Second French-Russian Conference "Random Geometry and Physics"
(17th - 21st October 2016)

Titles and Abstracts of Invited Speakers

ALESHKIN Konstantin
(Landau Institute for Theoretical Physics, Moscow)

On correlation numbers in Minimal Liouville Gravity and Liouville OPE discrete terms

The computation of the correlation numbers in Minimal Liouville Gravity involves an integration over moduli spaces of complex curves. Two independent approaches to this problem, based respectively on the higher equations of motion in the Liouville conformal field theory and on the Douglas string equation, give rise to the results which are not always consistent among themselves. In the talk I will show that in order to reconcile these two approaches the so-called discrete terms in the operator product expansion of the underlying Liouville theory describing gravitational sector must be properly taken into account. This leads to the modified version of the expression for the correlation numbers.

ALEXANDROV Serguey
(Laboratoire Charles Coulomb, Montpellier)

Instantons, wall-crossing and quantum dilogarithm identities

Motivated by mathematical structures appearing in gauge and string theories with N=2 supersymmetry, I'll consider the behavior of certain generalized theta series under Kontsevich-Soibelman transformations. In Calabi-Yau string vacua, such theta series encode instanton corrections from NS5-branes, and their transformation properties ensure the mutual consistency of NS5-instantons, D-instantons and wall-crossing. It turns out that the transformations are captured by Faddeev's quantum dilogarithm, and lead to a new type of quantum dilogarithm identities with the quantization parameter inversely proportional to the NS5-brane charge.

BELAVIN Alexander
(Landau Institute for Theoretical Physics, Moscow)

Superstring compactification and Flat structures on the deformations of Gepner chiral rings

We propose a new simple method for computing flat coordinates on the Frobenius manifolds linked with TCFT. Approach is based on using the Conjecture about integral representations for the flat coordinates and on the Saito cohomology theory. It helps to reduce the problem of the computation of the flat coordinates to a simple linear problem. Coefficients of the decomposition of flat coordinates in a sum of monomials of deformation parameters coincide with the coefficients of the decomposition of the dual to these monomials differential forms in a sum over basis elements of Saito cohomologies.

BERSHTEIN Mikhail

(Landau Institute for Theoretical Physics, Moscow)

Q-deformed Painlevé tau function and q-deformed conformal blocks

We propose q-deformation of the Gamayun-Iorgov-Lisovyy formula for Painlevé τ function. Namely we propose formula for τ function for q-difference Painlevé equation corresponding to $A_7^{(1)}$ surface (and $A_1^{(1)}$ symmetry) in Sakai classification.

In this formula τ function equals the series of q-Virasoro Whittaker conformal blocks (equivalently Nekrasov partition functions for pure $SU(2)$ 5d theory). The talk is based on the joint works with A. Shchechkin [arXiv:1608.02566] and [arXiv:1608.02568].

BONZOM Valentin

(LIPN, Université Paris-Nord, Villetanneuse)

Enumeration of colored triangulations in arbitrary dimensions

Colored triangulations are gluings of simplices in arbitrary dimensions. As seen in Cristofori's presentation, they can be represented graphically as edge-colored graphs which strongly suggests that their combinatorics can be studied. They generalize combinatorial maps to higher dimensions: they admit an extension of the genus of a map, they can be generated by random tensors the same way random matrices generate maps, etc. In this talk, I will focus on families of colored triangulations obtained by gluing certain building blocks, thus generalizing the notion of p-angulations. I will show what the generalization of planar p-angulations is for some building blocks and that their universality classes depend on the building blocks unlike the two-dimensional case.

BOROT Gaétan

(MPI for Mathematics, Bonn)

Nesting in the O(n) loop model on random maps of arbitrary topology

We consider self-avoiding loops on random maps, weighted by a parameter n. This so-called O(n) model contains as special case Ising, Potts, percolation, ... As is well-known, it exhibits in the critical regime two universality classes, dilute or dense, and it is conjectured that the loop configurations are described to a coupling of CLE processes with parameter $n = 2\cos\pi(1 - 4/\kappa)$ with Liouville quantum gravity, with parameter $8/3 < \kappa < 4$ in the dilute phase, and $4 < \kappa < 8$ in the dense phase – while n spans the interval (0,2).

