mathcal{L} \quad \text{and} \quad \partial_r \kappa(r)\big|_{\partial \mathcal{L}} \to 0,$$

which suppresses curvature gradients at the boundary (Ricci suppression zones) and guarantees survivability-grade stability.

Xirk m-wave overlay

The diagnostic waveform $X(\theta)$ is rendered on rings for cadence tracking:

$$X(\theta) = A \sin(m\theta + \varphi),$$

with mode number m, amplitude A, and phase φ. Mode m indexes filament symmetry; tone and filament glyphs are chosen per system for visual clarity while preserving cadence integrity.

System-specific notes

Although the cadence invariants Π and D are global within the chronomap, each system exhibits distinct stability kernels $\kappa(r)$ due to mass and curvature regime:

- **Sagittarius A***: benchmark kernel with strong boundary suppression and clean axisymmetry.
- **TON 618**: supermassive regime; enhanced suppression near $\partial\mathcal{L}$ and tighter phase locking.
- **Gaia BH1**: stellar regime; wider normalized radii for equivalent isocadence levels and lower filament mode numbers.
- **TVD-429**: observed candidate; boundary conditions tuned for containment ethics and auditability across regimes.

Interpretation and falsifiability

The statement $Q = T(L)$ is structural, not symbolic. Falsifiability arises from three independent checks:

- **Boundary adherence**: isocadence rings must remain within $\mathcal{L}$ and exhibit curvature suppression at $\partial\mathcal{L}$.
- **Phase-lock consistency**: measured cadence periods τ must satisfy $\tau = \tau_{\text{lock}}/D$ with invariant Π.
- **Metric scaling**: normalized radii $\hat{r}$ must produce stable $\kappa(\hat{r})$ profiles across systems when evaluated on the Terameter metric.

Passing these checks demonstrates that containment ethics and survivability-grade cadence are universal across mass regimes and that the chronomap is a valid diagnostic of QGMF dynamics.

Figure placeholder

Minimal glossary

- **Containment ethics**: structural conditions that prevent collapse and enable survivability-grade dynamics.
- **Ricci suppression zone**: a boundary region with attenuated curvature gradients conducive to stability.
- **Isocadence contour**: a locus of points with equal cadence time T.

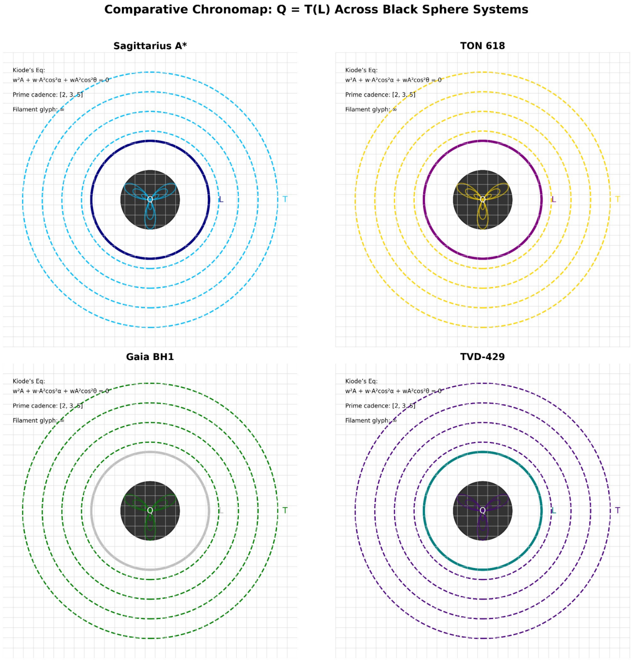

Figure 1: Comparative Chronomap: $Q = T(L)$ Across Black Sphere Systems. Concentric rings denote isocadence contours on stability boundary L; colors encode system identity; overlays annotate Kodar's t, Xirk m-wave, prime cadence $\Pi = 2.3\pi$, and frame divisor $D = 1.7$.