1. Abstracts of Plenary Talks at String-Math 2017

Speaker: Chris Beem

Title: Comments on Vertex Operator Algebras for N=2 SCFTs

Abstract: Every N=2 SCFT in four dimensions comes equipped with a vertex operator algebra that encodes the spectrum and OPE coefficients of an infinite class of 1/4 BPS operators known as Schur operators. I will discuss a number of results as well as open questions regarding the structural properties of the VOAs that appear in this correspondence and their relationship to four-dimensional physics. I will discuss a proposal for how to recover of the Higgs branch of vacua from the VOA and the consequences of this proposal for the behavior of Schur superconformal indices under modular transformations. Throughout, I will highlight an important filtration on these VOAs whose construction remains elusive.

Speaker: David Ben-Zvi

Title: Commuting symmetries in gauge theory

Abstract: I will describe recent work with Sam Gunningham providing a quantization of Ngo's integration of classical Hamiltonian systems and a categorification of Kostant's construction of the center of enveloping algebras. A natural context for the result is the Seiberg-Witten geometry of supersymmetric gauge theories, which I'll discuss from an abstract TFT perspective developed together with Chris Beem, Mat Bullimore, Tudor Dimofte and Andy Neitzke.

Speaker: Tom Bridgeland

Title: Riemann-Hilbert problems from Donaldson-Thomas theory

Abstract: I will discuss a class of Riemann-Hilbert problems which arise naturally in Donaldson-Thomas theory. They involve maps from the complex plane to an algebraic torus which have prescribed discontinuities along a given collection of rays, and are closely related to the problems considered by Gaiotto, Moore and Neitzke. I will explain that in the 'uncoupled' case these Riemann-Hilbert problems have unique solutions which can be written explicitly as products of gamma functions. I'll also discuss the case of the resolved conifold, where the Riemann-Hilbert problem leads naturally to a non-perturbative string partition function.

Speaker: Miranda Cheng

Title: Moonshine and Classification of Certain Mock Modular Forms

Abstract: What's so special about Ramanujan's mock theta functions? How do we know where moonshine appears? Motivated by these questions, I will present classification results on mock Jacobi forms of certian types. I will then discuss how this classification leads to discovery of extensions of umbral moonshine, and points to surprising new directions in moonshine. Based on joint work with J. Duncan.

Speaker: Cyril Closset

Title: Supersymmetric indices, partition functions and the A-twist

Abstract: I will explore the compactification of supersymmetric gauge theories with four supercharges in three and four dimensions to two dimensions, on a circle or a torus. The effective two-dimensional N=(2,2) theory can be topologically twisted. In particular, the A-twisted theory encodes the algebra of line (or surface) operators in three (or four) dimensions. I will show that it also encodes a large family of supersymmetric partition functions and indices, including the N=1 supersymmetric index on the three-sphere. This leads, in particular, to a new evaluation formula for the index, and to new tests of field theory dualities.

Speaker: Clay Cordova

Title: BPS Particles, Superconformal Indices, and Chiral Algebras

Abstract: I will describe a recent conjecture that relates wall-crossing invariant generating functions of BPS particles to superconformal indices. I will also discuss generalizations which relate BPS states in the presence of defects, i.e. framed BPS states, or 2d-4d BPS states, to indices in the presence of defects. I will also elaborate on the rich interplay between these ideas and the relationship between 4d N=2 theories and chiral algebras.

Speaker: Kevin Costello

Title: Integrable systems and quantum groups from quantum field theory

Abstract: Quantum groups and integrable lattice models arise from a four-dimensional cousin of Chern-Simons field theory. In this talk I will explain how to use this field theory to explain from first principles why certain physical systems have quantum-group symmetry. In particular, by embedding this system into string theory and applying string dualities, I will provide a derivation of the Nekrasov-Shatashvili correspondence. This talk is based on joint work with Yamazaki and Witten and with Yagi.

Speaker: Tudor Dimofte

Title: Koszul duality patterns in physics

Abstract: In mathematics, the concept of Koszul duality has played a major role in representation theory and geometry. In its basic form, the "duality" related pairs of algebraic objects and their representation categories. It is slowly becoming appreciated that Koszul duality also plays a major role in physics, arising naturally in the study of boundary conditions in QFT and their operator algebars. I will describe the underlying idea and various examples, drawing in part from current work with Andy Neitzke and David Ben-Zvi on G-actions in supersymmetric quantum mechanics, and from work with Kevin Costello.

