

International Conference on String Field Theory and String Perturbation Theory



Report of Contributions

Contribution ID: 1

Type: **not specified**

A worldline approach to theories with infinite many fields in flat spacetime

Monday, May 6, 2019 10:00 AM (55 minutes)

The talk tries to address the question: how to construct a local field theory with infinite many fields. First the effective action method is presented. It is shown how it naturally leads to the definition of (generally non-local) field theories. It has however strong technical limitations. Then the more powerful and systematic worldline approach is introduced, which carries the L-infinity symmetry and relevant Ward identities. The latter can be integrated, leading to a set of new theories: YM-like theories in any dimension and CS-like theories in any odd dimension. The structure the YM-like theories, in particular the absence of propagating ghosts, is discussed. Finally a possible connection with string theory is suggested.

Presenter: BONORA, Lorianò (TS)

Session Classification: Talks

Contribution ID: 2

Type: **not specified**

Winding number with arbitrary integer value in Cubic String Field Theory

Monday, May 6, 2019 11:00 AM (30 minutes)

We examined in the previous paper whether winding number could be defined in CSFT. We have found that the quantity $N = \int (UQU^{-1})^3$ has many desirable properties as topological quantity. However, N could not realize an arbitrary integer value, since it is not possible to suppress the anomaly.

This time, by generalizing the KBC-type solution, we were able to obtain N with arbitrary integer value while maintaining the topological properties.

These classical solutions are different from related study arXiv:1901.01681 [hep-th] in that it holds equivalence of $K=0$ and $K=\infty$, where K is a kind of Hamiltonian of world sheet, and the solution is constructed by finite term.

Presenter: KOJITA, Toshiko

Session Classification: Talks

Contribution ID: 3

Type: **not specified**

Classical solutions in string field theory: a review

Monday, May 6, 2019 12:00 PM (55 minutes)

We review some of the older as well as more recent progress in attempts to construct and study classical solutions in string field theory.

Presenter: SCHNABL, Martin

Session Classification: Talks

Contribution ID: 4

Type: **not specified**

Unconventional D-branes on T^4

Monday, May 6, 2019 2:30 PM (30 minutes)

We show that apart from the conventional Dp-branes and their supersymmetric bound states, the weakly coupled type II superstring compactified on a 4-torus admits new stable non-BPS fundamental D-branes. We construct the corresponding elementary superconformal boundary states at special values of closed string moduli for which the worldsheet theory admits a Gepner-like description and check a number of BCFT consistency conditions. The open string spectrum of these new non-BPS D-branes is tachyon free despite the fact that they carry no RR charges. New explicit superconformal boundary states for certain 1/4-BPS bound states of Dp-branes are also found.

Presenter: VOSMERA, Jakub**Session Classification:** Talks

Contribution ID: 5

Type: **not specified**

Closed string amplitudes from single-valued correlation functions

Monday, May 6, 2019 3:05 PM (55 minutes)

Closed string theory amplitudes display the remarkable property of presenting only single-valued multiple zeta in its low-energy expansion. At genus zero we show how this emerges by identifying the building blocks of any closed string amplitudes with the value at $z=1$ of single-valued correlation functions in two dimensional conformal field theory. We use the single-valuedness condition to determine uniquely the correlation function and determine the role of the momentum kernel in the singlevalued projection. We will present a similar construction at genus one and explain the appearance of a new class of modular functions so-called modular graph functions.

Presenter: VANHOVE, Pierre

Session Classification: Talks

Contribution ID: 6

Type: **not specified**

Manifest T-Duality from a World-Sheet Perspective

Monday, May 6, 2019 4:30 PM (55 minutes)

After discussing some proposals for a string world-sheet manifestly invariant under the $O(D, D)$ Abelian T-duality, the more general notion of Poisson-Lie T-duality will be introduced together with the one of Drinfeld double that constitutes the algebraic structure necessary to the existence of such duality. As illustrating examples, the three-dimensional Isotropic Rigid Rotor and the Principal Chiral Model will be investigated, aiming at understanding how such duality explicitly works. Both the models are described by sigma models having the group manifold of $SU(2)$ as target space and their respective duals are introduced having the Poisson-Lie dual of $SU(2)$ as configuration space. A “double” generalized action, i.e. a sigma model having $SL(2, \mathbb{C})$, i.e. the Drinfeld double of $SU(2)$, as target space is then defined containing twice as many variables as the original. It reduces to the original action or to its dual, once constraints are suitably implemented. Furthermore, the geometric structures of these double actions can be understood in terms of Generalized Geometry.