I will review how these maps can be counted, first for disks and cylinders, then for any arbitrary topology using a topological recursion, and how to track the number of separating loops and the topology of nestings. More explicit computations can be carried for triangulations, possibly with bending energy for the loops. In the critical regime for large maps, we obtain the relative probability of the various nesting topology, as well as the large deviation of the number of separating loops along cylindric parts of the maps, which typically scale like ln(number of vertices). In the case of number of separating loops in a pointed disk, taking into account the coupling to Liouville theory via KPZ formulas, this result perfectly agrees with the extreme nesting properties of the CLE obtained previously by Miller, Watson and Wilson.

This is based on several joint works, with Jeremie Bouttier, Bertrand Duplantier, Bertrand Eynard, Elba Garcia Failde, Emmanuel Guitter, and Nicolas Orantin.

BURYAK Alexandr
(Department of Mathematics, ETH Zürich)
Intersection theory on the moduli space of Riemann surfaces with boundary and integrable hierarchies

A study of the intersection theory on the moduli space of Riemann surfaces with boundary was recently initiated in a work of R. Pandharipande, J. Solomon and R. Tessler. They defined open intersection numbers and proposed an open analog of Witten's conjecture. In a joint work with R. Tessler we proved this conjecture. More recently we observed that the generating series of the open intersection numbers admits a refinement that distinguishes contributions from surfaces with different numbers of boundary components. We construct a matrix model for the refined generating series and conjecture that it is equivalent to the Kontsevich-Penner model that was recently intensively studied by A. Alexandrov.

CALKA Pierre
(Université de Rouen)
Random geometry and convexity: study of random polytopes

In this talk, we consider a particular aspect of random geometry in connection with convex and integral geometry. More precisely, we use a point process of the Euclidean space as a basic object to generate random convex sets and convex tessellations. This kind of discrete structures arise notably in computational geometry which may explain the importance of their average-case analysis.

We concentrate on the asymptotic description of the random polytope defined as the convex hull of a binomial or Poisson point process and we investigate several associated random functionals including the number of extreme points and volume. In their 1963 seminal work, A. Rnyi and R. Sulanke were the first to obtain limiting expectations in the planar case and to point out the completely different behaviors of uniform inputs inside a smooth convex body and inside a convex polytope. Though central limit theorems were obtained by M. Reitzner, I. Bárány and V. Vu between 2004 and 2010, there have been relatively few results concerning the asymptotic variances. Our main contribution is the construction of a scaling limit of the boundary of the random polytope and the use of this limit process to calculate explicit limiting variances. The method applies to uniform points inside a smooth or polytopal convex body and to Gaussian points as well. We emphasize the case of uniform points inside a convex polytope, where the localization of extreme points near the vertices of the polytope plays a central role. If time allows, we will also briefly address similar asymptotic questions for Poisson-Voronoi tessellations.

The main theme of this talk comes from a joint work with J. E. Yukich.

COUVREUR Romain
(Ecole Normale Supérieure, Paris)
Non-scalar operators for the Potts model and logarithmic correlation functions in arbitrary dimension

We investigate the operator content of the Q-states Potts model in arbitrary dimension using the representation theory of the symmetric group S_Q. This work generalizes the previous construction of symmetric tensors by R. Vasseur and J. Jacobsen to arbitrary irreducible representations. The operators we obtain transform non-trivially under rotations, with a spin that can be measured on the lattice. The correlation functions have a physical interpretation in terms of Fortuin-Kasteleyn clusters and describe for instance propagation of percolation hulls ($Q = 1$). Our classification is expected to predict which operators are mixed by scale transformation in arbitrary dimension and thus have a logarithmic correlation function.

The main theme of this talk comes from a joint work with J. E. Yukich.

CRISTOFORI Paola

(Universita degli studi di Modena e Reggio Emilia, Modena)

Representing PL-manifolds by edge-colored graphs: basic concepts and recent results

Crystallization theory arose in the seventies as a graph-theoretical representation for compact PL-manifolds of arbitrary dimension: it makes use of a particular class of edge-colored graphs, which are dual to colored (pseudo-)triangulations. Since then, several results regarding the topology and combinatorics of PL-manifolds have been obtained by means of their crystallizations or, more generally, gems. More recently, a link has been established between edge-colored graphs and random tensors, giving a new significant viewpoint on several aspects of crystallization theory. In this talk we review basic concepts, techniques and classical results (mainly in the setting of closed manifolds) and discuss recent developments and open problems. In particular, we focus on the relations between combinatorial invariants defined via edge-colored graphs and known invariants of 3-manifolds (such as Heegaard genus and Matveev's complexity) and on the case of 4-dimensional manifolds with particular regard to problems of classification in the TOP and PL=DIFF categories.

