Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

November 15 **Bartosz Kołodziejek and Kamil Szpojankowski,**
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Title: *A phase transition for tails of the free multiplicative convolution powers*

In the talk we will discuss the problem of the tail behavior of free multiplicative convolution powers $\mu^{\boxtimes t}$, $t \geq 1$. We consider measures μ on the positive half-line with regularly varying tail, which means that

$$\mu\left((x, +\infty)\right) \sim x^{-\alpha} L(x), \tag{1}$$

where L is a slowly varying function, and $f(x) \sim g(x)$ means that $g(x)/f(x) \to 1$ as $x \to +\infty$.

In the first part of the talk we will completely characterize the behavior of the S-transform at 0^- of measures with regularly varying tails.

In the second part of the talk we will show some application of this result. In particular we will show that there is a phase transition in the tail behavior of $\mu^{\boxplus t}$, for measures as in (1), between regimes $\alpha < 1$ and $\alpha > 1$. Further we show the free probability analogue of Breiman's lemma and discuss tail behavior of $\boxtimes$-infinitely divisible measures in terms of the tail behavior of the corresponding Levy measure.