



**UNIVERSITÄT
BIELEFELD**



Faculty of Physics



Faculty of Mathematics



THE UNIVERSITY OF
MELBOURNE

Seminar

Bielefeld - Melbourne Random Matrices

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Reflective intelligent surfaces: random matrices in 6G wireless systems modeling

Radio channel modeling and system performance analysis for wireless communications exploit random matrix theory since the very introduction of the multi-antenna transmission paradigm in late '90's. Matrices from polynomial ensembles have been providing realistic and analytically handy models for communications taking place at frequencies typical of the third and fourth generation of mobile telephony, and still serve to analyze low-frequency performance in the most recent and currently developing fifth generation.

The shift to far-higher frequencies planned for fifth and, especially, sixth generation of mobile communications is leading to the adoption of radio channel models putting emphasis on geometry-related rather than on scattering-related information.

In this scenario, both Euclidean as well as random Vandermonde matrices play a major role.

The talk focuses on a representative case of 6G multi-antenna link, where signal transmission from transmit to receive uniform linear array is aided by a so-called "reflective intelligent surface", a passive device with signal-bearing capabilities only. This involves the analysis of products of random Vandermonde matrices with complex entries of unit modulus, with either random or deterministic matrices interspersed.

Wednesday, 21 April 2021, 0900 hrs CEST

Zoom Konferenzschaltung— Please contact Gernot Akemann
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