Beam Spot / Tracking

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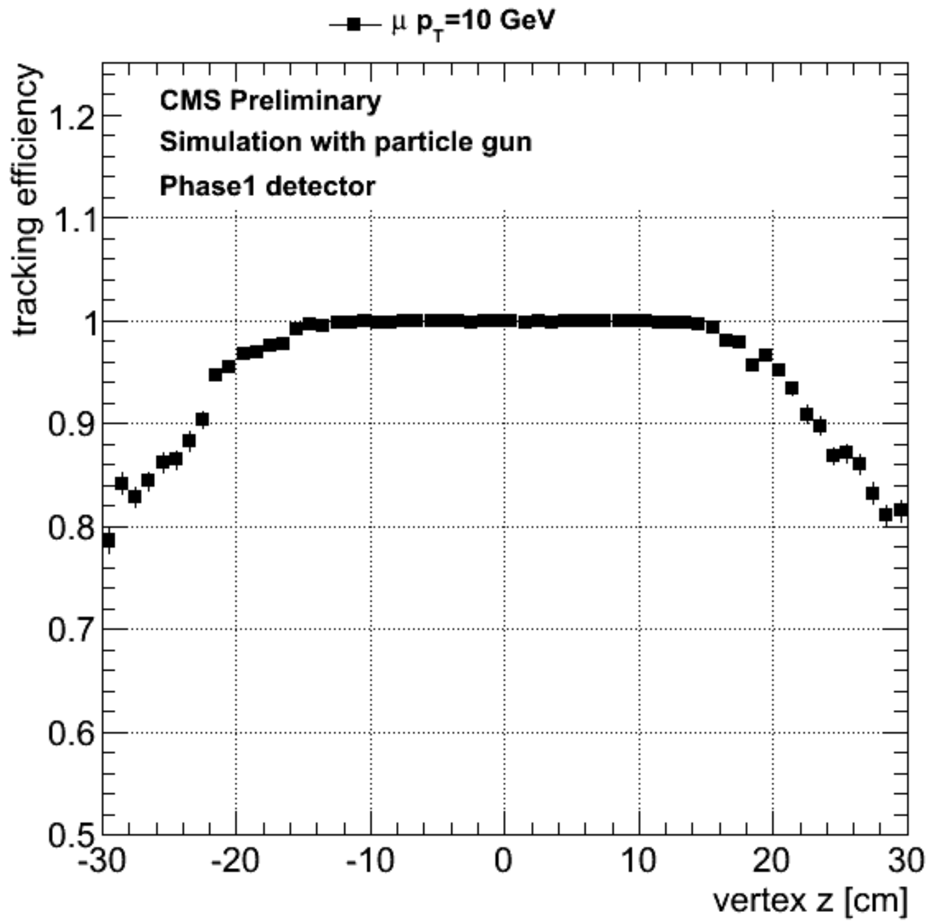
Sep. 27, 2013

