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DK Seminar

October 8, 2014, 14:00 -15:30

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Numerical scheme for spin-polarized drift-diffusion model

Abstract: In the talk I will present my most recent results on the model [1] describing spin-polarized electron transport in semiconductors on which I have been working from the beginning of my PhD studies [2]. In the last semester the work was concentrated mostly on the numerical scheme. PDEs of the model are discretized implicit in time and with finite volume method in space. The Newton's method was exploited to resolve a nonlinearity of the problem. Its application instead of Scharfetter-Gummel scheme [3], exploited in our work before, allowed to gain solution of the system with wider spectrum of parameters. Present results include analysis of the numerical scheme and presentation of a new numerical experiment.

REFERENCES

- [1] S. Possanner and C. Negulescu. Diffusion limit of a generalized matrix Boltzmann equation for spin-polarized transport. *Kinetic Related Models* 4 (2011), 1159-1191.
- [2] A. Jüngel, C. Negulescu, P. Shpartko. Bounded weak solutions to a matrix drift-diffusion model for spin-coherent electron transport in semiconductors, Preprint (2013) arXiv:1312.2461.
- [3] John J. H. Miller. *Computational methods for boundary and interior layers in several dimensions*. Boole Press, Dublin, 1991.