DELEPOUVE Thibault

(Laboratoire de physique théorique, Orsay)

Enhanced tensor models

The perturbative expansion of ordinary tensor models are dominated by tree-like melonic graphs. The non melonic contributions can be enhanced , leading to different types dominant graphs. We study a model which mixes melonic with matrix-like interactions and which dominant Feynman graphs mixes tree structure with 2D maps.

ERBIN Harold

(Laboratoire de physique théorique de l'Ecole Normale Supérieure, Paris)

2d quantum gravity with massive matter

Recent progresses have been made for computing the gravitational effective action for 2d quantum gravity in presence of massive matter. This problem is of great importance since the four-dimensional world contains massive matter and a corresponding 2d toy model should include this feature. In this case the action contains new contributions beside the usual Liouville action and the leading order of those is given by the Mabuchi action. Despite its physical importance this action has barely been studied and most of its physical properties are not known. In this talk I will explain a method to compute the spectrum and show that it coincides with the one of the Liouville theory.

GAVRYLENKO Pavlo
(National Research University High School of of Economics, Moscow)
Determinantal formula for the general isomonodromic tau-function

I will present some matrix Fredholm determinant which is proved to be the general isomonodromic tau-function and discuss this proof very briefly. Then I will explain that presented determinant has a nice combinatorial expansion in terms of Nekrasov functions. The talk is based on the joint paper with O. Lisovyy [arXiv:1608.00958].

GURAU Razvan
(Centre de physique théorique, Ecole Polytechnique, Palaiseau)
Random tensors, a "functional integral" point of view

Random tensors generalize random matrices to higher dimensions. Mathematically they are probability measures with certain invariance requirements. In physics language, this means that random tensors can defined starting from a specific class of "functional integrals". In this talk I will discuss some perturbative and non perturbative results on random tensors as seen from the perspective of this "functional integral" formulation.

KAREV Max
(Steklov Mathematical Institute, St.Petersburg)
Monotone orbifold Hurwitz numbers

Monotone Hurwitz numbers arise as coefficients of the asymptotic expansion of HCIZ-integral. In my talk, I'll introduce their definition in the terms of the symmetric group, and discuss properties of their generating functions in the orbifold case.

KATANAEV Mikhail
(Steklov Mathematical Institute, Moscow)
Chern-Simons term in the geometric theory of defects

The Chern–Simons term is used in the geometric theory of defects. The equilibrium equations with δ-function source are explicitly solved with respect to the $MS/MO(3)$ connection. This solution describes one straight linear disclination and corresponds to the new kind of geometrical defect: it is the defect in the connection but not the metric which is the flat Euclidean metric. This is the first example of a disclination described within the geometric theory of defects. The corresponding angular rotation field is computed.

This talk is based on a collaboration with J. Zanelli, Centro de Estudios Cientificos, CECs, Valdivia, Chile.

KUCHUMOV Nicolai*(Saint Petersburg State University)*
Limit shapes of dimer model and six-vertex model

The talk is about limit shape phenomena which manifest in certain models of equilibrium statistic mechanics. The principle is that large scale behavior of the system is deterministic, while at small scale the system is random. Two types of such system will be discussed: the dimer model and the six vertex model.

LAHOCHE Vincent
(Laboratoire de physique théorique, Orsay)
Flowing in tensor theory space

Tensorial Group Field Theories (TGFTs) are a class of quantum field theories defined on group manifolds and characterised by a specific form of non-locality of their interactions, called tensoriality. They are an interpretation of quantum space-time models, or "pre-geometric", with Feynman amplitudes indexed by triangulations. Understanding the transition from this discrete version to our continuous space-time remains the greatest challenge for these theories, and for this challenge, renormalization, the building of effective theories, the search for fixed points and phase transitions, are essential. In this talk, I present recent achievements in this research direction, focussing on non-perturbative renormalization group aspects in the Functional renormalization group framework.