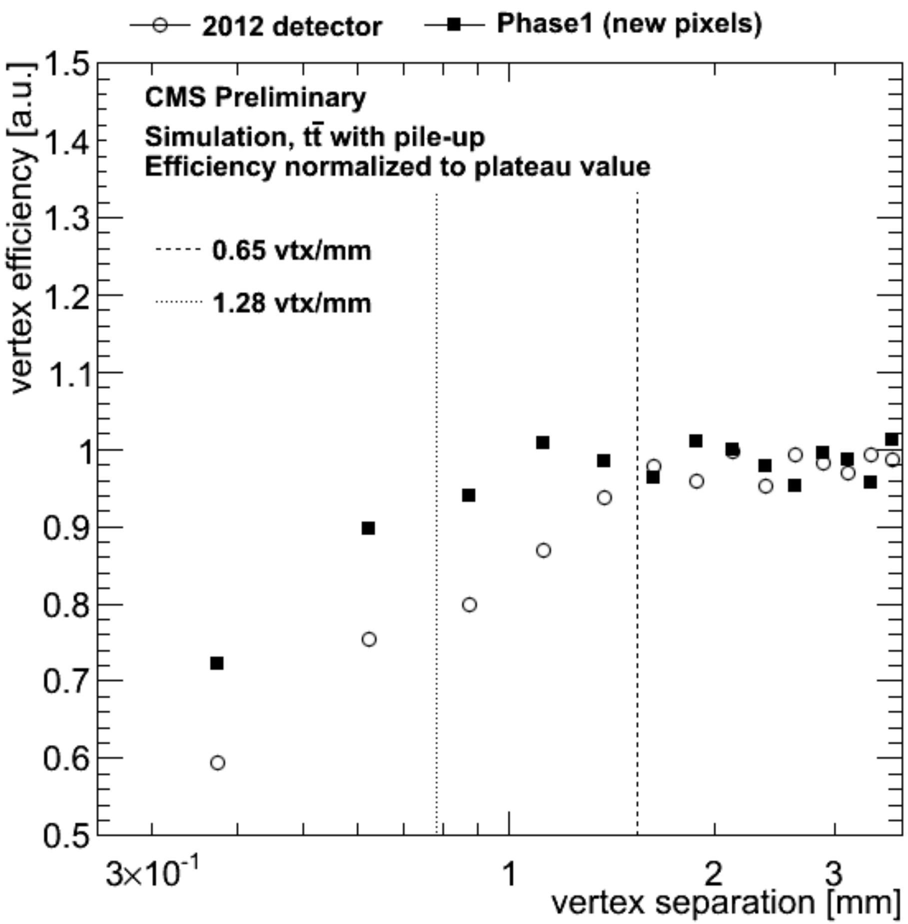
Beam Spot longitudinal acceptance

- Sample of 20 muons per event, with pT=10 GeV and random |eta|<2.5.
- Muons originate from the same vertex, produced with flat probability in the range [-35,+35] cm.
- The assumed detector geometry is Phase1 (new pixel detector with 4 barrel layers and 3 forward disks per side).



