



Der Wissenschaftsfonds.



Einladung

zum Vortrag im Rahmen des **SFB Colloquiums** (Standort Graz), mit dem Titel

Operator norms of structured Gaussian random matrices

VORTRAGENDER: **Joscha Prochno**, University of Hull, UK

DATUM: Freitag, 2. Februar 2018

ZEIT: 13:15 Uhr

ORT: KFU Graz

Abstract: Random matrices and their spectra are under intensive study in Statistics since the work of Wishart on sample covariance matrices in the 1920s, in Numerical Analysis since their introduction by von Neumann and Goldstine in the 1940s, and in Physics as a consequence of Wigners work on heavy nuclear atoms since the 1950s.

In fact, much of the random matrix theory revolves about the limit properties of the spectrum of large N times N random matrices as the dimension N tends to infinity, for instance, Wigner's semicircle law, the Marchenko-Pastur law or the Bai-Yin and Tracy-Widom laws. However, many applications require understanding what happens for a fixed dimension N rather than in the limit. This means we have to understand the spectrum of random matrices for finite N , which results in quantitative estimates that hold (up to universal constants) in all dimensions with high probability. That "non-asymptotic" part of random matrices is what we are interested in. The non-asymptotic theory of random matrices has important applications in Banach Space Theory and Asymptotic Geometric Analysis. Here random matrices appeared already in the 70s and were, for example, successfully used to characterize (p, q) -absolutely summing operators on Hilbert spaces. Ever since, random matrices are extensively studied and methods of Banach spaces have produced numerous deep and new results. In particular, in many applications the spectral properties of a Gaussian matrix, whose entries are independent identically distributed (i.i.d.) standard Gaussian random variables, were used. In this setting a lot is known, whereas we know much less when the entries are independent but not identically distributed. In this talk, we present quantitative estimates for the expected value of operator norms of Gaussian random matrices with independent and mean-zero entries (not necessarily identically distributed), i.e., random Gaussian matrices with a non-trivial variance structure. The talk is based on joint work with O. Guédon, A. Hinrichs, and A.E. Litvak.