

## Abstracts - IRTG meeting at Ebernburg 2025

**Tobias Braun** (RWTH): Clifford Orders

Abstract: Clifford algebras play an important role in the algebraic theory of quadratic forms over numbers fields  $K$ , due to the famous Hasse-Minkowski Theorem. They can be described by a quadratic extension and an element in the Brauer group of  $K$ . Their arithmetic counterpart, Clifford orders of quadratic lattices over the ring of algebraic integers  $O_K$ , has not gotten much attention and the language to describe these is not yet well developed. In this talk, I present a selection of my results from Project A17 - Clifford Orders - of the previous second phase of the SFB-TRR 195.

Duration: 30-40 mins

**Lars Göttgens** (RWTH): The Computer Algebra System OSCAR

Duration: 30-40 mins

**Diego A. Robayo Bargans** (RPTU): Stable Weierstrass points of metric graphs

Subject: Tropical geometry, combinatorics

Duration: 20-30 mins

**Marie Roth** (RPTU): Character sheaves and modular representations of finite reductive groups - On the unitriangularity of the decomposition matrices

Abstract: Decomposition matrices encode the link between the complex irreducible representations of a finite group  $G$  and the irreducible representations of  $G$  over an algebraically closed field of characteristic  $l > 0$ . In general, these objects are very hard to compute. The next best approximation is asking whether the decomposition matrix of  $G$  is lower-unitriangular. We will discuss this property for finite groups of Lie type.

Remark: This talk was my PhD defense talk.

Duration: 45 mins

**Michael Schlößer** (RWTH): Fibres of linear degenerate short flags

Duration: 15 mins

**Wilken Steiner** (Siegen): The conjugacy problem in  $S$ -arithmetic groups

Abstract: This is a 15min snapshot talk about my doctoral project, which I started end of last year and has as its topic isomorphisms of lattices over orders. In the talk I will focus on the conjugacy problem in  $GL_n(R)$  for certain rings  $R$ , how it can be reduced to such an isomorphism problem, and the current state of knowledge with the plan of the thesis.

Duration: 15 mins

**Alexander Wendel** (UdS): Entrywise application of non-linear functions on orthogonally invariant matrices

Abstract: We show that the elementwise application of nonlinearities to orthogonally invariant random matrix ensembles, with respect to the asymptotic eigenvalue distribution, is equivalent to adding an independent GOE Matrix/a free semicircular element. This phenomenon is known as 'Gaussian equivalence principle'. The phenomenon even occurs when dealing with several random matrices that are correlated. For this, we use the combinatorics of set partitions, the symmetry of the ensembles, as well as properties of matrices that possess all correlation moments. The talk is based on joint work with Roland Speicher: arxiv: 2412.06943.

Duration: 20-30 mins