

FREIE UNIVERSITÄT BERLIN  
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

## DISPUTATION

**Donnerstag, 13. Juli 2017, 15.15 Uhr**

**Ort: Raum 140, Arnimallee 7, 14195 Berlin**

**Disputation über die Doktorarbeit von**

**Herrn Jia-Yuan Dai**

**Thema der Dissertation:  
Spiral Waves in Circular and Spherical Geometries  
The Ginzburg-Landau Paradigm**

**Thema der Disputation:  
Generalized Latin squares**

Die Arbeit wurde unter der Betreuung von **Prof. Dr. B. Fiedler** durchgeführt.

Abstracts:

***Dissertation:***

We prove the existence of spiral waves for the complex Ginzburg-Landau equation in the circular and spherical geometries. Instead of applying the shooting method in the literature, we establish a functional approach and generalize the known results of existence for rigidly-rotating spiral waves. Moreover, we prove the existence of two new patterns: frozen spiral waves in the circular and spherical geometries, and spiral-pairs, that is, spirals with two tips, in the spherical geometry.

***Disputation:***

In the 18th century Choi Seok-Jeong and Euler invented Latin squares and studied their orthogonal mates, independently. Nowadays, the popular game Sudoku is a special type of Latin squares and orthogonal mates are important in modern experimental design. In April 2017, Brualdi and Dahl generalized the concepts of Latin squares and orthogonal mates by introducing alternating sign hypermatrices. In this talk we will characterize generalized Latin squares and introduce several interesting open problems.

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. B. Fiedler