

# Synthesis of integrabilities in the context of duality between the string theory and gauge theories.

9–13 September, Moscow

		Mon	Tue	Wed	Thu		Fri
Steklov Mathematical Institute, Room 430	11:30–12:30	Anokhina	And. Morozov	Zenkevich	Orlov	11:30–12:30	Sopenko
	12:45–13:45	Kruglinskaya	Aminov	Popov	Sleptsov	12:45–13:45	Helminck
	14:00–15:00	Akhmedov	Danilenko	Yoshida	Runov	14:00–15:00	Rosly
Higher School of Economics, Room 317 (Mon), 1001 (Tue–Thu)	17:00–18:00	Slepukhin	Zabrodin	Natanzon	Nemkov	15:00–16:00	Nawata
	18:15–19:15	Kanno	Zotov	Kazarian	Marshakov/ Gavrilenko	16:00–17:00	Lando*
	19:30–20:30	Yoshioka	Nawata	Anokhina	Nawata		

\*To be confirmed

## Monday, 9 September

1. Anokhina, TBA
2. Kruglinskaya, Complex volume and cluster algebra.
3. Akhmedov, What is Quantum Field Theory in de Sitter?
4. Slepukhin, Kinetic equation for scalar field theory in de Sitter space. Heavy particles.
5. Kanno, Superconformal index with surface defect and Macdonald polynomial (A review).
6. Yoshioka,  $q$ -Virasoro/W Block at Root of Unity and 2d-4d Connection.

## Tuesday, 10 September

1. And. Morozov, Evolution method for the Knot Polynomials.
2. Aminov, On Double Elliptic Systems and Theta Function Identities.
3. Danilenko, TBA
4. Zabrodin, Quantum transfer matrices and classical tau-functions.
5. Zotov, Algebraic Bethe ansatz for quantum spin chains via classical many-body systems
6. Nawata, Knot homology and 3d gauge theory.

## Wednesday, 11 September

1. Zenkevich, Quantum spectral dualities.
2. Popov, TBA
3. Yoshida, Schrodinger Sigma Models and Jordanian Twists.

*Abstract: We consider the classical integrable structure of two-dimensional non-linear sigma models defined on 3D Schrodinger spacetime (called the Schrodinger sigma models). The global symmetry is  $SL(2)_L \times U(1)_R$ . The  $SL(2)_L$  symmetry is enhanced to the Yangian  $Y(sl(2))$ . We show that the  $U(1)_R$  symmetry is enhanced to a Jordanian twisted Yangian.*

4. Natanzon, Symmetric dispersionless 2D Toda hierarchy and double Hurwitz numbers.
5. Kazarian, Symplectic geometry of Chekhov-Eynard-Orantin recursion.

*Abstract: The topological recursion of Chekhov-Eynard-Orantin is a procedure allowing one to reconstruct partition functions in numerous problems of mathematical physics. The power of this method is justified by a huge number of manifesting examples, however, in most cases its validity is usually considered as a miraculous coincidence without a proper explanation why it should work.*

*In the talk, we describe a geometric background to the topological recursion providing a better understanding of its nature. We show that the possible partition functions obtained by this recursion are in one-to-one correspondence with the Lagrangian subspaces in the infinite dimensional symplectic vector space. The symplectic group acts on the space of partition functions by mean of ‘quantization of quadratic Hamiltonians’. As an immediate corollary we obtain, for example, that the Gromov-Witten potentials of complex varieties, and more general, those of any CohFT are particular examples of general partition functions, therefore, they automatically always satisfy relations of topological recursion.*

*As it is shown in the recent joint paper with Dunin-Barkowski, Orantin, Shadrin, and Spitz, the above correspondence applied to the simplest non-trivial case of Hurvitz potential provides an independent proof of the Bouchard-Marinino conjecture and the ELSV formula.*

6. Nemkov, Modular transform of four-point conformal blocks as Fourier transform.

### **Thursday, 12 September**

1. Orlov, Tau functions, matrix integrals and character expansions.
2. Sleptsov, TBA
3. Runov, TBA
4. Nawata, Knot homology and 3d gauge theory (II).
5. Marshakov, TBA
6. Gavrilenko, TBA
7. Anokhina, TBA

### **Friday, 13 September**

1. Sopenko, TBA
2. Helminck, Hierarchies of pseudo difference operators and their Darboux transformations.
3. Rosly, On self-dual Yang-Mills theory.
4. Nawata, Knot homology and 3d gauge theory (III).
5. Lando, TBA