

Título puesto: Determination of insertion devices performance at ALBA II

Curso: 2024/25

División: Aceleradores

Descripción del proyecto:

The design studies to upgrade ALBA to a low emittance synchrotron light facility, which will be called ALBA II, are currently ongoing. These design studies are mainly aimed to minimize the electron beam emittance for the new storage ring. However, the properties of the emitted radiation in terms of photon beam flux, size and divergence are not given only by the electron beam emittance, but they depend also on other properties of the electron beam (beta function values at the source point, energy dispersion, etc.), and they are also affected by the field errors of the insertion devices themselves (customarily characterized by means of the phase error parameter).

In this project the student will investigate the expected performance of the insertion devices currently installed at ALBA once the accelerator has been upgraded, analyzing the effect of the different machine parameters which are currently being adjusted. In a second phase the student may also look into the optimized design parameters for new insertion devices, taking full profit of the enhanced characteristics of ALBA II. The project will combine calculations using theoretical expressions with numerical simulations using synchrotron radiation computation codes (Spectra and SRW).

Program:

- Introduction to synchrotron accelerators and synchrotron radiation production.
- Theoretical approach to the calculation of synchrotron radiation output for ALBA II.
- Cross-check of obtained results with numerical simulations.
- Documentation of the project.

Educational profit:

- Introduction to Accelerator and Synchrotron facilities.
- Synchrotron radiation calculation theory and simulation tools.
- Data analysis.
- Experience of working in a large-scale research facility.

Perfil del estudiante:

Student profile: Physics student or similar.

Requirements:

- Knowledge of electromagnetism.
- Good theoretical skills to develop analytical calculations.
- Programming skills, particularly in Python, will also be appreciated.

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