LE DOUSSAI Pierre
(Laboratoire de physique théorique de l'Ecole Normale Supérieure, Paris)
The Kardar Parisi Zhang equation : integrability and universality

LE GALL Jean-François
(Département de Mathématiques Paris-Sud, Orsay)
First-passage percolation in random planar lattices

We consider local modifications of the graph distance in random graphs drawn in the plane, which are also called random planar maps. A particular case is the first-passage percolation distance, where the edges of the graph are assigned i.i.d. random lengths. We show that in large scales the associated first-passage percolation distance is asymptotically proportional to the graph distance. For the infinite random lattice known as the UIPT (uniform infinite planar triangulation), this means that large balls for the first-passage percolation distance behave asymptotically like balls for the graph distance. This is in sharp contrast with the results known or conjectured to hold for deterministic lattices. In the special case corresponding to the so-called Eden model on random triangulations, we are able to compute the explicit value of the multiplicative constant. This talk is based on a joint work with Nicolas Curien.

LIASHYK Andrei
(National Research University High School of of Economics, Moscow)
Form factors in $gl(2|1)$-invariant integrable models

I will present determinant representation for scalar product in $gl(2|1)$ invariant integrable models solvable by the nested algebraic Bethe ansatz. Then I will explain how to obtain explicit determinant representations for form factors of the monodromy matrix entries. Our results allow one to obtain determinant formulas for form factors of local operators in the supersymmetric t-J model. The talk is based on the joint papers with coauthors [arXiv:1605.06419, arXiv:1605.09189, arXiv:1606.03573, arXiv:1607.04978].

LIONNI Lucas
(Laboratoire de physique théorique, Orsay)
3D gluings of octahedra

We study 3D colored triangulations obtained by gluing octahedra together, and identify those which maximize the number of edges. They are shown to be triangulations of the 3-sphere, in bijection with a family of trees. It follows the talks by P. Cristofori and V. Bonzom, and is based on joint work with the latter. Our results arise as an application of a more general bijection between colored triangulations which are built by gluing certain building blocks and some generalization of edge-colored hypermaps.

MAJUMDAR Satya
(Laboratoire de Physique Théorique et Modèles Statistiques, Orsay)
Height distribution in 1-d Kardar-Parisi-Zhang equation : Large Deviations

I will first briefly review the height distribution in one dimensional growth models belonging to the Kardar-Parisi-Zhang (KPZ) universality class. The probability distribution of the typical height fluctuations at late times, properly centered and scaled, is described by the Tracy-Widom distribution. In this talk, I will discuss how to compute the atypical large height fluctuations, both at long times and at short times. We will see that the late time large deviation function of the height undergoes a third-order phase transition, in a class of growth models in curved geometry including the continuum KPZ equation itself. The short time height distribution in the KPZ equation in droplet geometry is also related to the position of the rightmost fermion in a harmonic trap at finite temperature—this connection will be discussed.

References:

(1) "Large deviations for the height in 1D Kardar-Parisi-Zhang growth at late times", P. Le Doussal, S.N. Majumdar and G. Schehr, Europhys. Lett. 113, 60004 (2016).

(2) "Exact short-time height distribution in 1D KPZ equation and edge fermions at high temperature", P. Le Doussal, S.N. Majumdar, A. Rosso and G. Schehr, Phys. Rev. Lett., 117, 070403 (2016).

MAKEENKO Yuri
(ITEP, Moscow)
Random geometry meets Lilliputian strings

It is known since 1980s that lattice-like regularizations of a quantum string in the target-space dimension d¿2 do not lead to the same results as canonical quantization. The latter is consistent for long string and results in the Alvarez-Arvis spectrum. I describe an approximate solution of proper-time regularized bosonic string (that becomes exact at large d) and show that the Alvarez-Arvis spectrum is reproduced only if the string length is of order of the target-space cutoff. The existence of such a Lilliputian continuum limit is due to the fact that the worldsheet metric becomes singular when the cutoff is removed, so the worldsheet cutoff is much smaller. I argue this picture realizes also beyond the approximation considered.

MARSHAKOV Andrei
(ITEP, Moscow)
Supersymmetric gauge theories, W-algebras and isomonodromic deformations

MILLER Jason
(Statistics Laboratory at the University of Cambridge)
Equivalence of Liouville quantum gravity and the Brownian map

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 $\gamma = \sqrt{8/3}$.

