



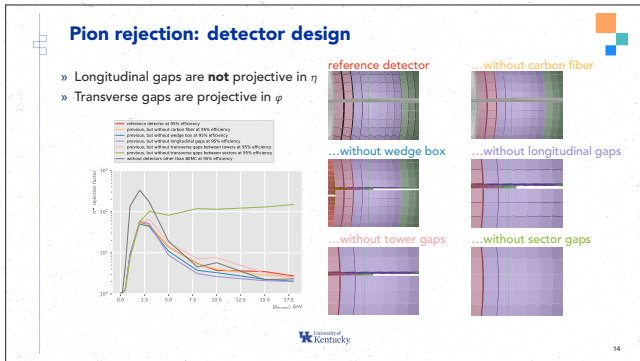
Post calorimetry review: SciGlass geometry with a tilt

Renee Fatemi, Dmitry Kalinkin

University of Kentucky

Goal

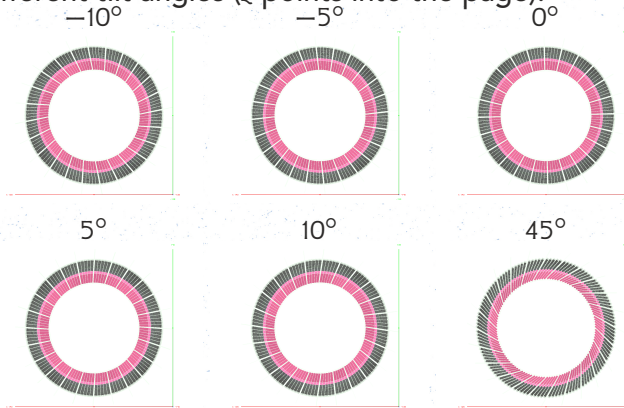
During the calorimetry review, it was shown that the reduced electron efficiency is a result of the gap between the sectors.



The following presentation studies performance of a design that combines sector structure and a tilt in phi direction.

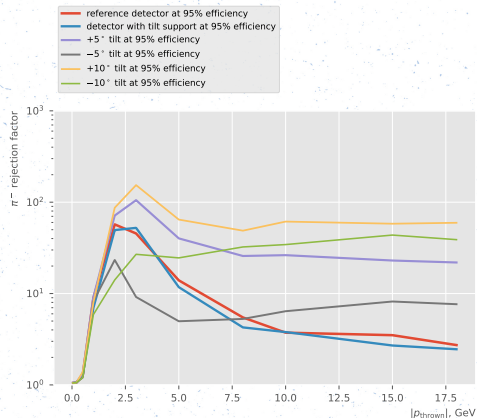
Geometry tilt variations

Examples with different tilt angles ($\hat{z}$ points into the page):



The proposed tilted geometry is principled on fixing the number of sectors and narrowing tower faces to fit them in the sector. Tower lengths are not stretched to maintain radiation depths of the calorimeter. The implementation is imperfect (at large tilt angles), but should be sufficient for initial studies.

E/p classifier

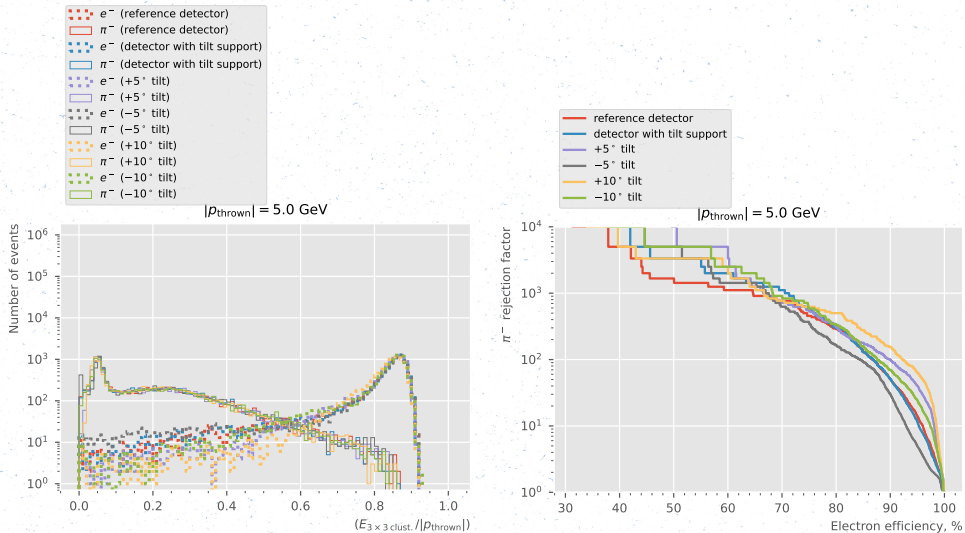


Similarly to the gapless detector, the performance at high $|p|$ is recovered.

