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Beam loss monitors characterization for SPES proton beam line

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Beam Loss Monitors will be installed along the primary SPES beam line to detect proton beam losses in the cyclotron area. They will be connected to the cyclotron Machine Protection System (MPS), as it is significant for the proper management of the accelerator during the operation. This report shows the work of characterization of such devices.
Preliminarily, the characteristics of models used in other facilities with features similar to SPES (Proton beam energy= 40-70 MeV and current= 200-500 μA) were analyzed.
Instrumentation Technologies-Libera, a company that makes potentially suitable devices for the SPES facility, was contacted as a possible supplier. They offer a system designed for beam loss measurements based on scintillators integrated on Photomultiplier, flash ADC and data acquisition. The gain is controlled by dc voltage managed by the system.
Detectors and electronics have been tested in two steps:
1. Irradiation with gamma and neutrons static sources;
2. Irradiation with the CN accelerator beam (zero-degree line).
From the tests, the detectors resulted very reactive to gamma and neutron radiation, so they could be suitable to be implemented at SPES as beam loss monitor purposes.
Moreover, to characterize the detector on the operational conditions is fundamental. For these reasons, testing the detector's behavior at the SPES cyclotron in normal operation (current= 200 μA and proton energy= 40 MeV) is mandatory and is planned for the next future.

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