Summer School

July 31–August 4

July 31, Monday

09:00–09:55	Registration
09:55–10:00	Welcome word (Nicolai Reshetikhin)
10:00–12:00	Ivan Corwin
12:00–14:00	Lunch
14:00–16:00	Fedor Smirnov
17:30–20:00	Welcome party

August 1, Tuesday

10:00–12:00	Ivan Corwin
12:00–14:00	Lunch
14:00–15:00	Nicolai Reshetikhin
15:00–15:30	Coffee break
15:30–16:30	Nicolai Reshetikhin
16:30–17:30	Boris Vertman

August 2, Wednesday

10:00–11:00	Philippe Di Francesco
11:00–12:00	Nicolai Reshetikhin
12:00–14:00	Lunch
14:00–16:00	Fedor Smirnov

17:30–20:00 Boat trip

August 3, Thursday

10:00–11:00 Philippe Di Francesco

11:00–12:00 Senya Shlosman

12:00–14:00 Lunch

14:00–15:00 Boris Vertman

15:00–15:30 Coffee break

15:30–17:30 Senya Shlosman

August 4, Friday

10:00–11:00 Philippe Di Francesco

11:00–12:00 Senya Shlosman

12:00–14:00 Lunch

14:00–16:00 Anatoly Vershik

Titles and Abstracts of Lectures

Ivan Corwin

Stochastic Quantum Integrable Systems

In this series of lectures I will explain how structures from quantum integrable systems can be employed to discover and analyze a variety of probabilistic systems. Studying asymptotics of these systems reveals universal behaviors which should hold true for larger universality classes.

Fedor Smirnov

Fermionic basis and exact correlation functions for integrable models

After a brief introduction into the fermionic basis I shall explain how it helps to compute the correlation functions. The basic idea behind the computation is that of the Operator Product Expansion (OPE). I shall explain that with the new method one can go much further than with existing one. More importantly I shall formulate a problem of finding exact coefficients of the OPE expansion.

Nicolai Reshetikhin

Limit shapes and fluctuations in dimer models

The first lecture will be an overview of dimer models and of their reformulation in terms of heigh functions. A brief reminder of the limit shape phenomenon will be given in the second lecture. In the third lecture the formula for correlation functions will be derived in a special case and a conjecture relating correlation functions for fluctuations of the height function and the large deviation functional will be given.

Boris Vertman

Kähler geometry, Bergman kernel, Quantum Hall effect

In the first lectute we recall basic aspects of Kähler geometry and introduce the Bergman kernel. In the second lecture we discuss its asymptotic expansion and its relation to the Quantum Hall effect.

Philippe Di Francesco

Integrable Combinatorics: application to the arctic curve phenomenon

Tiling problems of finite domains often exhibit an arctic curve phenomenon, which for large domains exhibits a separation (arctic curve) between a frozen phase (typically induced by corners) and a liquid/disordered phase away from the boundaries. The aim of these lectures is to present various approaches to the determination of these arctic curves. We will mainly focus on the example of the domino tilings of the Aztec diamond.

Lecture 1 Lorentzian quantum gravity and paths; non-intersecting lattice paths; application to the combinatorics of domino tilings

Lecture 2 The tangent method; application to the domino tilings.

Lecture 3 The cluster algebra approach and discrete integrability; exact solutions of the T-system; arctic curves for inhomogeneous tilings.

Senya Shlosman

On 3D Ising model and Airy diffusions

(To be announced)

Anatoly Vershik

Early history of the limit shape theorems

The lectures are based on papers of the period 1970–2000.

Lecture 1. General posing of the problem; link with group theory, statistical physics and number theory.

Lecture 2. Invariant measures on the space of tableaux; variational principle, examples.