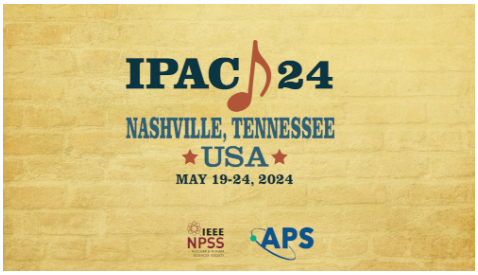

Contribution ID: **1409** Contribution code: **TUPC74** Type: **Poster Presentation**

Characterization of the optics of the TT24 and P42 beam lines in the CERN SPS north area

Tuesday, 21 May 2024 16:00 (2 hours)

400 GeV protons extracted from the CERN SPS are transported to the T4 target via the TT20 transfer line. The P42 beamline then transports the protons that did not interact in the T4 target to the T10 target. During operation in 2021 and 2022, higher than expected beam losses were measured, in addition to an increased beam spot size that had previously been observed. It was suspected that the optics between TT24 and P42 might not be well matched but due to a lack of instrumentation this was not confirmed. The recent installation of additional beam profile monitors (BSG) in the P42 beamline has allowed the present optics to be evaluated for the first time. In addition, magnet response functions have been measured and updated. A kick response study was performed using corrector dipoles to kick the beam with the subsequent displacement measured on the BSGs. The dependence between the kick and the beam position was used to fit a MADX optics model of TT24 and P42. Quadrupole scans were then performed to determine the initial conditions of the model. These results are presented in this paper.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

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Session Classification: Tuesday Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.T12 Beam Injection/Extraction and Transport