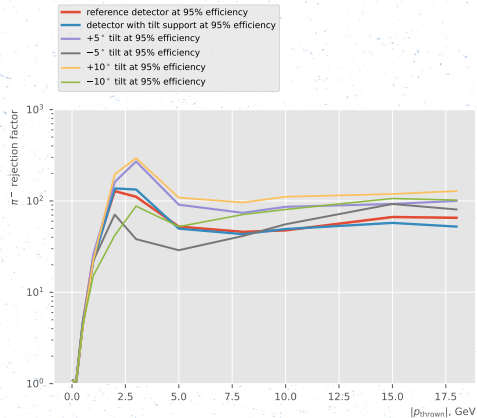
reference detector is the ePIC 23.03.0 geometry used for the review

geometry with tilt support is revision 864fb690 based on latest development geometry with tilt set to 0 degrees

E/p classifier: example ROC curve



ML classifier



When relying on the Machine Learning, adding tilt can improve the performance by an additional factor of 2x

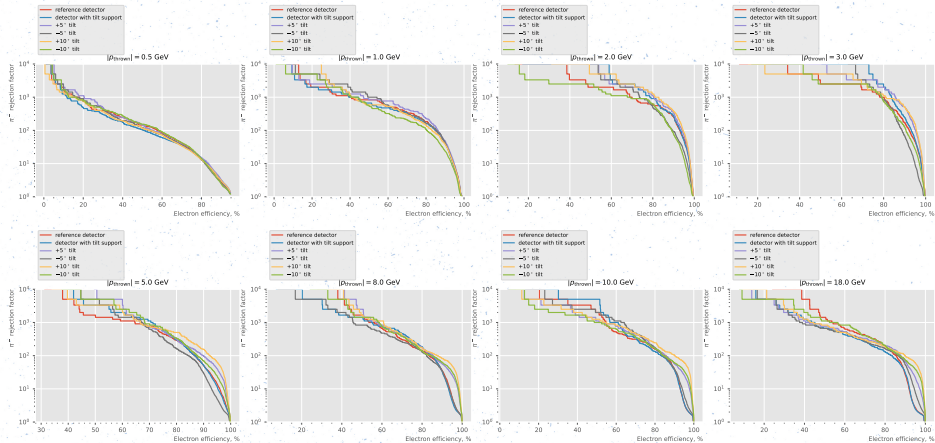
Conclusions

- » A geometry combining sector structure with a tilt is presented
- » Positive (clockwise) tilt angle is preferred (assuming $\vec{B} \uparrow \hat{z}$, electrons curve counter-clockwise)
- » Effect of wedge gaps is effectively mitigated

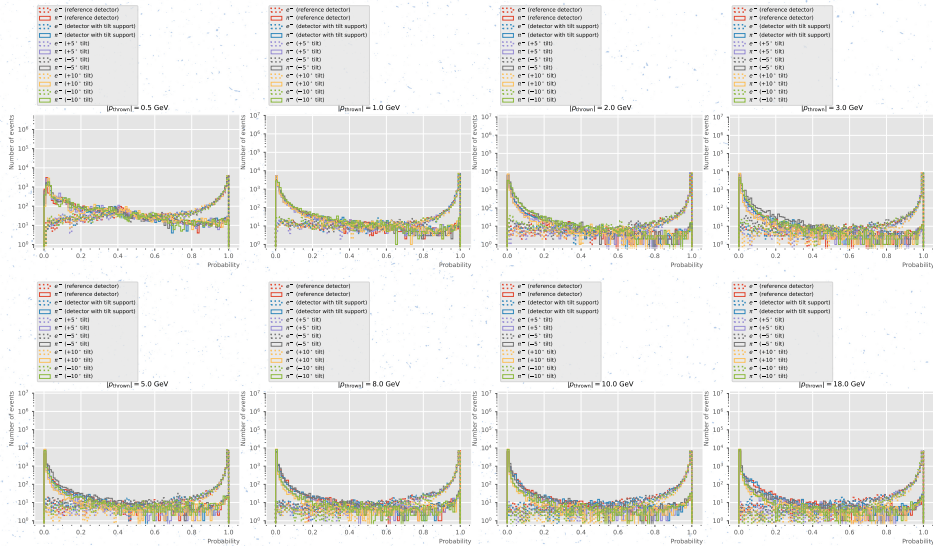
Backup



E/p classifier



ML classifier



ML classifier

