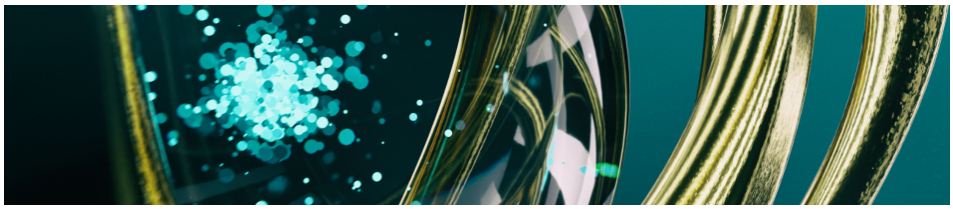

Contribution ID: **129** Type: **not specified**

Study Placement of BLMs in P42

The P42 beamline in CERN's North Area will deliver 400 GeV/c protons from the SPS to BDF/SHiP after the high-intensity upgrade of ECN3. The aim of our study is to analyze whether beam loss monitors (BLMs) could be used to verify the beam position upstream of the P42 XTAX during wobbling, and whether they could be used to monitor beam sweeping at the BDF/SHiP target.

This study was performed by running simulations in BDSIM, a program based on the Geant4 toolkit. The simulation models were developed by CERN's BE-EA-LE team, and modifications were made using pyg4ometry and built-in BDSIM tools. The simulated signals in the BLMs were then analysed.

When simulating the beam at the P42 XTAX, a cylindrical hole (d = 40 mm, l = 100 mm) was added to the XTAX, and two BLMs were placed 3 m upstream of the XTAX. Simulations were run with seven different horizontal beam positions. A 30% decrease in dose detected by the BLMs was observed when the beam was hitting the cylindrical hole. This shows that BLMs could be used to verify the position at which the beam is hitting the XTAX. In the beam sweeping simulation at the BDF target, a 12 μm titanium plate representing a beam diagnostics device was placed inside the beampipe. Four BLMs were placed 1 m downstream of the plate. Simulations were run at eight discrete beam positions along the sweeping trajectory. A clear BLM signal dependence on beam position was observed, with a high/low signal ratio of 1.5. The signal asymmetry was caused by secondaries coming from the titanium plate. Secondaries propagating backwards from the target produced a symmetric signal. The simulated signal suggests that BLMs could be used to monitor beam sweeping at the BDF target.

In conclusion, we show that BLMs could be used for beam position verification at the P42 XTAX and for monitoring beam sweeping at the BDF target.

Type of contribution

Poster

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