IMPRS UFAST Focus Course

Numerical Methods and Practical Skills for Computational Physics

Part II: Numerical Methods in Computational Physics

Lecturers: Heiko Appel, Henning Glawe
Hands-On exercises: Hans Fangohr, Henning Glawe, Nicolas Tancogne-Dejean, and Heiko Appel

Abstract:

Theory and experiment have been the two pillars of science that for centuries have underpinned our understanding of the world around us. With the advent of powerful computers, computational methods have emerged as a third pillar of science. Among other techniques, numerical methods, data analysis, and visualization have become indispensable tools for many scientists nowadays. This course intends to introduce basic numerical methods which allow to perform numerical simulations on modern computing platforms.

Topics include:

- Approximation of functions
- Root finding and solving nonlinear equations
- Numerical differentiation and integration
- Solving ordinary and partial differential equations
- Solving linear systems of equations
- Eigenvalue problems
- Optimization

In addition, in the course we provide hands-on exercises for participants to gain experience with high-performance computing environments. We intend to cover:

- Compiling and linking codes
- The Slurm queueing system and module environments
- Basic revision control with git
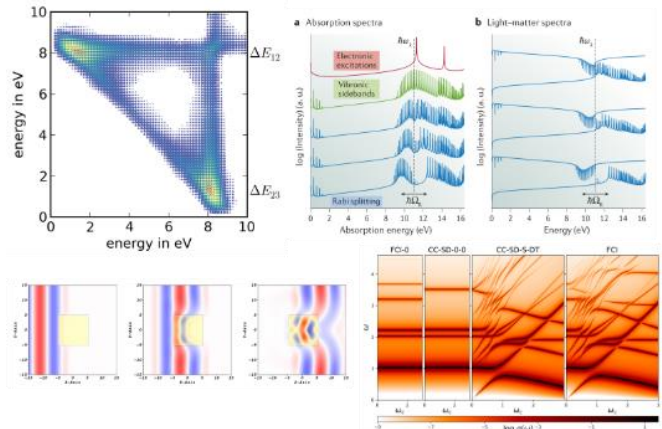
Basic Python knowledge, as for example provided by the course "Introduction to Programming with Python for Computational Science" is recommended for this course.

21st – 28th February 2022 (online course)
09:00h – 12:00h

Register on Geventis I-UF FC3