

Background Considerations

- The reduction in the Velo aperture may affect the local vacuum conditions in the experimental beam pipe.
 - Based on the current running experience the background from local beam gas is not expected to become an issue for the experiment unless the vacuum conditions degrade drastically.
- Existing studies with 7 TeV beams shows that the rate of particles from Machine Induced Background^(*) is small with respect to those from pp collisions at nominal LHC operation and nominal LHCb $\mathcal{L} = 2 \times 10^{32} \text{ cm}^{-2}\text{s}^{-1}$ ($\mathcal{L}_{\text{upgrade}} = 5 - 10 \times \mathcal{L}_{\text{nominal}}$)
 - Rates reaching LHCb will depend on machine optics and not VELO aperture
 - Increased rate in VELO due to higher flux at smaller radii not expected to be an issue for low multiplicity showers. Low rate high multiplicity showers illuminate the whole VELO as now.
- Further verification to be carried out with VELO proposed layout

^(*) due to beam interactions with machine elements or residual gas far (arcs) and close (LSS) to LHCb