

# Spectra of Random Operators and Related Topics

## ランダム作用素のスペクトルと関連する話題

- December 10-12, 2015; 平成 27 年 12 月 10 日 (木) – 12 日 (土)
- Keio University (Hiyoshi Campus), Building “Raiosha”, Conference Room M.  
慶應義塾大学 (日吉キャンパス) 来往舎中会議室

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### Program

**12 月 10 日 (木) /December 10**

**10:00-10:50** Fumihiko Nakano (Gakushuin University, Tokyo, Japan)  
TBA

**11:00-11:50** Dhriti Ranjan Dolai (Institute of Mathematical Sciences, Chennai, India)  
Spectral statistics of random Schrödinger operators with unbounded potentials.

**11:50-13:30** Lunch Break

**13:30-14:20** Christopher Shirley (Université Libre de Bruxelles, Brussels, Belgium)  
Spectral statistics for one-dimensional random operators.

**14:30-15:20** Christian Sadel (Institute of Science and Technology, Klosterneuburg, Austria)  
SDE limit for products of random matrices and GOE limit for Anderson model on long strips. (joint with B. Virag)

**15:40-16:30** Shin'ichi Kotani (Osaka University, Osaka, Japan)  
TBA

**16:40-17:30** Tohru Koma (Gakushuin University, Tokyo, Japan)  
Quantization of conductance in quasi-periodic quantum wires.

**12月11日（金）/December 11**

**10:00–10:50** Takuya Mine (Kyoto Institute of Technology, Kyoto, Japan)

Trace formula for the Aharonov-Bohm magnetic fields.

**11:00–11:50** Frédéric Klopp (Université Pierre et Marie Curie, Paris, France)

TBA

**11:50–13:30** Lunch Break

**13:30–14:20** Keith Slevin (Osaka University, Osaka, Japan)

Numerical simulation of the Anderson-Heisenberg model.

**14:30–15:20** Tomi Ohtsuki (Sophia University, Tokyo, Japan)

Disordered Chern insulator and Weyl semimetal.

**15:40–16:30** Taro Kimura (Keio University, Yokohama, Japan)

Matrix integral and representation theory: a physical point of view.

**16:40–17:30** Trinh Khanh Duy (Kyushu University, Fukuoka, Japan)

Spectral measures of random Jacobi matrices associated with Gaussian and Wishart beta ensembles.

**12月12日（土）/December 12**

**10:00–10:50** Tomohiro Sasamoto (Tokyo Institute of Technology, Tokyo, Japan)

Stochastic dualities for asymmetric interacting particle systems.

**11:00–11:50** Taro Nagao (Nagoya University, Nagoya, Japan)

Replica analysis of directed scale-free networks

**12:00–12:50** Makoto Katori (Chuo University, Tokyo, Japan)

Noncolliding pinned Brownian motions.

本研究集会は科学研究費助成事業課題番号 26400148 および学習院大学客員研究員助成金の支援を受けています。

This workshop is supported by JSPS KAKENHI Grant Number 2640018 and Grant for Visiting Research Fellow (Gakushuin University).

(November 18, 2015)

## Abstracts

### **Kimura, Taro: Matrix integral and representation theory: a physical point of view.**

We discuss the unitary matrix integral, especially from a physical point of view. This integral is potentially connected with representation theory, and typically applied to Chern-Simons theory, knot theory, and their generalizations. This talk is partly based on arXiv:1408.0020 and arXiv:1503.01462.

### **Sadel, Christian: SDE limit for products of random matrices and GOE limit for Anderson model on long strips.**

We consider products of i.i.d. random matrices that are small perturbations of a fixed matrix  $T_0$ . After projecting out the fast growing directions by taking a Schur complement we find a limiting continuous time process in a critical scaling. This limit can be described by an SDE. Applied to the transfer matrices of random Schrödinger operators on strips one can describe the limiting point process of the eigenvalues in this scaling. Introducing some further scaling one can connect to a random matrix ensemble. Finally one can obtain GOE type statistics along certain subsequences of disorder parameter, length and width of the strip where length and width parameter go to infinity and the disorder to zero.