Speaker: Ron Donagi

Title: Hitchin's system and Geometric Langlands

Abstract: We discuss an approach to the Geometric Langlands Conjecture based on Hitchin's system combined with non Abelian Hodge theory.

Speaker: Tobias Ekholm

Title: Higher genus knot contact homology and recursion for the colored HOMFLY polynomial

We present a conjectural description of Legendrian Symplectic Field Theory for the conormal of a knot ("higher genus knot contact homology") and discuss its relation to the recursion relation for the colored HOMFLY polynomial. This reports on joint work with Lenny Ng.

Speaker: John Francis

Title: Factorizationhomologyand the cobordism hypothesis

Abstract: Factorization homology offers a multiplicative analogue of ordinary homology. Ordinary homology "integrates" an abelian group or chain complex over the moduli space of open subspaces of a manifold M. The result takes disjoint unions of manifolds to direct sums of chain complexes. Factorization homology "integrates" an n-disk algebra or higher category over the moduli space of stratifications of M. The result takes disjoint unions to tensor products. I'll give an introduction to factorization homology. Time permitting, I'll also discuss the cobordism hypothesis after Baez-Dolan, Costello, Hopkins-Lurie, and Lurie which asserts that for a suitable target C, there is an equivalence TQFT(C) = obj(C) between C-valued framed topological field theories and objects of C. I'll describe a proof of the cobordism hypothesis based on factorization homology. This is joint work with David Ayala.

Speaker: Kenji Fukaya

Title: Relative and/or equivariant Lagrangian Floer theory and Atiyah-Floer conjecture

Abstract: In this talk I will explain my recent joint work with Aliakbar Daemi, about Atiyah-Floer conjecture. Atiyah-Floer conjecture states a relation between certain Lagrangian Floer homology and Instanton homology (Floer homology of 3 manifolds based on Yang-Mills equation.) The main difficulty of this conjecture is that symplectic side is originally a singular space (the moduli space of flat connection of surface). I will explain that we can replace it by certain relative+equivariant version of Lagrangian Floer homology of smooth symplectic manifold and and also a program to prove the conjecture.

Speaker: Alexander Goncharov

Title: Quantum Hodge Field Theory

Abstract: We define QHFT by introducing quantum Hodge correlators. They have the open string theory format: Given a family X $\to$ B of compact Kahler manifolds, let S be an oriented topological surface with special points on the boundary. We assign to each interval between the special points a simple local system on X, and to each special point an Ext between the neighboring local systems. A quantum Hodge correlator assigned to this data lives on the base B. It is a sum of finite dimensional convergent Feynman type integrals. Among the simplest Hodge correlators are Rankin-Selberg integrals for L-functions. More complicated Hodge correlators include single-valued polylogarithms of different flavors: classical, multiple, elliptic, ... The sum of all quantum Hodge correlators satisfies a Quantum Master Equation. Quantum Hodge correlators can be perceived as Hodge-theoretic analogs of the invariants of knots and threefolds provided by the perturbative Chern-Simons theory. Here is an example. Hodge theory suggests to view a Riemann surface as a threefold, and a point x on it as a knot in the threefold. Then the Green function $G(x;y)$ - the basic Hodge correlator, is an analog of the linking number - the simplest Chern-Simons type invariant. What do the quantum Hodge correlators do? Let B be a point, and the local systems are just the constant sheaves.

1. Hodge correlators (S is a disc) describe an action of the Hodge Galois group by A-infinity automorphisms of the cohomology algebra $H(X;C)$ preserving the Poincare pairing.

2. Quantum Hodge correlators (S is any surface) describe an action of the Hodge Galois group by quantum A-infinity automorphisms of the algebra $H(X;C)$ with the Poincare pairing.

Speaker: Lotte Hollands

Title: A geometric recipe for superpotentials

Abstract: We give a geometric interpretation of the effective twisted superpotential for any four-dimensional N=2 quantum field theory of class S in the partial Omega-background. Important ingredients are spectral networks generated by Strebel differentials, the space of opers, and the abelianization method.

Speaker: Kentaro Hori

Title: Boundary conditions in 2d (2,2) gauge theories

Abstract: I will talk about B-type boundary conditions in 2d (2,2) supersymmetric gauge theories without quantum Coulomb branch. A constraint on the boundary data - the grade restriction rule - is obtained from the convergence of the hemisphere partition function. The rule plays an important role in finding equivalences of categories associated to paths in the quantum Kahler moduli space, and in formulating homological Seiberg duality. Under some conditions, the category of grade restricted boundary conditions agrees with the non-commutative crepant resolution of the quotient singularity by Spenko-Van den Bergh.