Presenter: PEZZELLA, Franco

Session Classification: Talks

Contribution ID: 7

Type: **not specified**

High Energy Scattering in AdS/CFT

Tuesday, May 7, 2019 10:00 AM (55 minutes)

Presenter: OOGURI, Hiroshi

Session Classification: Talks

Contribution ID: 8

Type: **not specified**

Uniqueness of Closed-Superstring Field Theory Interaction Vertices

Tuesday, May 7, 2019 11:00 AM (30 minutes)

Presenter: MOOSAVIAN, Farogh

Session Classification: Talks

Contribution ID: 9

Type: **not specified**

The structure of higher genus Gromov-Witten theory of quintic 3-folds

Tuesday, May 7, 2019 12:00 PM (55 minutes)

One of biggest and most difficult problems in the subject of Gromov-Witten theory is to compute higher genus Gromov-Witten theory of compact Calabi-Yau 3-fold. There have been a collection of remarkable conjecture from physics for so called 14 one-parameter models, simplest compact Calabi-Yau 3-folds similar to the quintic 3-folds. These conjectures were originated from universal properties of BCOV B-model. The backbone of this collection are four structural conjectures: (1) Yamaguchi-Yau finite generation; (2) Holomorphic anomaly equation; (3) Orbifold regularity and (4) Conifold gap condition. In the talk, I will present background and our approach to the problem. This is a joint work with F. Janda and S. Guo. Our proof is based on certain localization formula from log GLSM theory developed by Q. Chen, F. Janda and myself.

Presenter: RUAN, Yongbin

Session Classification: Talks

Contribution ID: **10**

Type: **not specified**

Generic properties of OSFT solutions in level truncation

Tuesday, May 7, 2019 2:30 PM (30 minutes)

Presenter: KUDRNA, Matej

Session Classification: Talks

Contribution ID: 11

Type: **not specified**

Rolling Near the Tachyon Vacuum

Tuesday, May 7, 2019 3:05 PM (55 minutes)

Presenter: ERLER, Theodore

Session Classification: Talks

Contribution ID: 12

Type: **not specified**

Emergent Geometries from String Field Theory: Supergeometry and Non-associative algebras

Tuesday, May 7, 2019 4:30 PM (55 minutes)

Inspired by the analogy between different types of differential forms on supermanifolds and string fields in superstring theory, I describe new multilinear non-associative products of forms which yield an A-infinity algebra for any supermanifold.

Presenter: GRASSI, Pietro Antonio

Session Classification: Talks

Contribution ID: 14

Type: **not specified**

The underlying gauge theory of the pure spinor superstring

Wednesday, May 8, 2019 11:00 AM (30 minutes)

Previous attempts to determine the worldsheet origin of the pure spinor formalism were not completely successful, but introduced important concepts that seem to be connected to its fundamental structure. I will present here a new proposal for the underlying gauge theory of the pure spinor superstring, based on an extension of Berkovits' twistor-like constraint. I will start with a quick review of previous approaches and then proceed to the BRST quantization of the new model. I will show that, after a field redefinition, spacetime supersymmetry emerges and the resulting action describes the pure spinor superstring.

Presenter: LIPINSKI JUSINSKAS, Rennan

Session Classification: Talks

Contribution ID: 15

Type: **not specified**

Open, closed and heterotic strings at one loop: Elliptic multiple zeta values versus modular graph forms

Wednesday, May 8, 2019 12:00 PM (55 minutes)

This talk is dedicated to one-loop amplitudes in open, closed and heterotic string theories and aims to illustrate connections between their low-energy expansions. For open strings, the coefficients in the one-loop α' -expansion are elliptic multiple zeta values which arise from moduli-space integrals over punctured cylinders. Closed and heterotic strings in turn introduce moduli-space integrals over punctured tori which evaluate to so-called modular graph forms. These modular forms are observed to exhibit striking parallels to the elliptic multiple zeta values in open-string expansions which should generalize the single-valued projection of multiple zeta values known from genus zero.

Presenter: SCHLOTTERER, Oliver

Session Classification: Talks

Contribution ID: 16

Type: **not specified**

Scattering Amplitudes from Intersection Theory

Wednesday, May 8, 2019 2:30 PM (30 minutes)

It has long been known that intersection theory on the moduli space of punctured Riemann surfaces computes all observables in the two-dimensional quantum gravity. It is natural to ask whether interacting theories could also admit a similar description. In the genus-zero case we construct a twisted version of intersection theory on the moduli space and propose that it gives rise to tree-level scattering amplitudes in a range of quantum field theories. We present recursion relations for intersection numbers on the natural fibration of moduli spaces.

