

Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

March 12 **David Jekel**, Fields Institute

Title: *Combinatorial aspects of Parraud's asymptotic expansion for GUE matrices*

We give a new combinatorial proof of Parraud's formula for the asymptotic expansion in powers of $1/N^2$ for the expected trace of polynomials of several independent $N \times N$ GUE matrices, which expresses the result using a mixture of free difference quotients, introducing new freely independent semicircular variables, and integration with respect to parameters. Our approach streamlines the statement of the formula while clarifying its relationship to the combinatorial genus expansion.