

Electrostatic Lenses for High Energy Electron Microscopy

Bachelor / Master Thesis

Accelerator Physics / Computational Engineering

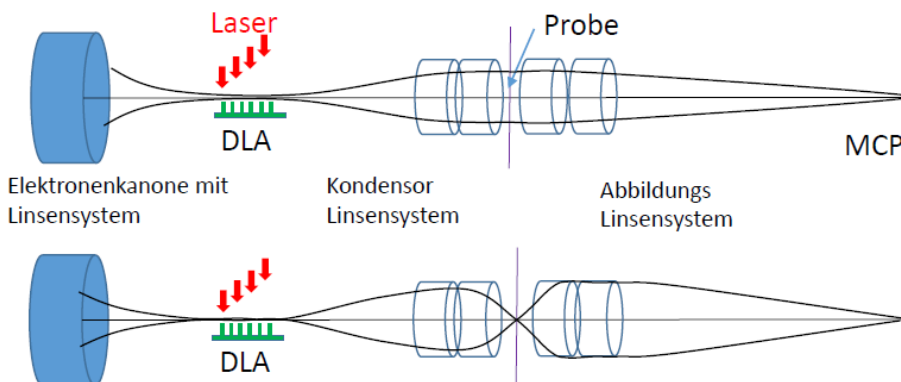
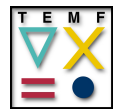
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Motivation

Dielectric Laser Accelerators (DLAs) have a key application: Boosting the energy of electron microscopes and electron diffractometers. In the ACHIP collaboration we are currently working towards a setup to accelerate electrons to at least twice the initial energy in the chip. These electrons are then to be sent through a sample either parallel (for diffraction) or hard-focused for scanning transmission electron microscopy. This thesis work shall design and simulate the electrostatic lensing system to do so.

Institut of Accelerator Science
and Electromagnetic Fields



Outline of an electrostatic lensing system for scanning transmission electron microscopy (bottom) and electron diffraction (top)

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Aim of the Bachelor / Master thesis

- Design of a simple lensing system (analytical methods)
- Simulation of the designed system (particle tracking)
- Optimization towards reduced aberrations and improved beam parameters

Requirements

Basic knowledge of accelerator physics, charged particle dynamics, numerical methods.