

# Status of FDC Geometry Options

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# Motivation

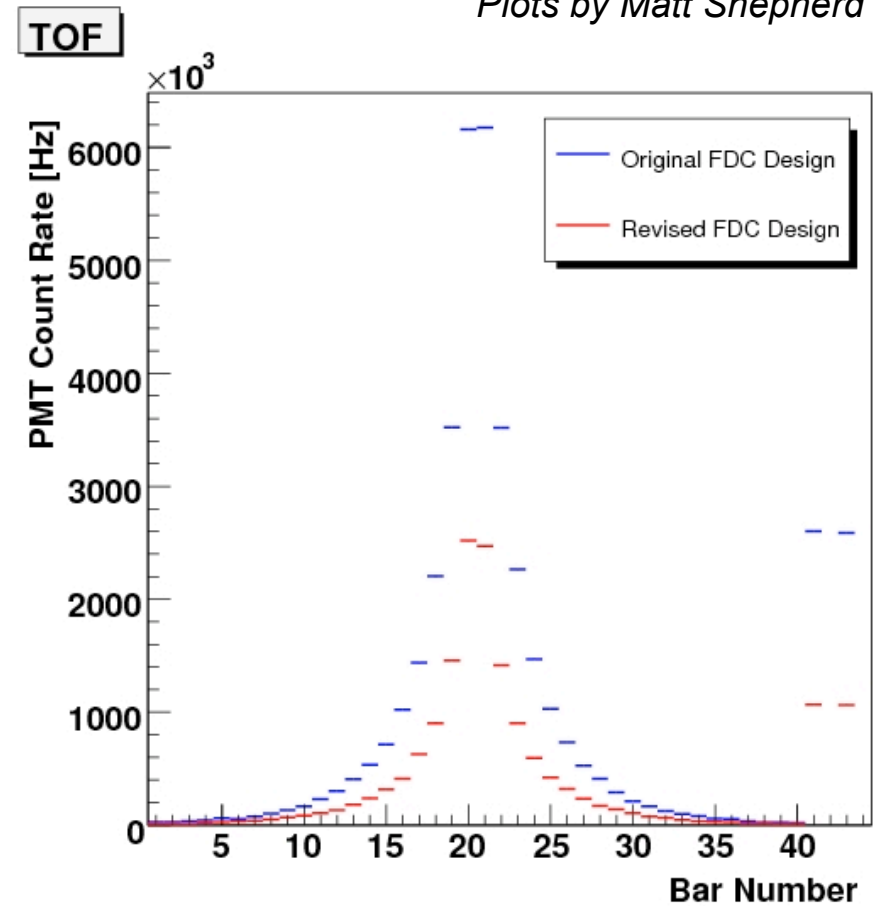
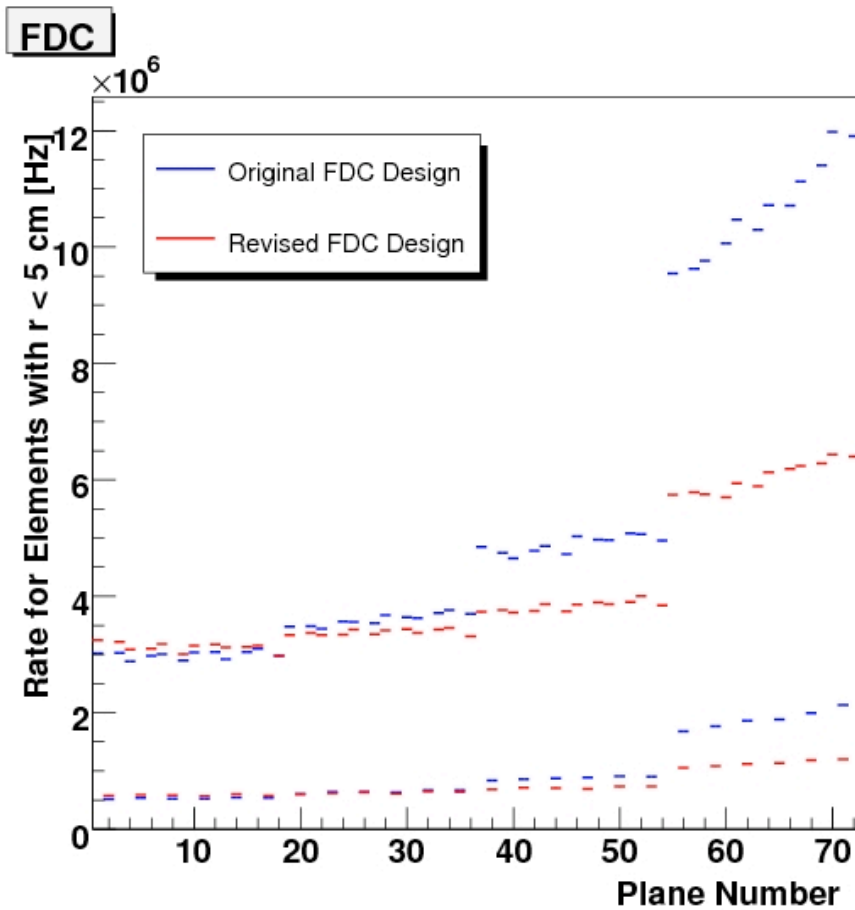
- The committee of the March, 2007 drift chamber review made a strong recommendation to try and reduce the amount of material in the FDC.
- Immediately after, the FDC group began working on new designs to address this recommendation...

