

Título puesto: Beam dynamics linear optics matching optimization for the ALBA II storage ring upgrade.

Curso: 2022/23

División: Accelerators

Descripción del proyecto:

Linear optics matching is a common procedure used during the accelerator optics design phase to establish magnets parameters required to achieve certain given beam characteristics. It is usually obtained through a numerical iterative search.

On the other hand, this approach does not fit very well in the context of massively automated optimization currently used in the design of the ALBA-II optics, where the time dedicated to match the linear optics account for a substantial fraction of the overall computational cost.

This project aim to investigate the possibility to speed up the matching process using a semi-analytical approach: A candidate solution is computed analytically from an approximated optics model and used as the starting condition for a numerical optimization so to reduce the required time.

The candidate will study the rudiments of accelerator linear optics, define formally the approximated matching problem using the linear optics matrix formalism and finally develop a python routine to solve (eventually with a symbolic mathematics package) the problem.

Perfil del estudiante:

Student profile: Physics student or similar engineering education

Requirements:

- Experience with programming languages like Python, C or Matlab.
- Good level of spoken and written English.

Program:

- Introduction to the Accelerator Physics
- Introduction to accelerator linear optics and matrix formalism
- Use of Python to simulate and optimize accelerator optics
- Documentation of the project.

Tutor: Michele Carlá

Responsable División: Francis Pérez