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Título puesto: Transverse beam dynamics studies for ALBA II. Curso: 2025/26 División: Aceleradores

Descripción del proyecto:

Accelerator physics is an exciting field with global applications. At the heart of any particle accelerator is linear optics correction, a process ensuring the beam properties remain stable. Students will gain hands-on experience with advanced methods to improve accelerator performance, focusing on the orbit response matrix **R**, a crucial diagnostic for optics correction.

Along the way, you will work with a multidisciplinary team of experts, gaining exposure to accelerator physics software tools and **tackling** relevant **challenges** worldwide. In particular, you will explore analytical approaches to speed up corrections, typically based on the derivatives of R. While well-established for pure quadrupoles, such formulas remain incomplete for combined-function dipoles, which mix dipole and quadrupole effects. In designing the next-generation ALBA accelerator, these innovative dipoles are crucial for a compact layout.

Currently, there is a formula with about twenty percent accuracy, hinting something vital is missing. Your mission is to identify and include that missing factor, enabling more precise corrections. Join us to advance global accelerator research, develop new skills, and help shape the future of high-performance beam physics.





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Perfil del estudiante:

Student profile:

• Physics and/or Mathematics student

Requirements:

- Strong mathematical skills are highly desirable.
- Prior knowledge of accelerator physics is advantageous but not mandatory.
- Experience with programming languages, particularly Python or MATLAB, is a plus.

Program:

- Introduction to Accelerator physics.
- Review of the specific literature on the existing formula.
- Documentation of the project.

Tutor: Zeus Martí Responsable División: Francis Pérez