# Timeline

- May 16 - Richard commits revised FDC geometry to repository
- May 17 - Matt posts new rate studies to wiki based on “Revised FDC Design”
- May 18 - Dan and Simon post 2 options for FDC to the Wiki
- June 1 - David tweaks geometry to “fully” implement options 1 and 2 in hdds
- June 4 - David posts plots of momentum resolution for FDC geometry options to Wiki
- June 5 - Mihajlo presents results of clustering efficiency in FCAL for 2 options. Things look funny and Richard is asked to have a look

# Background Rate Studies

Plots by Matt Shepherd

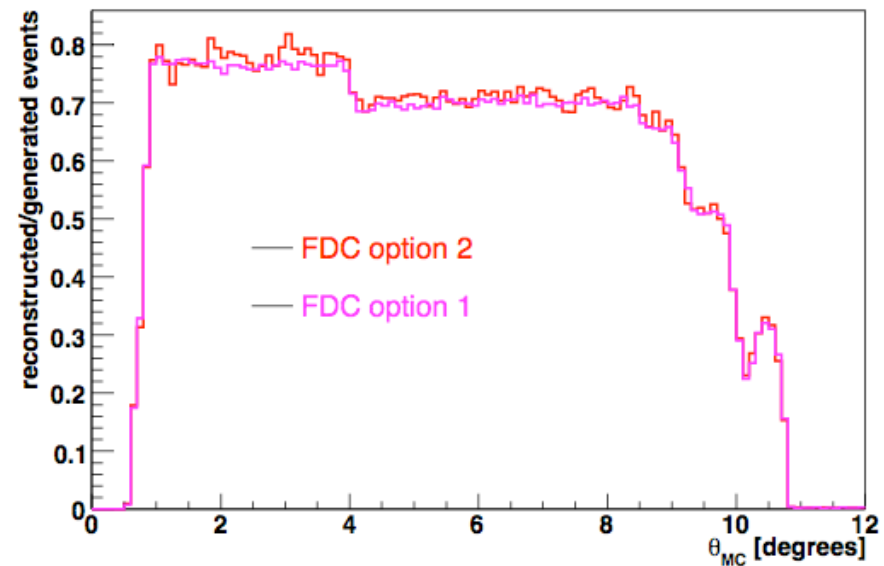
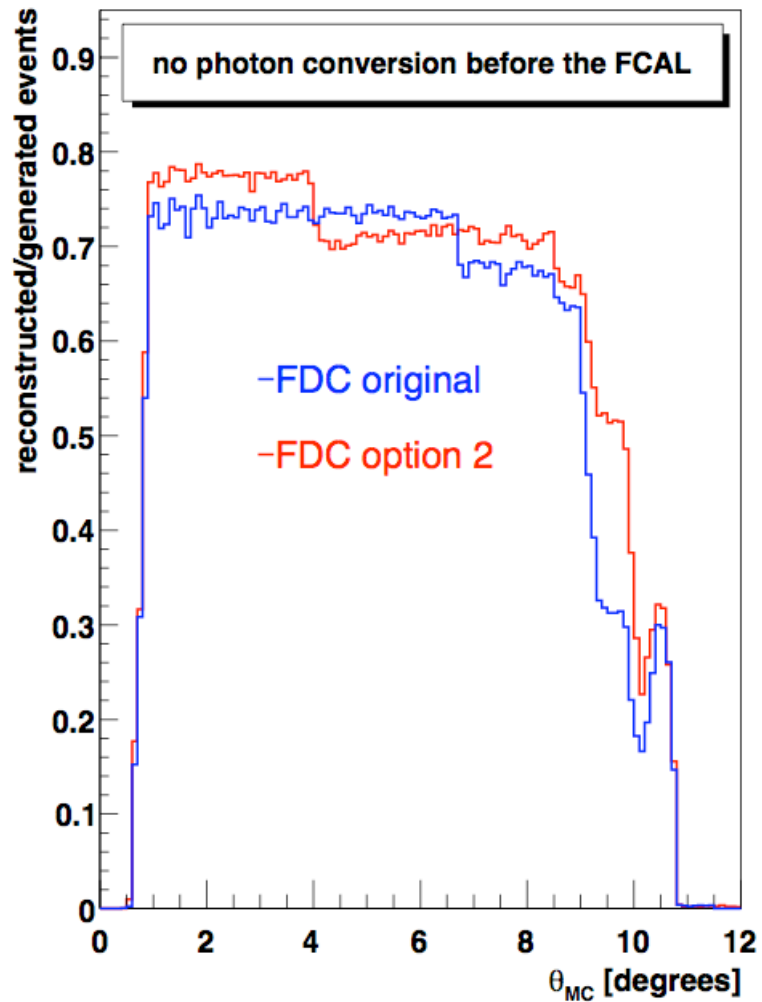


