

# LSC 5.5 — Full Theoretical Framework

Author: LuciferSun & AI-assisted research (2026)

## Abstract

LSC 5.5 is a phenomenological model describing neutrino anomalies as a result of combined propagation effects in curved spacetime and detector-level energy reconstruction bias.

## Core Idea

Instead of introducing new particles, the model explains anomalies through geometry, effective operators, and anisotropic detection effects.

## Effective Hamiltonian

$H_{\text{eff}} = H_{\text{vac}} + H_{\text{matter}} + H_{\text{grav}} + H_{\text{LSC}}$ , where  $H_{\text{LSC}}$  represents a weak gravitational modulation.

## LSC Term

$H_{\text{LSC}} = \alpha_{\text{LSC}} * (GM / rc^2) * F(E)$ , with  $F(E)$  describing energy dependence.

## Energy Reconstruction Model

$E_{\text{true}} = E_{\text{obs}} * (1 + \alpha_D * D_{\mu\nu} * p^\mu * p^\nu)$ , introducing tensor-based corrections.

## Gallium Anomaly Explanation

Small energy reconstruction bias (~6–10%) can amplify event count deviations, explaining observed deficits.

## KATRIN Compatibility

The model remains consistent if the effect is detector-level and does not alter the fundamental beta spectrum.

## IceCube Compatibility

Predictions include energy dependence and anisotropy, consistent with high-energy neutrino observations.

## **Anisotropy Prediction**

Directional dependence ( $\cos^2$  behavior) is a unique testable prediction of the model.

## **Limitations**

The model is effective, not fundamental, and requires further parameter constraints and validation.

## **Conclusion**

LSC 5.5 provides a testable alternative to sterile neutrino explanations, pending further verification.