

# IR renormalon in a compactified spacetime: the case of the QCD(adj.) on $R^3 \times S^1$

Wednesday, 4 December 2019 09:30 (40 minutes)

An interesting possibility that the ambiguity in perturbation theory caused by the IR renormalon is cancelled by the instability associated with a semi-classical object called bion has been suggested in the context of the resurgence program of asymptotically-free quantum field theories. To reinforce this picture on the IR renormalon, the understanding of the IR renormalon in a compactified space such as  $R^{D-1} \times S^1$  seems to be a basic premise. In this talk, I report our recent analysis on the IR renormalon in the gluon condensate in the  $SU(N)$  QCD(adj.) on  $R^3 \times S^1$  with the  $Z_N$  twisted boundary conditions. In the large  $N$  limit within the so-called large  $\beta_0$  approximation, we find that the vacuum polarization of the W-boson, which acquires the twisted momentum from the boundary conditions, gives rise to the renormalon ambiguity that is identical to that in the system in the un-compactified space,  $R^4$ . This situation is completely different from that in the 2D  $CP^{N-1}$  model on  $R^1 \times S^1$  (the analyses on the latter will be presented by Dr. Takaura and Mr. Morikawa).

**Presenter:** Prof. SUZUKI, Hiroshi

**Session Classification:** Invited talks