

# ILD Pixel TPC simulation

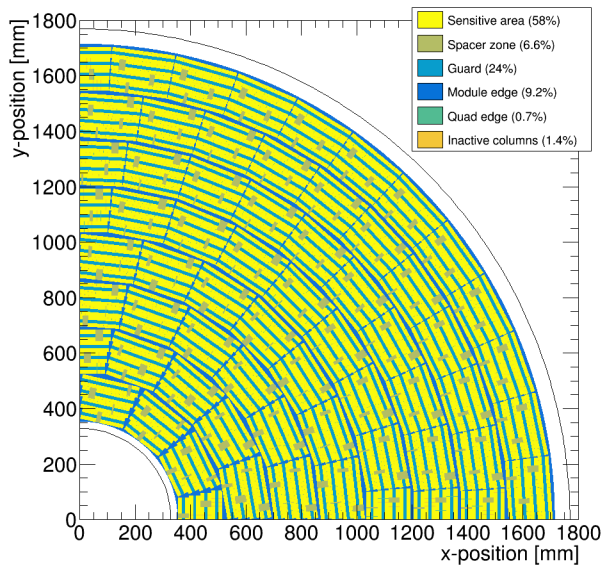
Kees Ligtenberg

Lepcol meeting

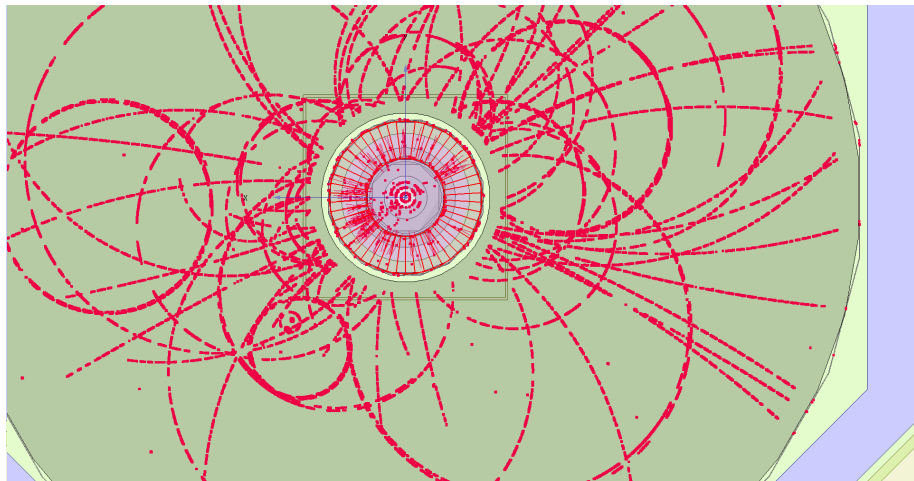
August 26, 2019



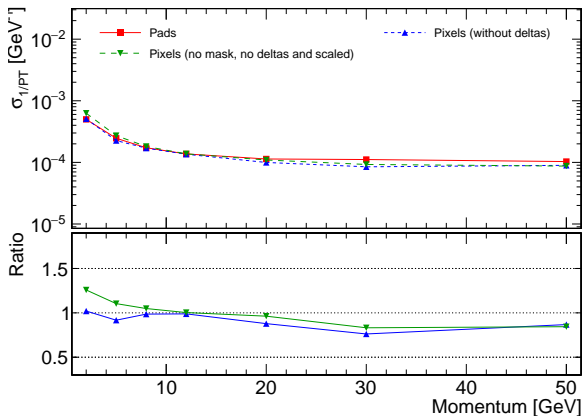
# Endplate layout



# Endplate mask in simulation



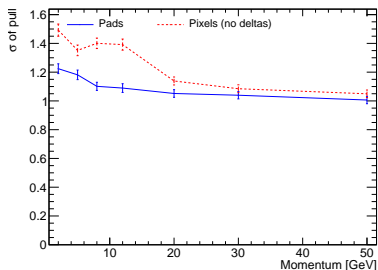
# Resolutions



compared to scaling, resolution improves in multiple scattering dominated region at low momenta

# Pulls

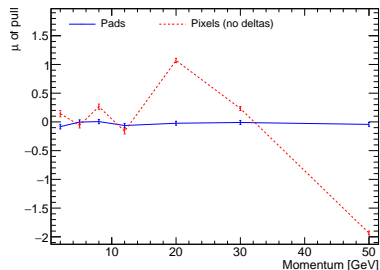
sigma



Multiple scattering is underestimated in track fit

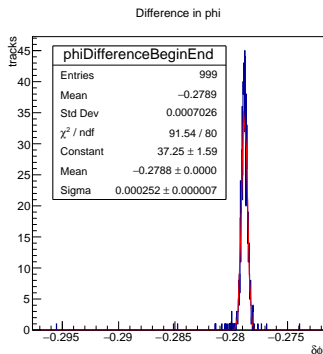
# Pulls

mean



Simulated with 1000 tracks in one single direction. It might be possible that cracks pull the track in one direction.

# Multiple scattering equation



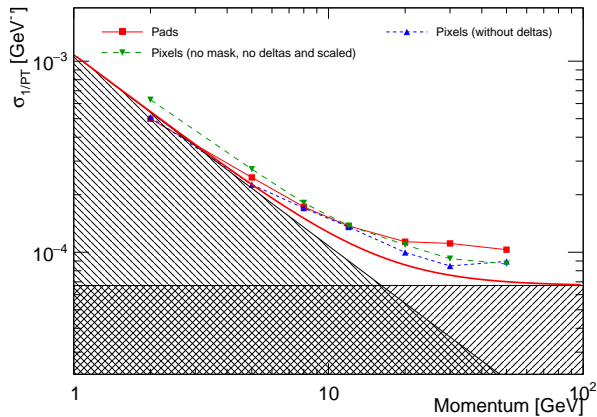
$$\theta_0 = \frac{13.6\text{MeV}}{\beta_{cp}} \sqrt{\frac{x}{X_{\text{rad}}}} \left( 1 + 0.038 \ln \frac{x}{X_{\text{rad}}} \right)$$

Difference in phi is compatible with basic equation:

e.g. for 5 GeV tracks 2.52 mRad (sim) vs 2.38 mRad (equation)

# Resolutions compared to limits

work in progress





# Resolutions compared to limits

work in progress

$$\left(\frac{\delta p}{p}\right)_{\text{MS}} = \frac{21 \text{ MeV}}{\beta \sin(\theta)} \frac{10}{3B} \sqrt{\frac{C_N}{2LX_0}}$$

$C_N = 1?$

$$\left(\frac{\delta p}{p}\right)_{\text{Meas.}} = p \sin \theta \frac{10}{3} \left(\frac{\text{T m}}{\text{GeV}/c}\right) \frac{1}{B} \sqrt{\frac{\epsilon^2}{L^4} \frac{720}{N+5}}$$