Universität Bielefeld | Fakultät für Physik

Mathematical Physics Seminar

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Eigenvector correlations for quaternionic Ginibre ensembles

Non-Hermitian matrices feature distinct left and right eigenvectors, neither of which forms an orthonormal system, while both sets together satisfy bi-orthogonality. It was suggested by Chalker and Mehlig in 2000 to study the statistics of eigenvector overlaps, in particular their correlation functions. For complex Ginibre ensembles they obtained one-point and two-point eigenvector correlations via Schur decomposition for finite N as well the corresponding limiting behaviour. Recently, several works by Bourgade, Dubach, and Fyodorov have brought new attention to the topic, establishing the results for the complex ensembles rigorously and deriving similar results for the real and quaternionic cases.

In this talk, I will present how Chalker's and Mehlig's approach is applied to quaternionic Ginibre matrices, leading to correlation functions that can be written compactly in terms of Pfaffian determinants. Given one purely imaginary eigenvalue, the formulae simplify, enabling us to derive the limiting behaviour near the origin of the complex plane. Finally, I will report on the limiting behaviour for one-point and two-point correlation functions for eigenvalues inside the bulk, which turn out to be identical to the limits in the real and complex cases.

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