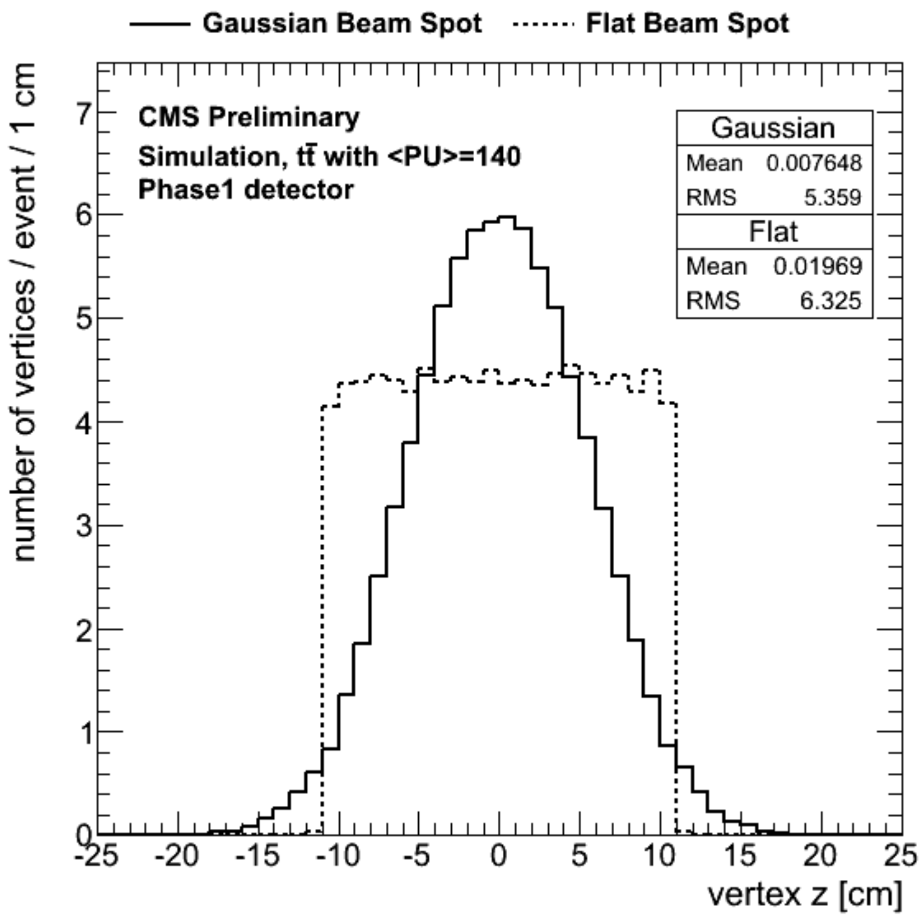
Efficiency vs vertex separation

- ttbar sample with pile-up.
- Vertex reconstruction efficiency as a function of the distance to the closest simulated vertex
- Efficiency value is normalized to plateau value (may depend on fine tuning of parameters)
- Vertical lines indicate the vertex density corresponding to the (average) vertex separation



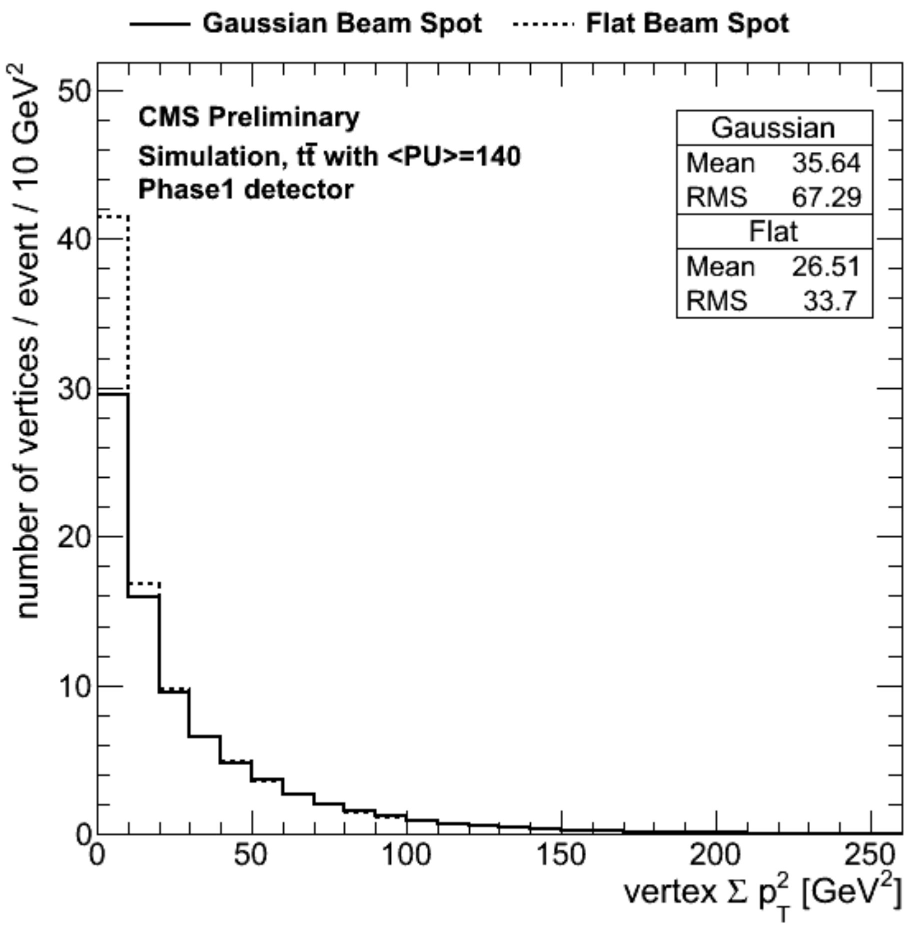
Reconstructed vertices vs z

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1 (new pixel detector with 4 barrel layers and 3 forward disks per side)
- Distributions normalized per total number of events in each sample
- Vertex selection: ndof>4