MIRONOV Andrei
(ITEP, Moscow)
Matrix models, check operators, and modular kernels in CFT

A review of check-operators, i.e. operators acting on the space of solutions of matrix model will be done. As a particular application, the known claim that the kernel of modular transformation in 2d CFT is an ordinary Fourier transformation at the perturbative level will be traced down to the commutation relation between the check-operator monodromies of the exponential resolvent operator in the underlying Dotsenko-Fateev matrix models and beta-ensembles. To this end, the conformal blocks is treated as eigenfunctions of the monodromy check operators and the kernel of the modular transformation is then defined as the intertwinner of the two monodromies, and can be obtained straightforwardly.

MOROZOV Andrei
(ITEP, Moscow)
Advances in Knot Polynomials

Review of achievements and problems in the theory of colored knot polynomial. Accent is made on the current mystery around the differential expansion and Racah matrices in rectanhular representations.

RAZUMOV Alexander
(IHEP, Provitno)
Comparing oscillator and prefundamental representations

In the theory of quantum integrable systems there are two classes of fundamental objects, transfer operators and Q-operators. They act on the quantum space of the model. The transfer operators are constructed as the traces of the monodromy operators acting on the tensor product of the auxiliary space and the quantum space over the auxiliary space. In the quantum group approach one constructs the monodromy operators from the universal R-matrix choosing representations for the corresponding Borel subalgebras. For the transfer operators one takes for the auxiliary and quantum spaces general Verma-type representations. Bazhanov, Lukyanov and Zamolodchikov suggested to construct Q-operators in a similar way as the traces of the appropriate monodromy-type operators. Here for the auxiliary space one uses the so-called oscillator representations. Recently, Hernandez and Jimbo introduced the concept of prefundamental representations of the Borel subalgebras. In the talk the connection of the oscillator and the prefundamental representations for the quantum groups related to the loop algebras of the Lie algebras sl_{l+1} is discussed.

RIBAULT Sylvain
(Institut de physique théorique, CEA-Saclay)
A conformal bootstrap approach to the Potts model

We study four-point functions of the Potts model, with two-dimensional critical percolation as a special case. We propose an exact Ansatz for the spectrum: an infinite, discrete and non-diagonal combination of representations of the Virasoro algebra. Based on this Ansatz, we compute four-point functions using a numerical conformal bootstrap approach. The results agree with Monte-Carlo computations of connectivities of random clusters.

ROSSO Alberto
(Laboratoire de Physique Théorique et Modèles Statistiques, Orsay)
Extreme value statistics of 2d Gaussian Free Field

We study minima statistics of the 2d Gaussian Free Field on circles and intervals. Free energy distributions of the associated Random Energy models are exactly calculated in the high temperature phase, and shown to satisfy the duality property, which enables us to predict the minima distribution by assuming the freezing scenario. The effect of the boundary condition is also discussed in detail.

SALEUR Hubert
(Institut de physique théorique, CEA-Saclay)
Entanglement entropy in non-unitary spin chains and CFTs

Entanglement entropy has proven invaluable to our understanding of quantum criticality. It is natural to try to extend the concept to "non-unitary quantum mechanics", which has seen growing interest from areas as diverse as open quantum systems, non interacting electronic disordered systems, or non-unitary conformal field theory (CFT). We propose and investigate such an extension here, by focussing on the case of one dimensional quantum group symmetric or supergroup symmetric spin chains. We show that the consideration of left and right eigenstates combined with appropriate definitions of the trace leads to a natural definition of Renyi entropies in a large variety of models. We interpret this definition geometrically in terms of related loop models and calculate the corresponding scaling in the conformal case. This allows us to distinguish the role of the central charge and effective central charge in rational minimal models of CFT, and to define an effective central charge in other, less well understood case. The example of the $sl(2/1)$ alternating spin chain for percolation is discussed in detail.

SHIROKOV Dmitry
(National Research University High School of of Economics, Moscow)
On connection between two sets of higher-dimensional gamma matrices

and a primitive field equation

We present a generalization of Pauli's theorem about connection between two different sets of Dirac's gamma-matrices to the cases of real and complex Clifford algebras of arbitrary dimension. Also we extend this theorem to the case of the sets depending smoothly on points of a pseudo-Euclidian space. We prove a local variant of this theorem and discuss relation between a global variant of this theorem and a primitive field equation.

