

## SPS Scrapers for LHC injection

**LHC injection well above pilot intensities:  
scraping at  $3.5 \pm 0.5 \sigma$  ( $\epsilon_n = 3.5 \mu\text{rad}$ )  
in the SPS in regular operation  
+ collimators to absorb the scraped particles**

**compatibility with fixed target and CNGS beam ?**

rough numbers (based on G.Arduini)

450 GeV LHC injection

scraping ~ 4 mm 3.5  $\sigma$

collimation 20 mm H, 38 mm V ~ 23  $\sigma$

SPS at injection, LHC beam, 26 GeV

scrapers at 29 mm H, 27 mm V

collimators at 22 mm H, 39 mm V

ring aperture limit by TIDV11892 and momentum scraper TIDP11434 (heavy objects)

full compatibility with CNGS and LHC fixed targeted injection, 14 GeV

scrapers

at 68 mm H, 29 mm V

collimators at 44 mm H, 42 mm V

for full compatibility: move collimators out by ~ 24 mm + retract TIDs

Can the collimators be destroyed by accidental local beam loss ?

Probably yes : leave them in the shadow of TIDs + active protection (beam loss monitors)