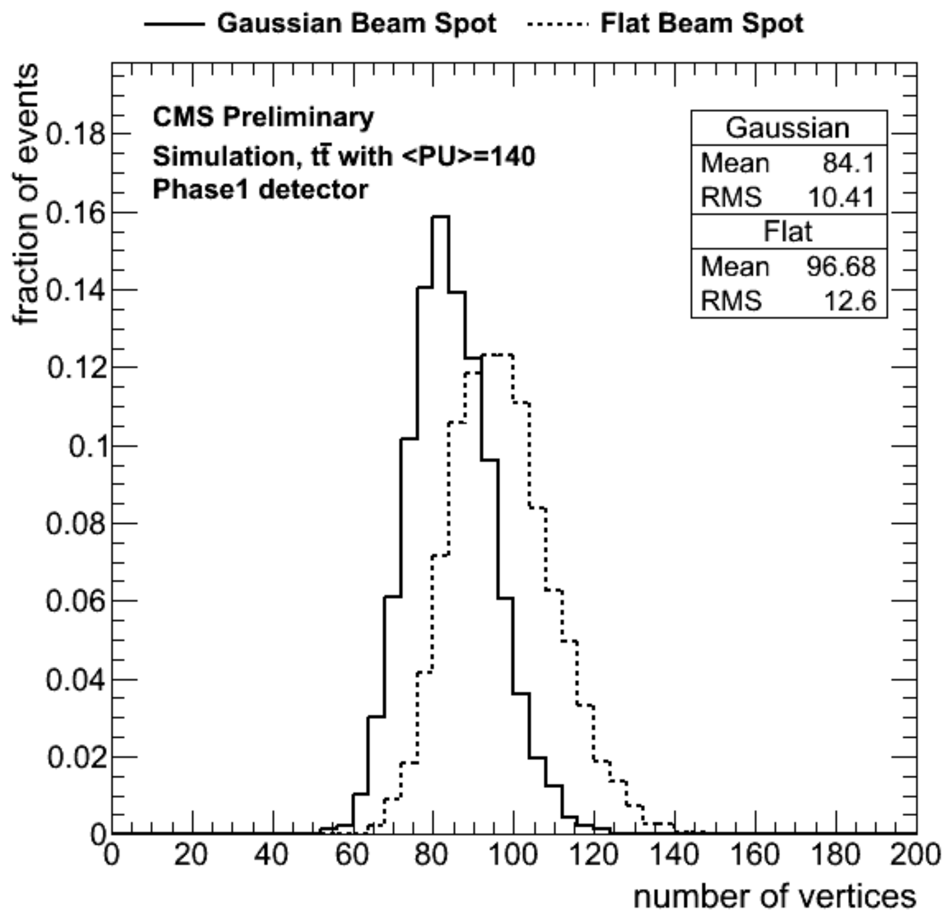
Reconstructed vertices vs $\Sigma\, p_T^2$

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_Z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1 (new pixel detector with 4 barrel layers and 3 forward disks per side)
- Distributions normalized per total number of events in each sample
- Vertex selection: ndof>4



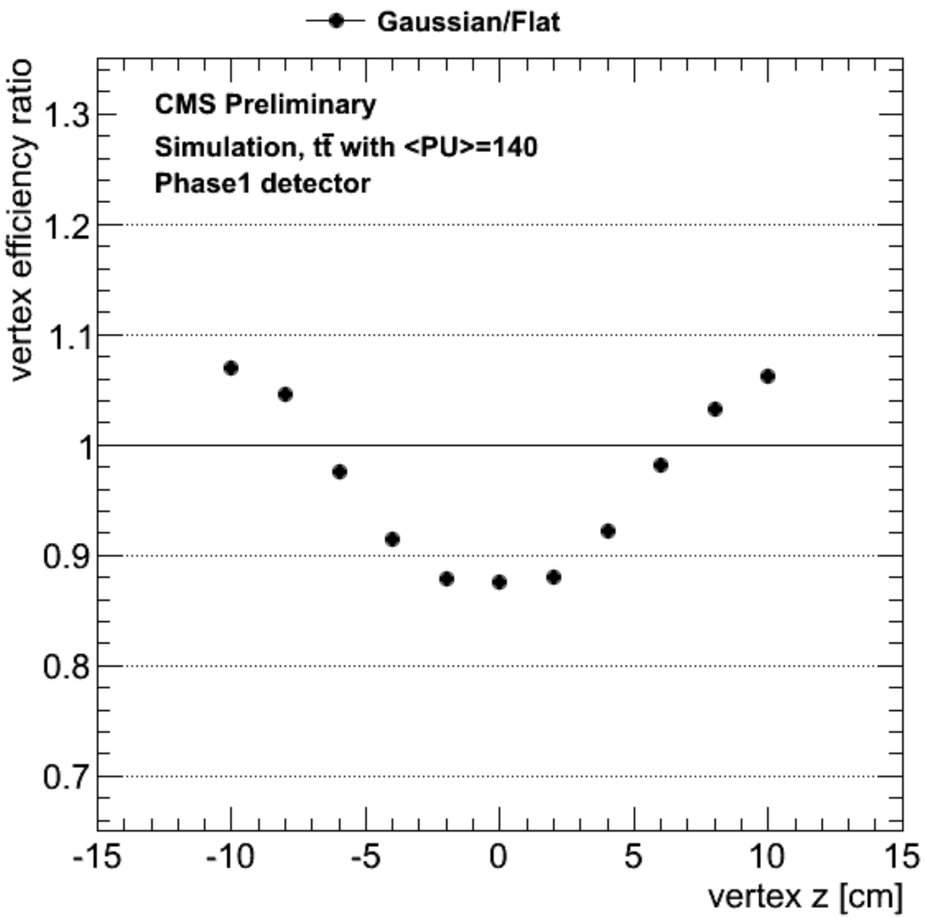
Number of reconstructed vertices per event

