

Probabilistic Operator Algebra Seminar

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May 18 **Doron Puder**, Tel Aviv University

Title: *On random permutations sampled by surface groups*

Let Γ_g be the fundamental group of the closed orientable surface of genus g , namely

$$\Gamma_g = \langle a_1, b_1, \dots, a_g, b_g \mid [a_1, b_1] \cdots [a_g, b_g] \rangle.$$

Fix an element $\gamma \in \Gamma_g$ and let $\phi: \Gamma_g \rightarrow S_N$ be a uniformly random homomorphism to the symmetric group S_N . We develop new techniques to study the random permutation $\phi(\gamma)$, and derive several results which are analogous to well-known results when Γ_g is replaced with a free group. In particular, we show the expected trace (namely, expected number of fixed points) of the random permutation $\phi(\gamma)$ is $O(1)$ whenever $\gamma \neq 1$. In the language of free probability, this means that the C^* -probability spaces defined on $C^*(\Gamma_g)$ by this trace on S_N converge to the regular C^* -probability space on $C^*(\Gamma_g)$.

This is joint work with Michael Magee (Durham, UK).