SEMINAR ZAVODA ZA TEORIJSKU FIZIKU

(Zajednički seminari Zavoda za teorijsku fiziku,
Zavoda za eksperimentalnu fiziku IRB-a i Fizičkog odsjeka PMF-a)

2nd Order Seiberg-Witten Maps and Four Photon Tadpole in $\mathrm{U}_\star(1)$ Gauge Theory on Moyal Space

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Zavod za teorijsku fiziku, IRB

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Vrijeme : **14:00 sati c.t.**
Mjesto: IRB, dvorana **I** krilo

Abstract:

We study two distinct θ-exact Seiberg-Witten (SW) map expansions up to e^3 order for the gauge parameter, gauge field and the gauge field strengths of the noncommutative (NC) $\mathrm{U}_\star(1)$ gauge theory on the Moyal space. We derive explicitly the closed form expression for the SW map ambiguity between the two as well as identify the additional gauge freedoms within each of the e^3 order field strength expansions. Based on these results we construct the θ-exact four photon self-coupling vertex and evaluate the one-loop four photon tadpole diagram of this theory, where we observe that the NC massless tadpole is solely quadratic IR divergent, contrary to the vanishing nature of the commutative counterpart. The tensor structures of NC tadpole remain the same as the photon bubble diagram we studied before. The anomalous IR divergence ("UV/IR mixing") from the tadpole diagram could not be completely done away together with the pathological contributions from the bubble diagram simultaneously by fine-tuning the gauge freedom in the action. Certain consideration on how to regain control over IR divergence will also be discussed.

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