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1 (new pixel detector with 4 barrel layers and 3 forward disks per side)
- Distributions normalized per total number of events in each sample
- Vertex selection: ndof>4



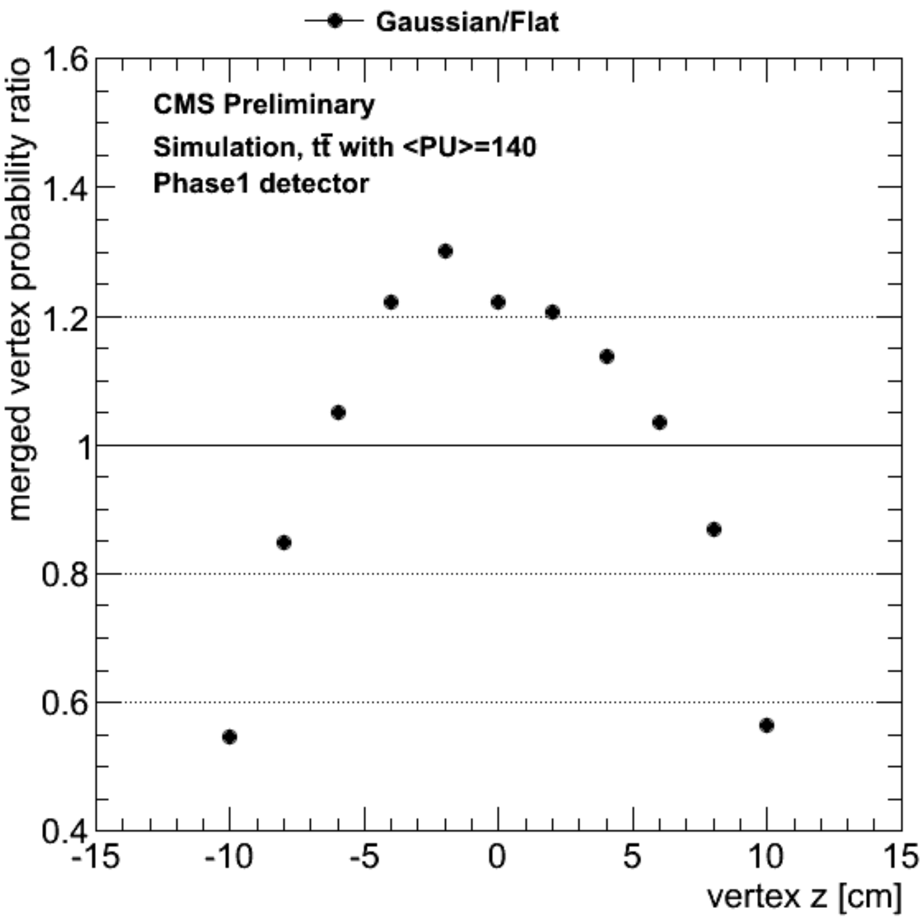
Vertex reconstruction efficiency vs z

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_Z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1
- Efficiency=$N_{associated}/N_{simulated}$
- Reco vertex associated to simulated if $|z_{reco}-z_{sim}|<3\sigma_{Z,reco}$
- No double counting of reconstructed vertices
- Shown efficiency in gaussian beam spot sample divided by efficiency in flat beam spot sample



