

FTEC Project: Characterization of bunch-by-bunch tune shift effect in the SPS

Department:

BE

Description:

After the Long Shutdown 2 and the implementation of the hardware upgrades of the injector chain as part of the LHC injector upgrade project, the SPS is expected to deliver high intensity bunch trains with 25 ns bunch spacing to the LHC. These beams will be exposed to several collective effects, such as beam coupling impedance, space charge and electron cloud. A good understanding of the bunch-by-bunch coherent and incoherent tune shift is required to optimize the beam performance as well as to find operational settings that ensure beam stability on the long injection plateau. The project will cover both simulation studies with the existing models and experimental studies (machine experiments) to cross-check these models.

Functions and training value:

- You will be working mainly on beam dynamics simulations, which have the potential to unveil features of measurement techniques. That's why, part of the project could also include direct beam measurements.
- You will strongly benefit from the interaction with a lot of experienced colleagues and thus have the unique opportunity to acquire knowledge of accelerator physics and general machine operation.
- The close collaboration with your other colleagues will also allow you to develop your team working skills.

Qualification / skills required:

- Master's degree in physics or engineering or equivalent
- Good programming skills (e.g. Python) and notions of accelerator physics will be an asset