Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

March 31 **Charles Bordenave**, University Aix-Marseille, CNRS.

Title: *Large deviations for macroscopic observables of heavy-tailed random matrices*

This is a joint work with Alice Guionnet and Camille Male. We consider a finite collection of independent Hermitian heavy-tailed random matrices of growing dimension. Our model includes the Levy matrices proposed by Bouchaud and Cizeau, as well as sparse random matrices with $O(1)$ non-zero entries per row. By representing these matrices as weighted graphs, we derive a large deviations principle for key macroscopic observables. Specifically, we focus on the empirical distribution of eigenvalues, the joint neighborhood distribution, and the joint traffic distribution. As an application, we define a notion of microstates entropy for traffic distributions which is additive for free traffic convolution.