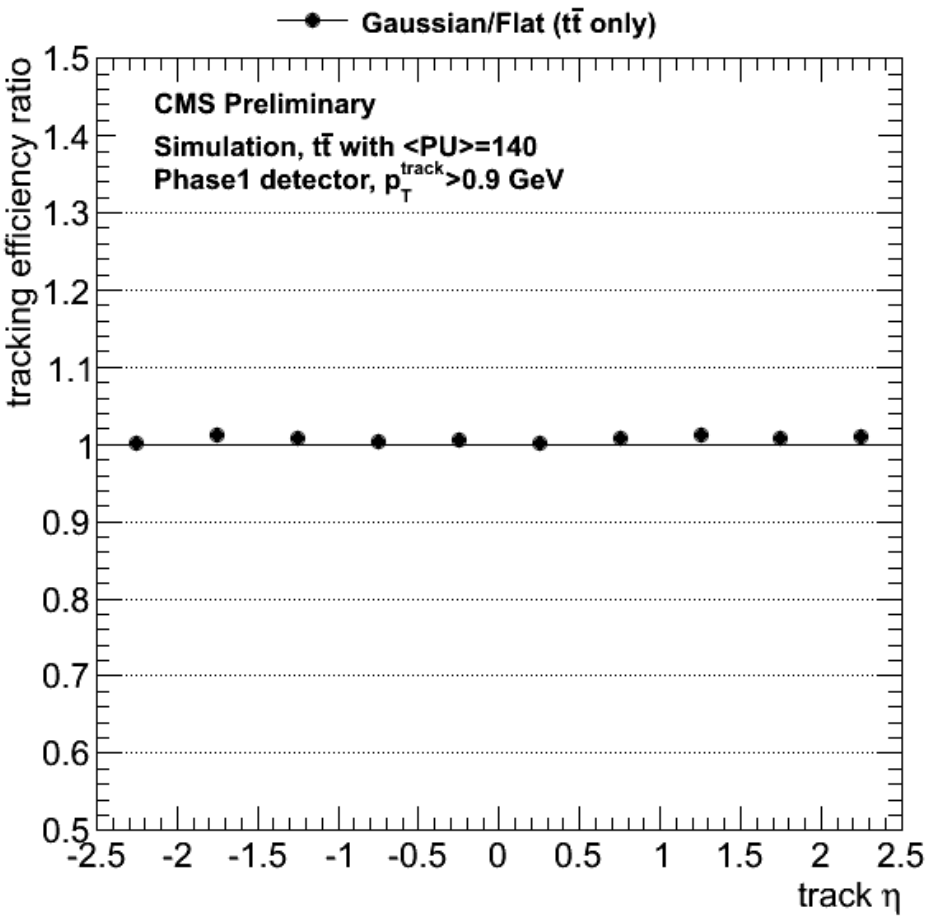
Merged vertex probability vs z

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1
- Probability=$N_{merged}/N_{simulated}$
- Reco vertex considered ad merged if associated to two simulated vertices
- Shown probability in gaussian beam spot sample divided by efficiency in flat beam spot sample



Track reconstruction efficiency vs η

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_Z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1
- Efficiency=$N_{associated}/N_{simulated}$
- Reco track associated to simulated if χ^2<50
- Shown efficiency in gaussian beam spot sample divided by efficiency in flat beam spot sample
- Efficiency computed only for tracks from ttbar event with p_T>0.9 GeV



Track reconstruction efficiency vs z

- ttbar samples with <pile-up>=140, one with gaussian beam spot (σ_Z~5.3 cm), one with flat beam spot within [-11,11] cm
- The assumed detector geometry is Phase1
- Efficiency=$N_{associated}/N_{simulated}$
- Reco track associated to simulated if χ^2<50
- Shown efficiency in gaussian beam spot sample divided by efficiency in flat beam spot sample
- Efficiency computed only for tracks from ttbar event with p_T>0.9 GeV