

LHCb OPERATION @450GeV

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WHAT COULD BE THE 450GeV OPERATION SCENARIO

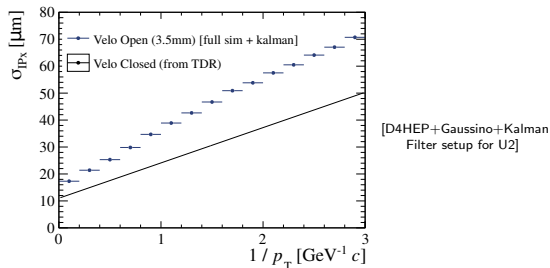
not an LHCb request for the moment

▶ Operation for commissioning:

- ▶ interested in particles from beam-beam interaction or beam-gas interaction.
→ early in Run 3
- ▶ No plan to move the Velo IN for that

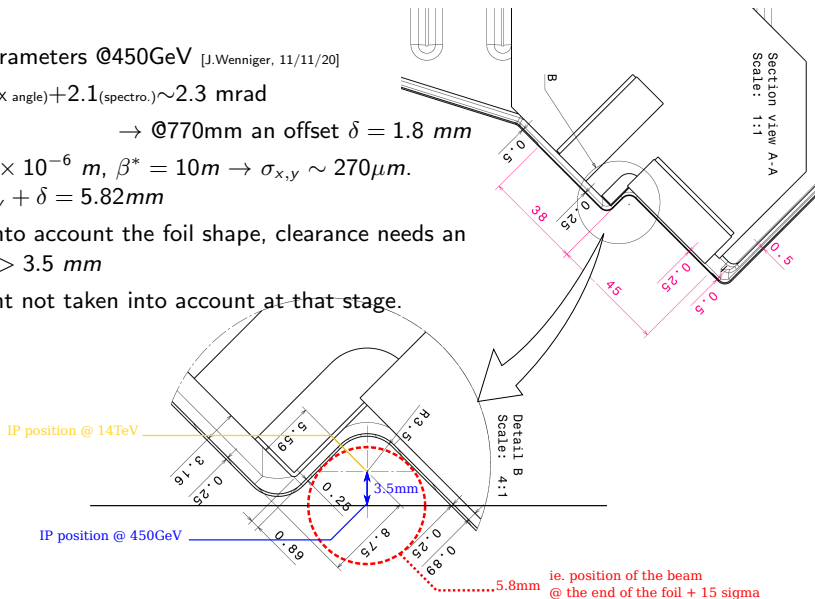
▶ Operation for Physics:

- ▶ Assumes the detector is commissioned, data quality is good.
→ later in Run 3
- ▶ There can be physics interest (QCD production in pp collisions, QCD production in p-He collisions - SMOG)
- ▶ should evaluate the minimum perf. requirements: IP resolution, angular acceptance.



BACK OF THE ENVELOPE

- ▶ Beam parameters @450GeV [J.Wenniger, 11/11/20]
- ▶ $0.170(\text{ext. X angle}) + 2.1(\text{spectro.}) \sim 2.3 \text{ mrad}$
→ @770mm an offset $\delta = 1.8 \text{ mm}$
- ▶ $\epsilon_n = 3.5 \times 10^{-6} \text{ m}, \beta^* = 10\text{m} \rightarrow \sigma_{x,y} \sim 270\mu\text{m}.$
→ $15\sigma_{x,y} + \delta = 5.82\text{mm}$
- ▶ Taking into account the foil shape, clearance needs an opening $> 3.5 \text{ mm}$
- ▶ Alignment not taken into account at that stage.



CONCLUSION

- ▶ With 450GeV beams **we could close the Velo at 3.5 mm** of its nominal closed position.
- ▶ To be checked if it is enough in terms of physics requirements
 - Would a scheme with higher bunch spacing allow to reduce the crossing angle?
- ▶ In any case a request of run at 450GeV with closed Velo will not come at the beginning of the run.
 - Only useful with a fully commissioned detector.
- ▶ In contact with LHCb physics coordination, operation and commissioning to come with a statement.