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Optics rematching between TT24 and P42 primary beam lines within the HI-ECN3 study project at CERN

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The High Intensity ECN3 (HI-ECN3) study project aims to increase the intensity of the proton beam delivered to a new experimental facility housed in the ECN3 underground cavern in CERN's North Area up to the $\sim 4 \times 10^{13}$ ppp (protons per pulse) and up to $\sim 4 \times 10^{19}$ POT (protons on target) per year. The increase necessitates upgrades of the primary beam transfer lines coming from SPS directly to the new Target Complex upstream of ECN3. In this work we describe the modifications to the primary beam line optics that allow the transfer of the beam to the HI-ECN3 facility in two scenarios: shared (beam is split between the three existing production targets) and dedicated (beam goes directly to the target serving ECN3). An optimization study is presented to reduce the sensitivity of the beam optics to errors and minimize the effects of the beam's interaction with material when transiting the existing target area between TT24 and P42, whilst respecting the different constraints needed to share the beam between ECN3 and the rest of the North Area and permit a vertical trajectory bump around the target serving EHN1.

Footnotes

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Paper preparation format

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Europe

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