Speaker: Anton Kapustin

Title: Bosonization on a lattice in higher dimensions

Abstract: In one spatial dimension, the Jordan-Wigner transformation turns a system fermions on a lattice into a system of bosonic spins on the same lattice. An important property of this transformation is that a local Hamiltonian is mapped to a local Hamiltonian. I will explain the analogue of the Jordan-Wigner transformation in higher dimensions. To achieve locality, in addition to spins one needs to introduce a (d-1)-form Z_2 gauge field, where d is the spatial dimension.

Speaker: Chiu-Chu Melissa Liu

Title: GW theory, FJRW theory, and MSP fields

Abstract: Gromov-Witten (GW) invariants of the quintic Calabi-Yau 3-fold are virtual counts of stable maps to the quintic 3-fold. Fan-Jarvis-Ruan-Witten (FJRW) invariants of the Fermat quintic polynomial are virtual counts of solutions to the Witten equation associated to the Fermat quintic polynomial. In this talk, I will describe the theory of Mixed-Spin-P (MSP) fields interpolating GW theory of the quintic 3-fold and FJRW theory of the Fermat quintic polynomial, based on joint work with Huai-Liang Chang, Jun Li, and Wei-Ping Li.

Speaker: Jason Miller

Title: Equivalence of Liouville quantum gravity and the Brownian map

Abstract: Over the past few decades, two natural random surface models have emerged within physics and mathematics. The first is Liouville quantum gravity, which has roots in string theory and conformal field theory. The second is the Brownian map, which has roots in planar map combinatorics.

We show that the Brownian map is equivalent to Liouville quantum gravity with parameter $\gamma = \sqrt{8/3}$.

Based on joint work with Scott Sheffield.

Speaker: Andrei Negut

Title: W-algebras, moduli of sheaves on surfaces, and AGT

To a smooth surface, we associate the W-algebra of type gl_r with two deformation parameters equal to the Chern roots of the cotangent bundle of S. We expect that the resulting algebra acts on the K-theory groups of moduli spaces of semistable rank r sheaves on S, and one can compute commutation relations between the algebra and the Carlsson-Okounkov Ext operator. When the surface is $S = A^2$, this allows one to present the Ext operator as a vertex operator for deformed W-algebras, thus yielding a mathematical proof of the 5d AGT relations with matter for the gauge group $U(r)$.

Speaker: Nikita Nekrasov

Title: Open-closed (little)string duality and Chern-Simons-Bethe/gauge correspondence

Abstract: In the past 30+ years two approaches to quantum groups, their realizations in quantum integrable systems and quantum gauge theories have been proposed, one of them recently revived by K.Costello. In this talk we shall relate these approaches using string theory. Based on the joint work with Mina Aganagic and Samson Shatashvili.

Speaker: Alexei Oblomkov

Title: B-model for knot homology.

Abstract: Talk is based on the joint work with Lev Rozansky. In my talk will outline a construction that provides complex C_b of coherent sheaves on the Hilbert scheme of n points on the plane for every n-stranded braid b. The space of global sections of C_b is a categorification of the HOMFLYPT polynomial of the closure $L(b)$ of the braid. I will also present a physical interpretation of our construction as a particular case of Kapustin-Saulina-Rozansky 3D topological field theory.

Speaker: Andrei Okounkov

Title: Gauge theories and Bethe eigenfunctions

Abstract: The talk will be based on a joint paper https://arxiv.org/abs/1704.08746 with Mina Aganagic. In this paper, we essentially complete the program of Nekrasov and Shatashvili who explained the meaning of Bethe roots, Bethe equations, etc. of quantum integrable systems via their correspondence with supersymmetric gauge theories. We explain the meaning of off-shell Bethe eigenfunctions (which also give solutions of the quantum Knizhnik-Zamolodchikov equations and related difference equations). Our formulas may be seen from a geometric, representation-theoretic, combinatorial, and other angles.

Speaker: Vasily Pestun

Title: Periodic monopoles and quiver W-algebra

Abstract: From quiver gauge theory we obtain explicit construction of the q-deformed W-algebra and see a different perspective into the world of the q-geometric Langlands correspondence, discussing in particular quantization and deformation of periodic monopoles, q-connections and q-opers.

