



**UNIVERSITÄT  
BIELEFELD**



Faculty of Physics



Faculty of Mathematics



THE UNIVERSITY OF  
MELBOURNE

# Seminar

Bielefeld - Melbourne Random Matrices

## Tamara Grava

Bristol University

### **Gibbs ensemble for Integrable Systems, a case study: the discrete nonlinear Schrödinger equation**

When the initial data of a discrete integrable system is sampled according to a probability measure, the Lax matrix of the system becomes a random matrix. The goal is to study the spectrum of random Lax matrices of integrable systems. In this setting we consider the discrete defocusing nonlinear Schrödinger equation in its integrable version, that is called Ablowitz Ladik lattice. When the initial data is sampled from the Gibbs ensemble the Lax matrix of the Ablowitz Ladik lattice turns into a random matrix that is related to the circular beta-ensemble at high temperature. We obtain the density of states of the random Lax matrix, when the size of the matrix goes to infinity, by establishing a mapping to the one-dimensional log-gas. The density of states is obtained via a particular solution of the double confluent Heun equation. Joint work with Guido Mazzuca.

**Tuesday, 23 November 2021, 0900 hrs CET**

Zoom Conference Call— Please contact Anas Rahman  
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