UNIVERSITÄT BIELEFELD

Faculty of Physics
Faculty of Mathematics

THE UNIVERSITY OF MELBOURNE

Seminar

Bielefeld - Melbourne Random Matrices

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Entanglement entropy and hyperuniformity of determinantal point processes

We will show that, under a condition on the Schatten p norms (p<1) of the Toeplitz operator associated with the kernel of a DPP, whose symbol is the indicator function of a domain, the bipartite entanglement entropy is proportional to the variance. This leads to equivalences between hyperuniformity classes and classes of growth for the entanglement entropy (area law and area law with log correction). Examples include the fermionic model in several dimensions considered by Gioev and Klich (PRL, 2006), which is a multidimensional version of the sine DPP, where a log correction to the area law shows up; the fermionic model on Riemann surfaces of Charles and Estienne (CMP, 2020, a work which strongly influenced this research), the infinite Ginibre process and its polyanalytic versions in higher Landau levels, which belong to the large class of Weyl-Heisenberg ensembles, a DPP defined via the action of the Heisenberg group, dependent on a function g (for choices of g within Hermite functions we are led to the mentioned Ginibre-type ensembles). These last classes of DPPs enjoy an area law as a consequence of their Class I hyperuniformity.

Wednesday, 28 June 2023,
0900 hrs CEST

Zoom Conference call— Please contact Lucas Hackl (Lucas.Hackl@unimelb.edu.au) for details regarding access