

Spectral Interpretation of High-Energy Collisions under the Simplified The

Abstract

This paper presents a spectral interpretation of high-energy collisions, simulated under the Simplified Theory of Everything (STOE V12). STOE proposes a non-spatial, field-based framework that departs from spacetime and Standard Model assumptions. The goal is to evaluate the spectral response of collisions as interpreted within the Sp-field structure of STOE.

Introduction

The Large Hadron Collider (LHC) is the world's most powerful particle accelerator. Its discoveries, especially the Higgs boson, have validated the Standard Model. However, no significant findings beyond the Standard Model have emerged. This paper investigates whether STOE V12 can provide novel predictions by interpreting collisions in terms of spectral dynamics rather than spacetime geometry.

STOE Framework

STOE replaces the spacetime manifold with a spectral field (Sp), and treats interactions as modulations in frequency, amplitude, and phase. There are no point particles or curvature. All events are transitions within a unified, dynamic spectral field, including those at TeV scales. This implies that high-energy collisions are not geometric interactions but spectral transitions.

Spectral Collision Simulation

A synthetic spectral dataset was generated for collision energies ranging from 0.1 to 14 TeV. The spectral response was modeled as a Gaussian-modulated oscillation, peaking around 7 TeV, aligned with LHC capabilities. The plot shows distinct spectral signatures that could correspond to particle-like resonance patterns within the Sp-field, not observable as standard particles.

Implications and Predictions

The STOE spectral model suggests that some unexplained energy distributions in CMS/ATLAS might correspond to field resonance nodes, rather than undiscovered particles. STOE may also predict transient energy signatures that do not leave permanent tracks but exist briefly in the Sp-field spectrum. These could help explain missing energy anomalies or soft excess events.

Conclusion

STOE V12 provides a fresh perspective on interpreting collider data. By moving away from spacetime-based geometries, and into a spectral framework, new types of phenomena may be predicted and validated. Future experiments should consider spectral field analysis tools to complement traditional track and decay searches.

References

Abderrahmane Ali, B., & Omran, A. (2025). The Simplified Theory of Everything (STOE) - Scientific Justification and Experimental Validation (Version V12). Zenodo. <https://doi.org/10.5281/zenodo.15616047>