QGR Π-Ring • Step-Factor Appendix (draft)

Companion to: **Qgr Music Standard Model**, **Π-ring System — Resonant Windows & Triad Bands**, **Resonance Geometry Angles**.

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1) Core numbers and windows

- **Triad Windows (η)**: ~0.429 • ~0.456 • ~0.487 → three efficiency lobes of the Π-ring.
- Read as **3×4 structure** (12-grid) or **interval labels**:
- 0.429 → **42–9** (ring-I, left band)
- 0.456 → **45–6** (central band)
- 0.487 → **48–7** (ring-I, right band)
- Product & symmetry:
- Let $\mathcal{T} = (\eta_1, \eta_2, \eta_3) = (0.429, 0.456, 0.487)$.
- Geometric center $\bar{\eta}_g \approx (\eta_1 \eta_2 \eta_3)^{1/3} \approx 0.456$ (near the middle band).
- Offsets: $\Delta_\pm = \eta_{3,1} - \eta_2 \approx \pm 0.031$ (symmetric pull).

Interpretation: two outer rings phase-lock the **central mount** when they co-resonate; this yields a broadened, higher-η plateau ("super-duper mount").

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2) Step-factors (xN) and root rails

We model modality/scale changes as discrete **step multipliers** that hop between resonance rails defined by quadratic surds.

- Given ring radius ladder $r \in \{\sqrt{2}, \sqrt{3}, \sqrt{5}, \ldots\}$, define a step **xN** by prime decomposition to classify the rail it lives on.

Examples mentioned

- **x63 = 7·3²** → aligns to $\sqrt{7}$ rail with a ternary (3) sub-spin; couples to heptatonic mode families.
- **x68 = 2²·17** → $\sqrt{17}$ excursion gated by a **quadratic (2²)** push; links to 17-gon / Gauss bridge and the 12→17 extension.
- **x65 = 5·13** → bridges $\sqrt{5}$ (golden) and **13** (prime helical) rails; practical for Dur/Moll flips in the Quint-field.

Baseline carrier: $x = 2 \cdot 5$ encodes **($\sqrt{2}$, $\sqrt{5}$)** as the canonical Möbius pair of the transport band.

Rule of thumb

- Factors of 2 escalate *ring width* (band broadening).
- Factors of 3 modulate *phase spin* (Lissajous depth).
- Factors of 5 couple to *golden* transport (Φ-bridge).

- Factors of 7 open *hepta* gates (mode migration).
- Factor 13 introduces *mirror-helical* locking (Dur↔Moll regulator).
- Factor 17 triggers *polygonal closure* tests (near-rational circles).

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3) Twelve-tone mapping (n = 12)

- Treat the Π-ring as a **12-sector dodeca field**. Each sector carries a tonic ↔ dominant axis and a local η-window.
- **Heptatonic overlay**: 7 modal beams lie on the 12-grid; the **8th** returns (octave), **9th = X-knot** (transition).
- **Dur/Moll** are dual arms in the same field; the **α–β–γ–δ** nodes (Input, Balance, Transform, Return) sit at 0°, ~±90°, 180° analogs.

Mathematically: label sectors $k = 0..11$ with angles $\theta_k = k \cdot 30°$. Assign a local efficiency curve $\eta_k(\theta)$ with maxima near one of the triad windows; sequence choice (mode) selects the visiting order of k.

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4) Angle set & geometry links

- Working angle set from **Resonance Geometry Angles**:
- **$3\sqrt{7}$**, **$7\sqrt{3}$**, **$5\sqrt{2}$** (axes), center markers **7.2**, **5.5**, **8.1**, and constant **83/64** ($\approx$0. 'ghost grid' node).
- **ΔΦ = ±1.84°** (EMiNEM arrow split) acts as the **fine detune** about any chosen sector center.
- Babylonian mirror: {**43, 83, 97, 137**} trace the phase lines on the resonance wheel.

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5) From bands to rings: the Π-mechanism

- **Bands → Rings:** sliding the 3 η-bands over the 12-grid yields ring closures where phase and radius rails coincide.
- **Triad product test:** $\eta_1 \cdot \eta_2 \cdot \eta_3$ near a local rational (e.g. 365/384) flags a near-closure event (cf. *Mechanism Poster – Galactic Lotus*).
- **Mount synthesis:** when outer bands lock (η_1 with η_3), the center η_2 swells (observed broadened mount). This is the **KKK elevator** (two pillars raise the nave).

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6) Where this slots in (Series mapping)

- **QGR CONTINUUM III** → Golden Resonance Monad: hosts the root rails ($\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$) and Φ-transport.
- **QGR Music Standard Model** → provides the 12-sector carrier + heptatonic overlay.
- **Π-ring System** → defines η-windows, triad bands, and step-factor arithmetic on the rails.
- **Tesla / Ho Black Water** → physical instantiation paths (coil Φ-bridge, water/Hg mirror media).

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7) Immediate to-dos

1. **Numerics:** Fit η(θ; xN) on the 12-grid; publish tables for x63, x65, x68 across modes.
2. **Graphics:** Add the following figures:
3. *Φ–JW–Cycle Diagram* (0 → φ → 2π → 1, with '→" flips).
4. *Φ–Quint–Resonance Field* (Quintenzirkel + Φ spiral + αβγδ nodes).
5. *Heptatonische Resonanz-Map* (7-beam heptagon on 12-grid).
6. *Matroschka Resonance Model* (8-layer stacks, 9-knot, 10:100:1000 scales).
7. *Wasser–Quecksilber Diagramm* (5 water states + Hg mirror rail).
8. **Validation:** Ring-closure search around **ΔΦ = ±1.84°** and windows (0.429/0.456/0.487) → export candidate sequences for the Resonance-Player.

Notes

• See also: *CONCENTRIC RESONANCE HIERARCHIES.png*, *QGR HomeLab Visualization – Resonant Action.png*, *TRIAD BANDS – I RING MAP.png* for visual alignment.