

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Anton Dzhamay**

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报告题目:

**Gap Probabilities in  $q$ -Racah tiling  
model and  
discrete Painless equations**

邀请人: 胡星标 研究员

报告时间: 2018 年 6 月 19 日 (周二)

下午 15:00-16:00

报告地点: 数学院思源楼九层

915 教室

## **Abstract:**

It is well-known that important statistical quantities, such as gap probabilities, in various discrete probabilistic models of random matrix type satisfy the so-called discrete Painlevé equations, which provides an effective way to computing gap probabilities. In this talk we discuss this correspondence for a particular class of models, known as boxed plane partitions (equivalently, lozenge tilings of a hexagon). For uniform probability distribution, this is one of the most studied models of random surfaces. Borodin, Gorin, and Rains showed that it is possible to assign a very general elliptic weight to the distribution, with various degenerations of this weight corresponding to the degeneration cascade of discrete polynomial ensembles, such as Racah and Hahn ensembles and their  $q$ -analogues. This also correspond to the degeneration scheme of discrete Painlevé equations, due to Sakai. The connection between the two is given by the isomonodromy theory. In this project we use geometry to study this correspondence, as well as the degeneration. In particular, we show that gap probabilities in the  $q$ -Racah tiling model can be computed in terms of discrete Painlevé equation of type  $E_{7}^{(1)}$ . This, in turn, gives us a new symmetric Lax pair for this equation.

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