Presenter: MIZERA, Sebastian**Session Classification:** Talks

Contribution ID: 17

Type: **not specified**

Strings on Celestial Sphere

Wednesday, May 8, 2019 3:05 PM (55 minutes)

Presenter: TAYLOR, Tomasz

Session Classification: Talks

Contribution ID: 18

Type: **not specified**

Making (excited) spin fields and twist fields pointlike defects on the worldsheet

Wednesday, May 8, 2019 4:30 PM (55 minutes)

Presenter: PESANDO, Igor

Session Classification: Talks

Contribution ID: 19

Type: **not specified**

String field theory and self-dual forms

Thursday, May 9, 2019 10:00 AM (55 minutes)

Presenter: SEN, Ashoke

Session Classification: Talks

Contribution ID: 20

Type: **not specified**

Light-cone reduction of covariant string field theory

Thursday, May 9, 2019 11:00 AM (30 minutes)

We extract a light-cone string field theory from Witten's covariant string field theory. The covariant string field splits into the light-cone string field and trivial excitations of BRST quartets: The latter generates the gauge symmetry and covariance. A new light-cone theory, which has an A-infinity type action, is obtained by path-integrating it out from the Witten theory. We show that the process of path-integrating-out fields is described by the homological perturbation lemma (for A-infinity) and thus our A-infinity light-cone string field theory has the same tree-level amplitudes as the Witten theory. [arXiv:1901.08555]

Presenter: MATSUNAGA, Hiroaki**Session Classification:** Talks

Contribution ID: 21

Type: **not specified**

Towards the Construction of New Democratic Theories

Thursday, May 9, 2019 12:00 PM (55 minutes)

Presenter: KROYTER, Michael

Session Classification: Talks

Contribution ID: 22

Type: **not specified**

Deriving on-shell open string field amplitudes without using the Feynman rule

Thursday, May 9, 2019 2:30 PM (30 minutes)

We present a series of new gauge invariant quantities in Witten's open string field theory. They are defined against a set of open-string states which satisfy the physical state condition around a classical solution. We discuss that, for known classical solutions, these gauge invariant quantities compute the on-shell tree-level scattering amplitudes on a D-brane configuration represented by the classical solution. (Based on collaborative work with H. Matsunaga)

Presenter: MASUDA, Toru

Session Classification: Talks

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

Presenter: TAKAHASHI, Tomohiko**Session Classification:** Talks

Contribution ID: 24

Type: **not specified**

On Finite Size D-branes

Thursday, May 9, 2019 4:30 PM (55 minutes)

I will discuss the marginal deformation describing the blow-up of a zero-size D-brane within superstring field theory as well as the world sheet description. By analyzing the equations of motion of superstring field theory we find that this marginal deformation is obstructed, at third order in the size of the D- brane. This obstruction is due to subtleties in the integration over odd moduli in super-moduli space, which are missed by the standard worldsheet approach in terms of vertex operators of various pictures.

Presenter: SACHS, Ivo**Session Classification:** Talks

Contribution ID: 25

Type: **not specified**

Heterotic string field theory with cyclic L-infinity structure

Friday, May 10, 2019 10:00 AM (55 minutes)

We construct a complete heterotic string field theory that includes both the Neveu-Schwarz and Ramond sectors. We give a construction of general string products, which realizes a cyclic L-infinity structures and thus provides with a gauge invariant action in the homotopy algebraic formulation. Through a map of the string fields, we also give the Wess-Zumino-Witten-like action in the large Hilbert space, and verify its gauge invariance independently.

Presenter: KUNITOMO, Hiroshi

Session Classification: Talks

Contribution ID: 26

Type: **not specified**

Crossing symmetry in superstring theory

Friday, May 10, 2019 11:00 AM (30 minutes)

We prove crossing symmetry of superstring amplitudes to all orders in perturbation theory. This is achieved by showing that the Green functions are analytic in a specific region of the complex momentum space ("primitive domain") and making use of results from Bros, Epstein and Glaser. The original derivation relies on locality and causality of the underlying QFT in position space: since this representation is not available in string theory due to the non-locality of the interactions, analyticity is obtained directly in momentum space. By reversing the argument, this teaches important facts on the nature of the QFT describing string theory.

Presenter: ERBIN, Harold**Session Classification:** Talks

Contribution ID: 27

Type: **not specified**

Final Discussion

Friday, May 10, 2019 12:30 PM (30 minutes)

Session Classification: Talks

Contribution ID: 28

Type: **not specified**

Nonperturbative definition of closed string theory via open string field theory

Wednesday, May 8, 2019 10:00 AM (55 minutes)

In open bosonic string field theory with the cubic interaction in terms of the star product a gauge-invariant operator can be defined for each on-shell closed string state. In the theory on N coincident D-branes we claim that the evaluation of correlation functions of the gauge-invariant operators in the $1/N$ expansion can be interpreted as a closed string perturbation theory in a low-energy limit. Therefore, open string field theory can provide a nonperturbative definition of closed string theory if it is a consistent quantum theory for finite N , which motivates us to explore the generalization to open superstring field theory.

Presenter: OKAWA, Yuji

Session Classification: Talks

Contribution ID: 29

Type: **not specified**

Gluing string amplitudes with coherent states

Friday, May 10, 2019 12:00 PM (30 minutes)

Presenter: SKLIROS, Dimitri

Session Classification: Talks