ID de Contribution: **3**   Type: **Non spécifié**

Random partitions and topological expansion of 2D Yang-Mills partition function

mercredi 19 juin 2024 16:30 (1 heure)

In the fifties, Chen Ning Yang and Robert Mills made a major breakthrough in quantum field theory by extending the concept of gauge theory to non-abelian groups. Since then, the study of Yang-Mills theory has been a very active field of research both in mathematics and physics. In particular, in the last two decades, significant progress has been made on the rigorous mathematical understanding of the theory on two-dimensional manifolds with gauge group U(N) or SU(N), and of their limit as N grows to infinity. If this talk, I will how the probabilistic study of well chosen random partitions allows us to give rigorous proofs of some topological expansions of the partition function predicted by physicists Gross and Taylor in the nineties. This is joint work with Thibaut Lemoine (Université de Lille).

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