VANHOVE Pierre
(Institut de physique théorique, CEA-Saclay)
The sunset in the mirror : a regulator for inequality in the masses

We study the Feynman integral for the sunset graph defined as the scalar two-point self-energy at two-loop order. The Feynman integral is evaluated for all inequal internal masses in two space-time dimensions. Two calculations are given for the Feynman integral; one based on an interpretation of the integral as an inhomogeneous solution of a classical Picard-Fuchs differential equation, and the other using arithmetic algebraic geometry, motivic cohomology, and Eisenstein series. Both methods use the rather special fact that the Feynman integral is a family of regulator periods associated to a family of elliptic curves. Using an Hodge theoretic (B-model) approach, we show that the integral is given by a sum of elliptic dilogarithms evaluated at the divisors determined by the punctures. Secondly we associate to the sunset elliptic curve a local non-compact Calabi-Yau 3-fold, obtained as a limit of elliptically fibered compact Calabi-Yau 3-folds. By considering the limiting mixed Hodge structure of the Batyrev dual A-model, we arrive at an expression for the sunset Feynman integral in terms of the local Gromov-Witten prepotential of the del Pezzo surface of degree 6. 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.

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

VARGAS Vincent
(Niels Bohr Institute, Copenhagen)
Ward and Belavin-Polyakov-Zamolodchikov (BPZ) identities for Liouville quantum field theory on the Riemann sphere

The foundations of modern conformal field theory (CFT) were introduced in a 1984 seminal paper by Belavin, Polyakov and Zamolodchikov (BPZ). Though the CFT formalism is widespread in the physics literature, it remains a challenge for mathematicians to make sense out of it. Liouville CFT (or quantum field theory) is an important class of CFTs which can be seen as a random version of the theory of Riemann surfaces. In a recent work, we constructed the correlation functions (and the random measures) of Liouville CFT in the Feynman path formalism using probabilistic techniques. In this talk, I will present a rigorous derivation of the so-called Ward and BPZ identities for Liouville CFT. These identities are the building blocks of the CFT formalism. In the context of Liouville CFT, they are the basis to compute the correlations of the theory and to establish the correspondence between the Feynman path formalism and the algebraic formalism based on the Virasoro algebra.

Based on joint works with F. David, A. Kupiainen and R. Rhodes.

VOLKOV Boris
(Moscow State University)
Stochastic Levy differential operators and gauge fields

The stochastic Levy differential operators are defined by analogy with the deterministic Levy Laplacian. Some relationship between stochastic Levy differential operators and the Yang-Mills equations are studied. The definition of the Levy Laplacian as the Cesaro mean of the second directional derivatives is used. The theorem that the Yang-Mills equations for a connection and the Levy-Laplace equation for a parallel transport are equivalent is shown to be invalid in the stochastic case in contrast to the deterministic case. An equation for a stochastic parallel transport, which contains the Levy divergence and is equivalent to the Yang-Mills equations, is obtained.

XIANGYU CAO
(Laboratoire de Physique Théorique et Modèles Statistiques, Orsay)
Minimum position of 2d Gaussian Free Field and Liouville theory

We relate correlation functions in $c \geq 25$ Liouville theory with the problem of extreme values of logarithmic correlated random variables. In particular, we show that this connection provides an exact prediction of the minimum position distribution of a 2d Gaussian Free Field plus a logarithmic confining potential.

ZABRODIN Anton
(ITEP, Moscow)
Large N expansion of beta-ensembles

We introduce a model of the logarithmic gas (the β-ensemble) on an arbitrary closed contour in the plane. The 1/N expansion is based on the loop equation of a general form of a boundary condition for an analog of the stress-energy tensor. The first three terms of the $1/N$ expansion of the free energy are calculated explicitly.

ZENKEVICH Yegor
(ITEP, INR, Moscow)
Integrability in refined topological strings

We study refined topological string amplitudes on toric Calabi-Yau threefolds. We find that the amplitudes for certain values of Kahler parameters are related by the R-matrix of the DIM algebra. We give a simple recipe to find the R-matrix, prove the RTT relations and study integrals of motion, which are related to the Bazhanov-Lukyanov-Zamolodchikov integrals of 2d CFT. The resulting integrable structure is also interesting from the point of view of 5d gauge theories and matrix models.