MD12844: FASER and SND background mitigations

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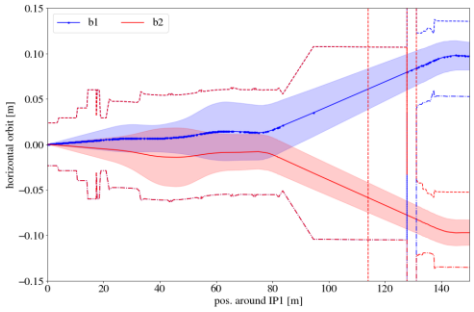
Procedure

- Inject two indivs per beam, 1.4e11 ppb, both colliding in IP1
- Nominal ramp and squeeze to 60 cm
- Measure reference background 1h
- Change corrector magnets and measure background 1h
- Inverted V xing in IR1:
  - Move IR1 TCTPVs to parking
  - Invert xing angle sign
  - Realign TCTPV and put at nominal settings
  - Measure background 1h
- Horizontal xing in IR1:
  - Move TCTPH, TCTPV and TCL4 in IR1 to parking
  - Rotate to H xing
  - Realign TCTs / TCL4s and put at nominal settings
  - Measure background 1h
- n.b. abs xing angle will not exceed 160 µrad
- Total time: 6h

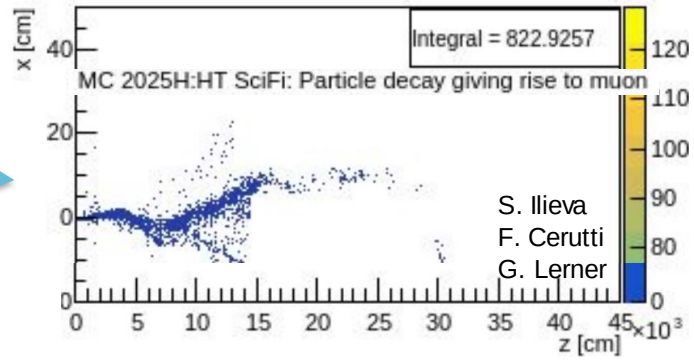
rMPP comments:

- Clarify masking and collimator thresholds:
  - Setup beam flag
  - ”Standard” collimation masks (lossmaps, alignment...):
    - Maskable BLMs
    - Collimator positions, beta*, DOROS BPMs, and energy interlocks
  - IR1 TCTs and TCLs thresholds to parking
- Detail rotation of xing angle and tools
  - Standard OP tool written by Michi for adjusting xing knobs and update orbit feedback will be used
- Change of beam flags and interlocks should be YES

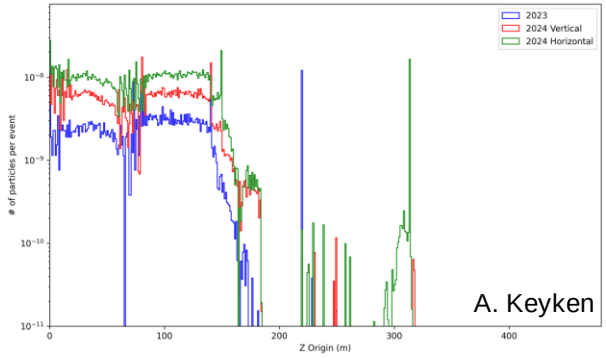
Introduction and Motivation



- 2024 configuration caused significant increase of muon background to FASER and SND
  - Frequent change of emulsion plates
  - Limited data taking
  - Simulations (FLUKA / BDSIM) identified muon source between IP and TAN*:



- Different mitigation ideas under study
  - No mitigation method found at this moment
  - Horizontal xing worsens the background:*
  - Inverted sign of V xing?
  - Corrector magnets upstream of TAN / DS?



- Measurements important to benchmark simulation models (ensure predictability of background in future configurations)
  - MD goal: Measure background for different configurations
  - Main focus on configurations that reduce background, if found

*LBS#122: https://indico.cern.ch/event/1431148/