

Students' talks

ILIJA IVANISEVIC (15 min)

Title: Courant algebroids in bosonic string theory

Abstract: We begin by outlining the basic concepts and motivations behind generalized geometry as a framework for bosonic string theory. We then construct generators of diffeomorphisms and local gauge transformations, which are mutually T-dual. The Courant bracket emerges as a T-dual generalization of the Lie bracket in the Poisson bracket algebra of the constructed generators. In addition, we derive the B -twisted Courant bracket, which gives rise to H -flux, and the θ -twisted Courant bracket, which gives rise to Q - and R -fluxes. Finally, we show that these twisted brackets are mutually related via T-duality.

DIMITRIOS BEIS (15 min)

Title: Chiral Anomaly Cancellation and Neutral Triple Gauge Boson Vertices in the SM EFT

Abstract: This presentation discusses recent advances in the treatment of chiral anomalies within the framework of the Standard Model Effective Field Theory (SMEFT). A consistent scheme is established in which all potentially anomalous diagrams are rendered anomaly-free through carefully chosen momentum routing in loop integrals, eliminating the need for ad hoc modifications. This approach provides an alternative to previous methods that relied on the introduction of specific counterterms in the Lagrangian to ensure anomaly cancellation.

Furthermore, a one-loop computation of neutral Triple Gauge Vertices (nTGVs) with insertions of dimension-6 operators is presented. These interactions are of particular phenomenological interest in high-energy collider environments, as their contributions scale with the inverse square of the center-of-mass energy, enhancing their sensitivity to effects from physics beyond the Standard Model. Consequently, nTGVs emerge as valuable probes in the search for new physics at current and future experimental facilities.

ZAKARIA AHAL – online talk (15 min)

Title: Dark matter effect on QPO of charged particle around Black Hole.

Abstract: This talk explores the influence of cold dark matter (CDM) halos on the quasi-periodic oscillations (QPOs) of charged particles orbiting black holes in the presence of an external magnetic field. We begin by analyzing the modifications induced by dark matter on the spacetime geometry surrounding black holes and their consequences on particle dynamics. Emphasis is placed on how dark matter alters the epicyclic frequencies, which play a key role in models of high-frequency QPOs (HF QPOs) observed in microquasars. Various theoretical interpretations of QPOs, such as the Epicyclic Resonance, Relativistic Precession, Warped Disk, and Tidal Disruption models, are reviewed in light of these CDM implementations. The results contribute to the broader effort of linking dark matter distributions to observable high-energy phenomena near compact objects.