

Terahertz Streaking of Ultrashort Electron Pulses

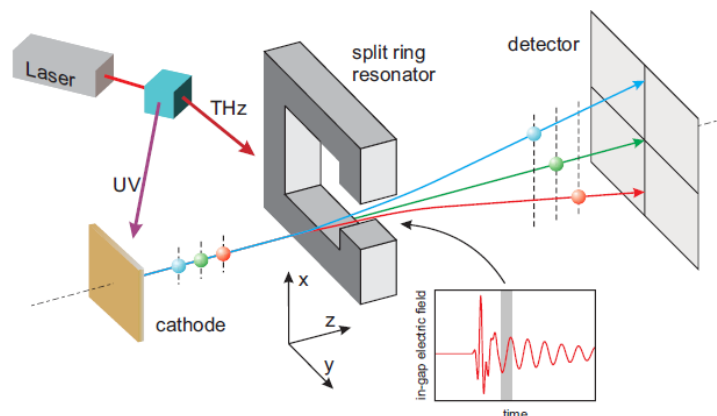
Bachelor / Master Thesis
Accelerator Physics / Computational Engineering
Start: variable



Motivation

Modern electron accelerators produce ultrashort electron pulses in the femtosecond regime. In order to characterize these pulses like in an oscilloscope, techniques employing Terahertz radiation are required. Sufficient THz amplitude is provided by a resonant split ring structure driven by optical rectification of a laser. The BSc/MSc thesis project includes the electromagnetic simulation of the split-ring and the electron dynamics therein. A voluntary opportunity to observe/join experiments at the FLUTE facility at KIT (Karlsruhe) will be given.

Institut of Accelerator Science
and Electromagnetic Fields



Prof. Dr. O. Boine-Frankenheim
Fachgebiet Beschleunigerphysik

Ansprechpartner/in:
Dr.-Ing. Uwe Niedermayer

Tel. +49 (0)6151 16-24039
niedermayer@temf.tu-
darmstadt.de

www.bp.tu-darmstadt.de

Setup by Fabianska, J., Kassier, G., Feurer, T. Split ring resonator based THz-driven electron streak camera featuring femtosecond resolution. *Sci. Rep.* 4, 5645

Aim of the Bachelor / Master thesis

- Electromagnetic Modeling and Simulation of THz Split-Ring
- Determination of detector image by particle tracking or analytical
- Generalization to more efficient/accurate structures

Requirements

Basic knowledge of accelerator physics, electromagnetic field theory, numerical simulations.