# FCAL Efficiency

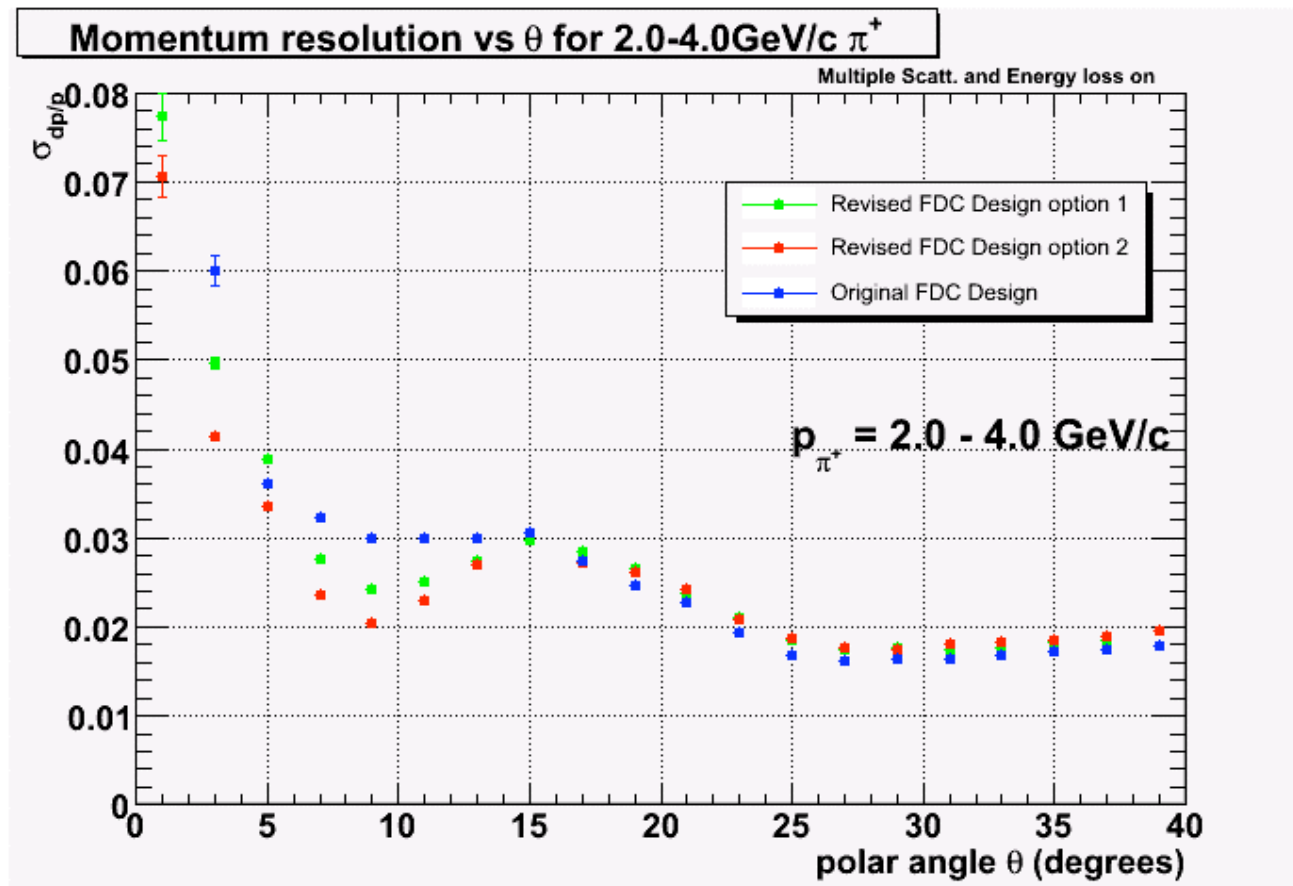
(with bug)

