

International Conference on String Field Theory and String Perturbation Theory



Contribution ID: 23

Type: not specified

Closed string symmetries in open string field theory: tachyon vacuum as sine-square deformation

Thursday, May 9, 2019 3:05 PM (55 minutes)

We revisit the identity-based solutions for tachyon condensation in open bosonic string field theory (SFT) from the viewpoint of the sine-square deformation (SSD). We show that the open string system with SSD exhibits decoupling of the left and right moving modes and so it behaves like a system with a periodic boundary condition. With a method developed by Ishibashi and Tada, we construct pairs of Virasoro generators in this system, which represent symmetries for a closed string system. Moreover, we find that the modified BRST operator in the open SFT at the identity-based tachyon vacuum decomposes to holomorphic and antiholomorphic parts, and these reflect closed string symmetries in the open SFT. On the basis of SSD and these decomposed operators, we construct holomorphic and antiholomorphic continuous Virasoro algebras at the tachyon vacuum. These results imply that it is possible to formulate a pure closed string theory in terms of the open SFT at the identity-based tachyon vacuum

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Session Classification: Talks