FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG

OPTIMIZATION
UNDER UNCERTAINTY
& DATA ANALYSIS

Master Thesis:

Optimization of Optical Particle Properties under Uncertainty

Tasks

In the context of optimizing optical properties of crystal structures, exciting questions arise. In general, the task is to decide for each site in a lattice whether a so-called absorber or otherwise a non-absorber should be placed. The optimization goal consists in determining an assignment for each site that minimizes the deviation to a desired color outcome. For this task, there already exists a practically efficient structure optimization method.

However, cracks in the crystaline structure may be present that can strongly affect its color spectrum. It is highly desirable to extend the optimization approach for placing absorbers in the crysrals' lattice by a (robust) protection against cracks. Recently, an algorithm has been developed for nonlinear robust optimization.

The task of the master thesis consists in performing a literature research on these two approaches (structure opimization and nonlinear robust optimization). Then, the goal is to integrate these into a unifying optimization framework. The aim is to algorithmically develop and to implement an integrated approach with some algorithmic specifications building upon the available methods. Knowledge in particle design is not necessary, however a background in optimization is highly required, for example in mixed-integer, nonlinear, robust or PDE-constrained optimization.

Contact

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Please send an email including your Transcript of Records, a short letter of motivation and the intended working period) to wima-abschlussarbeiten@lists.fau.de.