

L0 Upgrade Background Study

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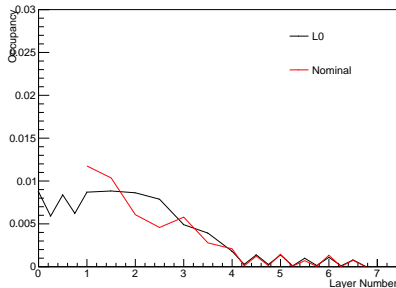
Introduction

- ▶ L0 upgrade simulations include additional tracking layer (layer 0) between target and current first layer and moving current L2 and L3 towards beam by 0.8 mm
- ▶ Resolved issues in the simulation that affected backgrounds (but had little affect on everything else)
 - ▶ L0 shifted due to not taking the beam rotation into account
 - ▶ Incorrect charge sharing matrix used for L0 strips (no intermediate strips unlike other layers)
 - ▶ MC wabs had generator level cut at 15 mrad and L2 and L3 now dip below that (now set at 5 mrad)
- ▶ Basic background studies and trigger rates are reported using wab-beam-tri MC (i.e. beam)

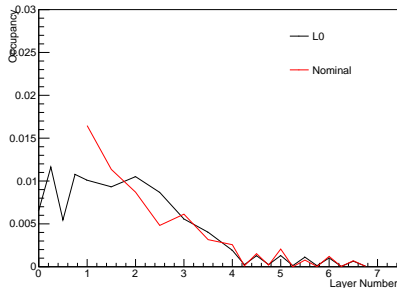
Cross Section Comparison

- ▶ Occupancies defined using 8 ns time windows
- ▶ $ClusterOccupancy = \frac{StripOccupancy}{ClusterSizeAverage}$ (Cluster size average is 1.1 for L0 and 1.5 for all other layers)

SVT Sensor Edge Cluster Occupancies Top



SVT Sensor Edge Cluster Occupancies Bottom



Trigger Rates

- ▶ L0 trigger rate is **31.2 kHz**
- ▶ Nominal trigger rate is **23.0 kHz**
- ▶ Detailed reasons for the increase trigger rates are to be explored
 - ▶ Plot trigger rate as function of cluster position in Ecal.
Separate these by charged particles and photons
 - ▶ Plot of z origin of particles that generate trigger clusters.
Separate by charged and neutral particles

Degraded Vertex Resolution

- Comparison of vertex resolution for nominal detector and L0 detector where L0 is not used for tracking (resolution degrades slightly due to multiple scattering)

