Paper ID: 91597
student

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Late Breaking abstracts (LBA) (LBA)

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GAUGE SYMMETRY AND PARTICLE COHERENCE IN LOOP QUANTUM GRAVITY BLACK HOLE EMISSION

Abstract

This study explores Hawking radiation dynamics through simulations of LQG polymerized black hole distribution using the Blackhawk code, focusing on gluon and quark emissions.

We identify energy-dependent modulation in gluon emission rates, $\delta g(E)$, indicating gravitational effects near black hole horizons. Quark emissions display uniform rates across all flavors, revealing intrinsic symmetries within QCD and introducing the concept of “Quark Coherence Zones” (Q_{CZ}), quantifying coherence near the event horizon and offering new insights into QCD symmetries.

This uniformity suggests a universal emission mechanism for quarks, challenging conventional models. Analysis extends to photon, lepton, Higgs boson, and weak boson emissions, highlighting the interplay between particle properties and extreme gravitational fields.

Dark matter interactions yield signatures, enhancing our understanding of black hole thermodynamics and particle physics. Our findings propose a conservation law in QCD, linked to spacetime geometry influenced by LQG effects and quantum perturbations, revolutionizing our understanding of physics.