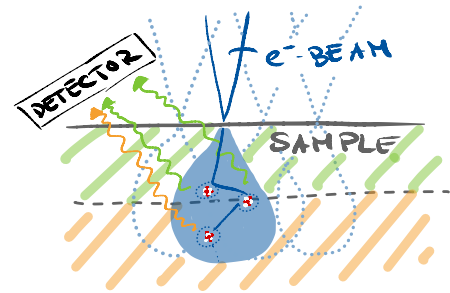


## HiWi-Job / Bachelor/ Master-thesis

### Topic: Subscale Material Imaging in Electron Probe Microanalysis

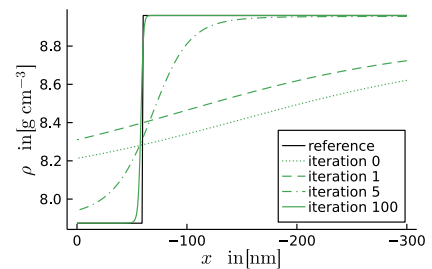
EPMA is a non-destructive imaging method for solid material samples. Intensity measurements of characteristic x-rays that are induced by an electron beam contain information about the materials structure and composition. Reconstructing the material constitutes the inverse problem of reconstruction in EPMA:



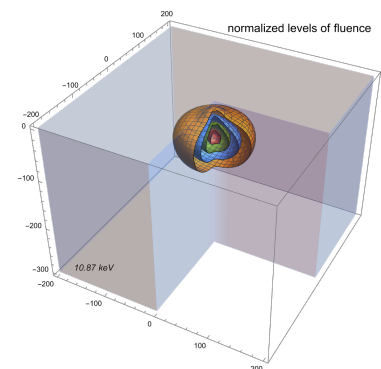
*"Find the material, such that a model reproduces the measured intensities best."*

#### What you will work with:

- gradient-based minimization
- adjoint methods (adjoint algorithmic differentiation, continuous adjoints)
- radiative transfer equation (e-transport)
- spherical harmonic moment approximation
- finite difference/finite volume solver
- julia programming language
- parametrization of the material/regularization
- statistical interpretation of the inverse problem



*If you are interested in applying your math/programming skills to a real-world problem, don't hesitate to contact us:*



Tamme Claus  
 Applied and Computational Mathematics (ACoM)  
 claus@acom.rwth-aachen.de  
 Rogowski 328d  
[acom.rwth-aachen.de/the-lab/team-people/name:tamme\\_claus](http://acom.rwth-aachen.de/the-lab/team-people/name:tamme_claus)

$$\langle y, Ax \rangle_Y = \langle A^* y, x \rangle_X$$

