



**UNIVERSITÄT  
BIELEFELD**



Faculty of Physics



Faculty of Mathematics



THE UNIVERSITY OF  
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# Seminar

Bielefeld - Melbourne Random Matrices

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### Entropy fluctuation formulas of fermionic Gaussian states

We study the statistical behaviour of entanglement in quantum bipartite systems over fermionic Gaussian states as measured by von Neumann entropy. The average von Neumann entropy formulas with and without particle number constrain have been recently obtained, whereas the main results of this work are the exact yet explicit formulas of the corresponding variances. In particular, the results resolve the recent conjecture on the variance in the case of no particle number constrain. Different than the previous methods in computing the exact variances in other generic state models, the key ingredient in proving the results of this work relies on a new simplification framework. The new framework consists of a set of new tools of what we refer to as dummy summation and re-summation techniques in simplifying finite summations. As a byproduct, the proposed framework leads to various new transformation formulas of hypergeometric functions

**Wednesday, 11 January 2023,  
0900 hrs CEST**

Zoom Konferenzschaltung— Please contact Leslie Molag  
([lmolag@math.uni-bielefeld.de](mailto:lmolag@math.uni-bielefeld.de)) for details regarding access