A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Donnerstag, 12. Juni 2014, 10.00 Uhr

Ort: Erhard-Schmidt-Hörsaal, Erdgeschoss, Weierstraß-Institut, Mohrenstr.39, 10117 Berlin

Disputation über die Doktorarbeit von

Herrn André Fiebach

Thema der Dissertation:

A dissipative finite volume scheme for reaction-diffusion systems in hererogenenous materials

Thema der Disputation:

An introduction to semiconductor device simulation

Die Arbeit wurde unter der Betreuung von **Prof. Dr. V. John** durchgeführt.

Abstracts:

Disputationsvortrag: The simulation of fabrication processes for microelectronic devices is one possible application of the methods studied in the thesis. The simulation of the electrical operation is crucial in the development of semiconductor devices. Drift terms have to be added and the resulting drift-diffusion model, formulated by van Roosbroeck, is a well accepted mathematical description of charged carrier transport in semiconductor devices. In the first part of the talk the model is introduced and the qualitative properties of the equations will be summarized. Next, a discretization in space and time of the system is derived which preserves the physical properties of the continuous problem. The application of the numerical method to a CCD sensor illustrates the working principle of many electronic cameras.

Results of the thesis: The talk gives an short overview of the results of my thesis. First a model for reactiondiffusion systems with reversible reactions is introduced which is suitable for heterogeneous materials. Then a Voronoi finite volume method in space and implicit Euler in time discretization is introduced. Next, the new analytical results concerning the discretized problem obtained in the thesis will be summarized. A numerical example will demonstrate the stability of the method.

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. V. John