ID de Contribution: **1** Type: **Non spécifié**

Grassmann Calculus for the combinatorics of Spanning Trees and Forests

mercredi 29 octobre 2025 13:30 (1 heure)

In this talk we will make a survey of how techniques of "Grassmann Calculus", that is, integration of expressions involving anticommuting variables, provide fermionic analogues of Gaussian integration, Wick's Theorem and perturbative field theory. These techniques are specially fruitful for describing certain combinatorial models in Statistical Mechanics, namely $n = 2$ Loop Models, Spanning Trees, and Spanning Forests.

If the time permits, we will also show how the model of Spanning Forests, in its Grassmann-variable formulation, has a hidden $\mathrm{OSp}(1|2)$ supersymmetry, that, by the Parisi–Sourlas mechanism, implies that it must be in the same universality class of the $O(n)$ loop model in the analytic continuation $n \to -1$.

Mostly based on (old) works in collaboration with S. Caracciolo and A.D. Sokal.

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