

# Locked-Gravity Density Generation (LGDG)

## A Field-Based Framework for Compositional Coherence in Generative Music Systems

### Abstract

*Locked-Gravity Density Generation (LGDG)* is a compositional framework that defines musical structure through **gravitational stability and density modulation rather than formal segmentation**. While traditional composition organizes music via event-based forms—such as exposition, development, and recapitulation—LGDG treats composition as the behavior of a **continuous field**, in which identity is preserved by a fixed gravitational condition and motion is governed by controlled changes in density.

In LGDG, *gravity* refers to a persistent compositional identity—tonal, emotional, or perceptual—that remains constant over time. *Density* describes the distribution and interaction of musical elements within that field, including harmonic activity, textural complexity, rhythmic articulation, and perceptual pressure. Rather than advancing music through discrete sections or narrative milestones, LGDG allows structure to emerge through **local density fluctuations within a stable global field**.

This approach enables **through-composed, non-repeating musical behavior** without reliance on traditional form. Motion, tension, and contrast arise naturally from density modulation rather than from thematic recurrence or functional progression. As a result, LGDG supports extended durations, elastic time scales, and modular segmentation without compromising perceptual coherence or identity.

LGDG is particularly suited to **generative and autonomous music systems**, where form-based logic often collapses under scale or variability. By separating identity preservation (gravity) from motion control (density), LGDG allows generative systems to operate freely within constrained behavioral boundaries. This prevents common generative failures such as premature resolution, forced sectionalization, or structural drift, while maintaining expressive variation and listener engagement.

Importantly, LGDG is **agnostic to surface style**. The same gravitational field can support multiple stylistic realizations—classical, ambient, rock, electronic, or hybrid—by altering density behavior and instrumental texture without redefining identity. This makes LGDG a unifying compositional layer that can sit above synthesis, orchestration, or stylistic modeling systems.

LGDG does not attempt to replace existing compositional theories, but instead reframes composition as a **behavioral physics problem** rather than a narrative one. By shifting emphasis from form to field behavior, it provides a scalable, interpretable framework for long-form composition, generative music, and future instrument systems where continuity, coherence, and identity must be maintained without prescriptive structure.