Speaker: Sakura Schäfer-Nameki

Title: 4d N=4 SYM with varying coupling

Abstract: I will discuss 4d N=4 Super-Yang Mills with topological duality twist, and its origin in 6d. As an application, this allows the construction of new 2d chiral superconformal field theories, which have holographic duals in F-theory.

Speaker: Nick Sheridan

Title: Versality in mirror symmetry

Abstract: One nice property of the categories that appear in homological mirror symmetry is that (under certain assumptions) any deformation of the category should be realized by deforming the geometric structure on which it depends: namely the Kähler form in the case of the Fukaya category, or the complex structure in the case of the derived category. In other words the family of categories should be 'versal'. This versality picture is less straightforward, however, at large volume limit/large complex structure limit points on the boundaries of these moduli spaces. I will describe the situation at these points (following Seidel), present a general versality-type result, and explain how this result gives an efficient approach to proving homological mirror symmetry. In particular, in joint work with Ivan Smith, we apply the result to prove homological mirror symmetry for a general class of examples which includes all Greene-Plesser mirrors, as well as Kuznetsov's 'K3 category of the cubic fourfold' and the (rigid) 'Z-manifold'.

Speaker: Ulrike Tillmann

Title: Topological field theories in homotopy theory

Abstract: We will explain the homotopy theoretic approach to topological field theory, survey some of the results, and provide new evidence that the stable homotopy category is a natural target category.

Speaker: Pierre Vanhove

Title: Local mirror symmetry and Feynman integrals

Abstract: Feynman integrals are period integrals of the motivic cohomology of hypersurface complements. They satisfy inhomogeneous differential equations leading to variations of mixed Hodge structures with non-trivial extensions. They are obtained from the natural Picard-Fuchs differential operator associated with the geometry defined by the graph polynomial. For a class of Feynman graphs leading to Calabi-Yau geometry we exhibit an unsuspected local symmetry. By considering the limiting mixed Hodge structure of the Batyrev dual A-model, we arrive at an expression for the Feynman integral in terms of the local Gromov-Witten prepotential. This expression is obtained by proving a strong form of local mirror symmetry which identifies this prepotential with the second regulator period of the motivic cohomology class determining the Feynman integral.

Based on work done in collaboration with Spencer Bloch and Matt Kerr.

Speaker: Shing-Tung Yau

Title: Aspects of Calabi-Yau variety and SCFTs in various dimensions.

Abstract: New progress about period integral associated with compact Calabi Yau manifold will be reported, which is related to observables of corresponding two dimensional (2,2) SCFT. We also systematically study non-compact three dimensional Calabi Yau manifold and its relation to 4d N=2, 5d N=1, and 4d N=1 SCFT.

Speaker: Xi Yin

Title: Conformal Bootstrap in Two Dimensions

Abstract: I will discuss constraints on unitary 2D CFTs based on associativity of OPE and modular invariance, including universal bounds on the spectral gap and distribution of OPE coefficients.

2. Abstracts of Parallel Talks at String-Math 2017

Speaker: Matthew Heydeman

Title: AdS/CFT and p-Adic Numbers: A Model of Discrete Holography

Abstract: Certain challenges of the AdS/CFT correspondence have recently been addressed by considering discrete models of the bulk geometry. In this presentation, I will review work done jointly with Matilde Marcolli and others on a discretization of the correspondence based on algebraic curves over the p-adic numbers. This construction naturally preserves the conformal symmetry of the boundary theory, and we find a precise duality between p-adic conformal field theories and lattice models of scalars on a discrete bulk geometry. After an informal review of the p-adic numbers, I will describe the correspondence for scalar fields. Higher genus Mumford curves have a natural interpretation as discrete black holes in the bulk. I will also discuss various p-adic boundary CFT's explicitly such as the O(N) and SYK models, and also a first attempt at dynamical bulk geometry. Altogether we find close connections between real and p-adic AdS/CFT, number theory, and quantum field theories on graphs.

Speaker: Hans Jockers

Title: M-Theory on twisted connected sum G2-manifolds

Abstract: I review the dimensional reduction of M-theory on G2-manifolds that are constructed by Kovalevs twisted connected sum by gluing suitable pairs of asymptotically cylindrical Calabi-Yau threefolds augmented with a circle S^1. The low energy effective theory exhibits in a certain limit gauge theory sectors with extended supersymmetry. Suitable singular asymptotically cylindrical Calabi-Yau threefolds lead to non-Abelian gauge symmetries with matter in the discussed M-theory context. Studying the obtained low-energy effective gauge theories, I describe geometric transitions among G2-manifolds and also obtain new explicit examples of G2-manifolds. This talk is based upon joint work with Thaisa Guio, Albrecht Klemm, and Hung-Yu Yeh.

