

# AG Zufallsmatrizen

# Seminar

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## **Local inhomogeneous circular law**

The density of eigenvalues of large random matrices typically converges to a deterministic limit as the dimension of the matrix tends to infinity. In the Hermitian case, the best known examples are the Wigner semicircle law for Wigner ensembles and the Marchenko-Pastur law for sample covariance matrices. In the non-Hermitian case, the most prominent result is Girko's circular law: The eigenvalue distribution of a matrix  $X$  with centered, independent entries converges to a limiting density supported on a disk. Although inhomogeneous in general, the density is uniform for identical variances. In this special case, the local circular law by Bourgade et al. shows this convergence even locally on scales slightly above the typical eigenvalue spacing. In the general case, the density is obtained via solving a system of deterministic equations. In my talk, I explain how a detailed stability analysis of these equations yields the local inhomogeneous circular law in the bulk spectrum for a general variance profile of the entries of  $X$ . This result was obtained in joint work with Laszlo Erdos and Torben Krueger.

**Monday, 18.12.2017, 14:15 Uhr**  
**V3-201**