

POST TITLE

Accelerator Physicist for non-linear beam dynamics and advanced collimation

Requesting Unit

BE-ABP-HSS

Associated Benchmark Job

Applied Physicist

Grade

6 or 7

Job description

Introduction

Are you an Accelerator Physicist or Engineer experienced in single-particle non-linear beam dynamics effects and advanced collimation techniques, and interested in working in an exciting international environment at the forefront of modern science? Would you like to work on the study of non-linear beam dynamics and advanced collimation techniques for CERN present and future accelerators? Then Take Part and join one of the teams that help to deliver unique particle beams used by physicists from all over the world to answer questions at the heart of particle physics!

You will join:

The [Accelerators and Beam Physics](#) (ABP) group, part of the [Beams department](#) (BE), in charge of beam performance over the complete CERN accelerator chain, from the source to the Large Hadron Collider (LHC) and carries out Research & Development (R&D) activities on the upgrade of the LHC, its injectors, the Compact Linear Collider (CLIC), and Future Circular Colliders study (FCC). [Click here for an animation of the CERN accelerator network](#).

The Hadron Synchrotron's Single Particle effects (HSS) Section is in charge of theoretical, numerical, and experimental studies of optics, hadron beam collimation, and linear and non-linear single-particle effects, affecting the performance of present and future hadron synchrotrons.

The design of new accelerators at the high-intensity frontier and the performance optimization of existing ones requires the development of accurate and predictive models of non-linear beam dynamics to estimate beam lifetime, diffusion, and halo generation and advanced beam collimation schemes. You will play a key role in the development of the theory and simulation tools associated to these studies.

Functions

As Accelerator Physicist in the BE-ABP-HSS Section, you will participate in the activities related with non-linear single particle beam dynamics and advanced collimation studies for the LHC, its upgrade, and future circular colliders. This includes activities on both theoretical developments, numerical simulations, and measurements in the existing CERN machines.

You will:

- Develop concepts from the domain of non-linear beam dynamics in view of evaluating halo generation and loss mechanisms and perform optimisation of performance.
- Develop novel concepts to design improved collimation systems based on new approaches, such as crystals and hollow electron lenses.

After a period of familiarisation you will:

- Contribute to the studies to apply advanced concepts of non-linear beam dynamics to the performance analysis and optimisation of circular colliders in general, with emphasis on LHC and its upgrade.

- Contribute to the studies to develop collimation and halo-removal techniques using novel technologies, such as hollow electron lens and bent crystals.
- Design and conduct experiments in the existing CERN machines to validate the concepts developed.
- Participate in the commissioning of crystal collimation in the LHC Run 3 and beyond, including studies of applications at future facilities.

Qualifications

Master's degree or PhD in the field of physics or engineering (or equivalent).

Experience

The experience required for this position is:

- Experience in the field of physics or engineering (or equivalent) with a first relevant experience in a scientific environment preferably in the design and/or operation of particle accelerators.
- Experience of accelerator physics, with demonstrated ability in the field of non-linear beam dynamics and/or collimation concepts.
- Experience of experimental techniques and analysis of data from beam measurements.
- Experience with development of single-particle beam dynamics simulation codes.

The following experience would be considered an asset:

- Experience with one of the following codes: MAD-X (see here <http://madx.web.cern.ch/madx/>), SixTrack (see here <http://sixtrack-ng.web.cern.ch/sixtrack-ng/>).
- Experience of massive numerical simulations with modern simulations codes.
- Experience of experimental techniques and analysis of data from beam measurements
- Experience with beam commissioning and performance optimization of existing facilities

Technical competencies

- Knowledge and application of single-particle dynamics (longitudinal/transverse)
- Knowledge and application of non-linear beam dynamics
- Knowledge and application of collimation systems
- Analysis and optimization of accelerator performance
- Simulation, design and development of particle accelerators

Behavioural competencies

- Achieving results: Having a structured and organised approach towards work; being able to set priorities and plan tasks with results in mind.
- Solving problems: assimilating large quantities of information, identifying key issues and formulating conclusions clearly and concisely
- Working in teams: effectively collaborating within multi-disciplinary and international teams.
- Communicating effectively and promoting mutual understanding: Expressing and explaining ideas in a clear, convincing manner;
- Demonstrating accountability: taking responsibility and being accountable for own actions;

Language skills

Spoken and written English or French: ability to understand and speak the other language in professional contexts. Ability to draw-up technical specifications and/or scientific reports and to make oral presentations in at least one of the two languages.

Additional information

Eligibility

Diversity has been an integral part of CERN's mission since its foundation and is an established value of the Organization. Employing a diverse workforce is central to our success. We welcome applications from all Member States and Associate Member States ([CERN: Member States](#)).

This vacancy will be filled as soon as possible, and applications should normally reach us no later than xx.xx.xx. By applying here, you allow CERN to consider your application for any position it considers relevant with respect to your profile. Please ensure you update your profile regularly with any relevant information and that you inform the Recruitment Service if you wish your file to be removed from the database.

Employment Conditions

We offer a limited-duration contract for a period of 5 years. Limited-duration contracts shall terminate by default on their date of expiry. Subject to certain conditions, holders of limited-duration contracts may be granted an indefinite contract.

SPECIAL CONDITIONS WHICH ARE REQUIRED IN A REGULAR BASIS	
	These functions require shift work, including nights, Sundays and official holidays.
	These functions require participation in a regular stand-by duty, including nights, Sundays and public holidays.
	These functions require work during nights, Sundays and public holidays.
	These functions require work in radiation-controlled areas.
	These functions require interventions in underground installations.
	These functions require international travel
	A valid driving license is required.

SPECIAL CONDITIONS WHICH MAY BE REQUIRED DEPENDING ON THE NEEDS OF THE ORGANIZATION IN THE FUTURE	
	Shift work
	Stand-by duty
X	Work during nights, Sundays and official holidays
	Work in radiation-controlled areas
	Interventions in underground installations