Speaker: Shota Komatsu

Title: Correlation Functions in N=4 SYM and Abstract: Triangulation of the Riemann Surface

I will explain the recent progress in the computations of correlation functions in planar N=4 SYM. The key idea is to triangulate the string world-sheet and compute the contribution from each "triangle" using integrability. I will show how it works in practice using several examples at weak coupling.

Speaker: Madalena Lemos

Title: Bootstrapping N=2 and 3 SCFTs

Abstract: In this talk we will discuss the bootstrap program applied to four-dimensional N=2 and 3 superconformal field theories, with focus on analytical results. After a brief review of the protected subsector captured by a two-dimensional chiral algebra, we will show how analytic bounds on anomaly coefficients are obtained and constrain the space of allowed SCFTs. Finally we end with a numerical bootstrap outlook.

Speaker: Si Li

Title: Integrable hierarchy from Kodaira-Spencer gravity

Abstract: We describe a universal approach to integrable hierarchies associated to Calabi-Yau geometry via Kodaira-Spencer gravity (B-twisted string field theory). The talk is based on arXiv: 1612.01292[math.QA] and a joint work in progress with Weiqiang He and Philsang Yoo.

Speaker: Pietro Longhi

Title: Spectral networks at marginal stability, BPS quivers, and a new construction of wall-crossing invariants

Abstract: I will discuss some properties and applications of BPS graphs, introduced in joint work with Gabella, Park and Yamazaki. In 4d N=2 theories of class S, BPS graphs arise from a degenerate limit of spectral networks, at maximal intersections of walls of marginal stability in the Coulomb branch. While the BPS spectrum is ill-defined at these loci, BPS graphs encode wall-crossing invariant information about the spectrum. I will discuss how BPS graphs can be used to construct BPS quivers, establishing a connection between them and spectral networks. I will also present a new construction of Kontsevich-Soibelman invariants, which makes their wall-crossing invariance manifest, and is entirely encoded by the topology of BPS graphs.

Speaker: Daniel Persson

Title: BPS-states and automorphic representations of exceptional groups

Abstract: Automorphic forms on exceptional Lie groups appear naturally in string theory compactifications. They manifest themselves as couplings in higher derivative corrections and in terms of generating functions of BPS-states. I will explain how to treat automorphic forms in the modern theory of automorphic representations, which can be directly connected to BPS-states in string theory. Various recent results, conjectures and open problems are outlined.

Speaker: Elli Pomoni

Title: Exact results for class S_k

Abstract: We will introduce a large class of N=1 superconformal theories, called S_k, which is obtained from Gaiotto's N=2 class S via orbifolding. We will study the Coulomb branch of the theories in the class by constructing and analyzing their spectral curves. Using our experience from the N=2 AGT correspondence we will search for a 2D/4D relations (AGT$_k$) for the N=1 theories of class S_k. From the curves we will identify the 2D CFT symmetry algebra and its representations, namely the conformal blocks of the Virasoro/W-algebra, that underlie the 2D theory and reproduce the Seiberg-Witten curves of the N = 1 gauge theories. We find that

the blocks corresponding to the SU(N) S_k gauge theories involve fields in certain non-unitary representations of the WkN algebra. These conformal blocks give a prediction for the instanton partition functions of the 4D N = 1 SCFTs of class S_k.

Speaker: Miroslav Rapcak

Title: Vertex Algebras at the Corner

Abstract: We introduce a four parameter family of algebras $Y_{L,M,N}[\Psi]$ that can be identified with algebras of operators living at junctions of domain-walls in topologically twisted $\mathcal{N} = 4$ super Yang-Mills theory. S-duality action on the system of defects induces triality action on Y-algebras. This triality generalizes Feigin-Frenkel duality between two realizations of $W_N[\Psi]$ algebra and connects it with the third realization based on coset construction. I will comment on relation of Y-algebas and truncations of $\mathcal{W}_\infty$ and possibility to extend the construction to more complicated webs of defects.

