

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Freitag, 12. Dezember 2014, 10.15 Uhr

**Ort: Institut für Mathematik, Arnimallee 2 (Villa),
14195 Berlin, Seminarraum 001**

Disputation über die Doktorarbeit von

Frau Katharina Jochemko

**Thema der Dissertation:
On the Combinatorics of Valuations**

**Thema der Disputation:
Translational k -tilings by a polytope**

Die Arbeit wurde unter der Betreuung von **Prof. Dr. R. Sanyal** durchgeführt.

Abstract: A family T of translates of a polytope P is a k -tiling of Euclidean space if almost every point in space is covered by exactly k translates in T . The polytope P is called a prototile of T . If $k=1$, the usual notion of a translational tiling is recovered. A fundamental theorem for 1-tilings is the Venkov-Alexandrov-McMullen characterization. It states that a polytope is a prototile of a 1-tiling if and only if the polytope is centrally symmetric and all its facets are centrally symmetric, plus an extra combinatorial condition. A similar characterization for prototiles of k -tilings for integers $k>1$ currently seems out of reach.

However, Gravin, Robins and Shiryaev [Combinatorica, December 2012] recently made progress in that direction: They show that, as with 1-tilings, a prototile of a translational k -tiling is necessarily centrally symmetric and has only centrally symmetric facets.

They furthermore prove that, given a rational polytope, these conditions are sufficient for some k depending on the polytope.

We will present their results and outline their approach.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. R. Sanyal