

FTEC Project: Modelization and optimization of the 40 MHz and 80 MHz RF systems of the PS synchrotron with beam

Department:

SY

Description:

The project will consist in completing an existing preliminary model of the 40 MHz and 80 MHz radio frequency chain for the PS accelerator. Model benchmarking will follow with measurements on the real systems.

In a second stage, the beam contribution will be added to the model to study the effectiveness of the feedback mechanism to control the beam. Beam-based measurements will be performed in collaboration with beam dynamics experts to characterize the cavity equivalent impedance and refine the model.

Finally, potential improvement options will be analyzed to reduce the beam induced voltage. In addition, a specification will be produced for the upgrade of the RF feedback chain with the aim to decrease the equivalent impedance associated to each cavity (more than 3dB).

Functions and training value:

You will be responsible for the development of the model and will be asked to participate in machine development (MD) studies during the measurement campaigns with beam. You will learn the use of the PSPICE simulation code and will be trained in the operation and measurements of high power RF systems.

Qualification / skills required:

- MSc in Electronic Engineering or Applied Physics
- Some experience with RF circuit design (transmission lines, resonators) and simulation of electronic circuits
- Familiarity with RF instrumentation, like oscilloscopes and VNA
- Some knowledge of Python programming and analysis tools would be an advantage