Speaker: Kasia Rejzner

Title: New perspective on Sine-Gordon model and perturbative QFT

Abstract: Recent advances in constructing QFT models on curved spacetimes using the algebraic framework have given a new perspective on many fundamental problems in QFT. The approach called perturbative algebraic quantum field theory (pAQFT) allows one to combine robust techniques of perturbative QFT with the concept of locality underlying AQFT. Recently, it was shown that these methods can be used also beyond perturbation theory, e.g. in construction of the local S-matrix and interacting fields of the Sine-Gordon model in 2D. By invoking Batalin-Vilkovisky (BV) formalism, pAQFT can also be used to quantize gauge theories and theories with diffeomorphism invariance (e.g. effective gravity or effective bosonic string).

Speaker: Andrea Santi

Title: Killing superalgebras and high supersymmetry

Abstract: I will talk about joint work with José Figueroa-O'Farrill on the algebraic structure of the Lie superalgebra generated by the Killing spinors of an 11- dimensional supergravity background. I will explain that any such Killing superalgebra is an appropriate deformation of a subalgebra of the Poincaré superalgebra and discuss applications to the classification of highly super- symmetric backgrounds. In particular, we will see that preserving more than half the supersymmetry implies the supergravity field equations.

Speaker: Claudia Scheimbauer

Title: A factorization view on states and observables in low-dimensional topological field theories

Abstract: In this talk I will sketch low-dimensional examples of a version of functorial topological field theory which is ?relative? to its factorization algebra of observables. Here, ?relative? requires weaker assumptions than boundary conditions, thus providing more flexible examples. We will see how to relate a state space or algebra to its (derived) endomorphisms or (derived) center in this way. A straightforward example is given by poynomial differential operators, i.e. the Weyl algebra, in positive characteristic and its center. This is joint work with Owen Gwilliam.

Speaker: Urs Schreiber

Title: Super p-Brane Theory emerging from Super Homotopy Theory

Abstract: It is a notorious open problem to determine the nature of the non-pertubative theory formerly known as Strings. I present results showing that, rationally, many of its phenomena emerge as stages of a Whitehead tower, invariant modulo R-symmetry, that emerges out of the superpoint regarded in super-geometric homotopy theory. This includes super-spacetime as such, the bouquet of all Green-Schwarz super p-branes, D-brane charge in twisted K-theory, M-brane charge, double dimensional reduction, T-duality, Buscher rules for RR-fields, doubled spacetimes, F-theory fibrations and S-duality. The orbifold S^4/S^1 (familiar from the near horizon geometry of M5-branes at A-type singularities) appears in a surprising unifying role. These results (arXiv:1611.06536 and arXiv:1702.01774) are joint with Domenico Fiorenza, Hisham Sati and John Huerta; also with Vincent Schlegel. Slides are available at ncatlab.org/schreiber/print/StringMath2017

Speaker: Alessandro Sfondrini

Title: AdS3/CFT2 and Integrability

Abstract: Integrable models are theories that possess rich symmetries at the classical or quantum level which constrain their dynamics, often leading to their exact solution. Such models also appeared in AdS/CFT, and allowed e.g. to study the spectrum of non-protected operators in planar N=4 super Yang-Mills with stunning precision and efficiency. I will review how the integrability approach can be applied to the spectral problem for AdS3xS3xT4 and AdS3xS3xS3xS1 superstrings, emphasising the striking new features that distinguish their underlying integrable systems from the AdS5 and AdS4 ones, and highlighting how these are intimately related to the properties of the holographic duals of these backgrounds.

Speaker: Benoit Vicedo

Title: Integrable field theories and dihedral affine Gaudin models

Abstract: The quantisation of so called non-ultralocal classical integrable field theories is an important open problem in Mathematical Physics. I will explain how this problem can be reformulated mathematically within the framework of affine Gaudin models. I will also motivate this new perspective on non-ultralocality as a way of understanding the massive ODE/IM correspondence, a conjectural classical/quantum duality in integrable field theories.

Speaker: Tony Yue YU

Title: The Frobenius structure conjecture in dimension two

Abstract: The Frobenius structure conjecture is a conjecture about the geometry of rational curves in log Calabi-Yau varieties proposed by Gross-Hacking-Keel. It was motivated by the study of mirror symmetry. It predicts that the enumeration of rational curves in a log Calabi-Yau variety gives rise naturally to a Frobenius algebra satisfying nice properties. In a joint work with S. Keel, we prove the conjecture in dimension two. Our method is based on the enumeration of non-archimedean holomorphic curves developed in my thesis. We construct the structure constants of the Frobenius algebra directly from counting non-archimedean holomorphic disks. If time permits, I will also talk about compactification and extension of the algebra.