



**INDIAN STATISTICAL INSTITUTE**  
Theoretical Statistics and Mathematics Unit  
Kolkata 700108

**SEMINAR**

Date: **18<sup>th</sup> August 2025, Monday**  
Time: **02:30 P.M**

Venue: **L-Infinity**  
5<sup>th</sup> Floor, A N Kolmogorov Bhavan,  
Theoretical Statistics and Mathematics Unit  
Indian Statistical Institute, Kolkata 700108

**TITLE**

**Discrete Quantum Group of Outer Automorphisms of von Neumann algebras**

**SPEAKER:**

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**ABSTRACT:**

The goal of this talk is to formulate a quantum group analogue of the group of outer automorphisms of von Neumann algebras equipped with a finite, faithful normal trace.

This will be done in the following two steps:

1. Let  $\mathcal{A}$  be an von Neumann algebra. Following the ideas due to S. Vaes, we construct a von Neumann algebraic discrete quantum group (DQG)  $\mathcal{Q}_{out}(\mathcal{A})$  as the universal object in the category of DQGs coacting on  $\mathcal{A}$ .
2. Moreover, if  $\mathcal{A}$  is also equipped with a finite faithful normal trace  $\tau$ , we construct a discrete quantum subgroup  $\mathcal{Q}_{out}^{\tau, kac}(\mathcal{A})$  which is an universal object in the category of  $\tau$ -preserving coactions on  $(\mathcal{A}, \tau)$  by Kac type DQGs.  
Then we construct the discrete quantum group of outer automorphisms of  $\mathcal{A}$ ,  $\mathcal{Q}_{out}^{\tau, kac}$ , by quotienting  $\mathcal{Q}_{out}^{\tau, kac}(\mathcal{A})$  by a suitable quantum normal subgroup  $\mathcal{Q}_{inn}(\mathcal{A})$  corresponding to what we call as 'inner' objects.

We will also try to discuss the discrete quantum outer automorphism groups for few concrete examples of finite dimensional von Neumann algebras.  
This is a joint work in progress with my supervisor Prof. Debashish Goswami.

**ALL ARE CORDIALLY INVITED**