*Plots by Mihajlo Kornicer*

Single cluster reconstruction efficiency



# Momentum Resolution (with bug)

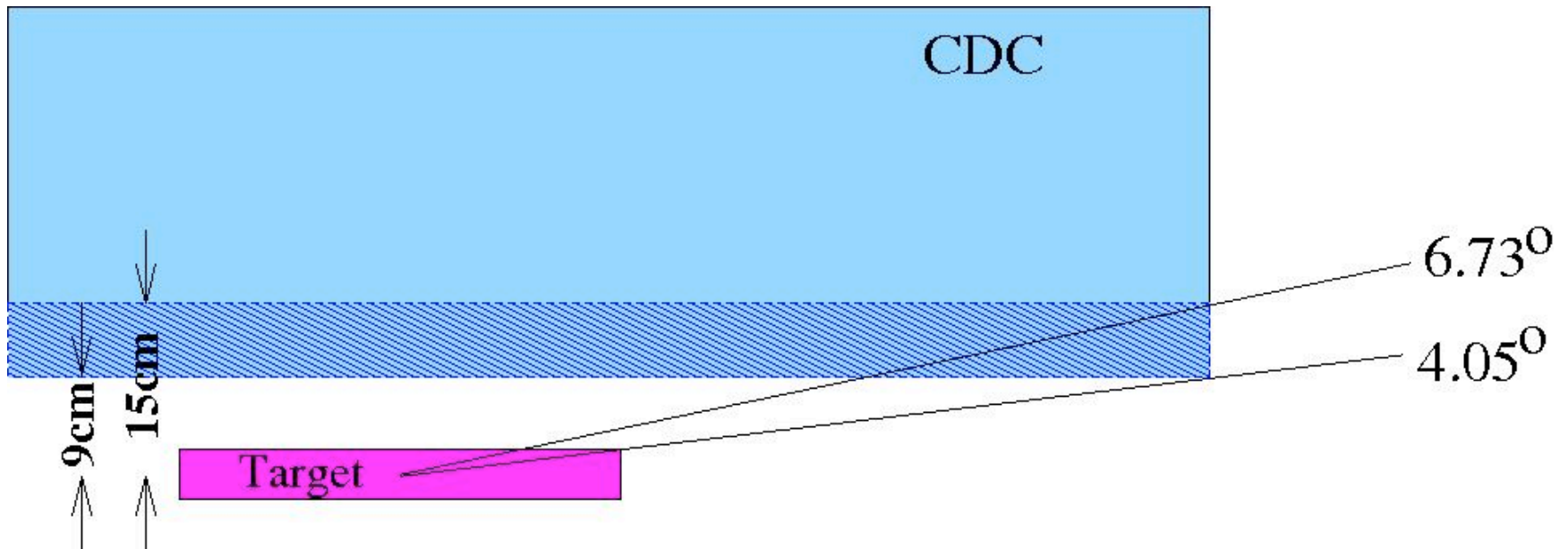


Plot by David Lawrence

# Timeline

- June 15 - Richard commits geometry changes to repository. Radiation Scans are posted to the wiki
- June 25 - Matt asks about status and Richard responds that “Bugs were found, the corrections applied, and corrected geometry validated”
- June 26 - David asks Mihajlo to repeat photon conversion studies
- June 29 - Mihajlo uploads new plots to Wiki (not shown at a meeting)
  - [http://www.jlab.org/Hall-D/software/wiki/index.php/Image:20070728\\_photon\\_efficiency.gif](http://www.jlab.org/Hall-D/software/wiki/index.php/Image:20070728_photon_efficiency.gif)
  - [http://www.jlab.org/Hall-D/software/wiki/index.php/Image:20070628\\_photon\\_conversion.gif](http://www.jlab.org/Hall-D/software/wiki/index.php/Image:20070628_photon_conversion.gif)

# “The Bug”



The bug was that the inner radius of the CDC was set at 9 cm instead of 15 cm. This placed additional material in the detector for tracks between 4.05 and 6.73 degrees.

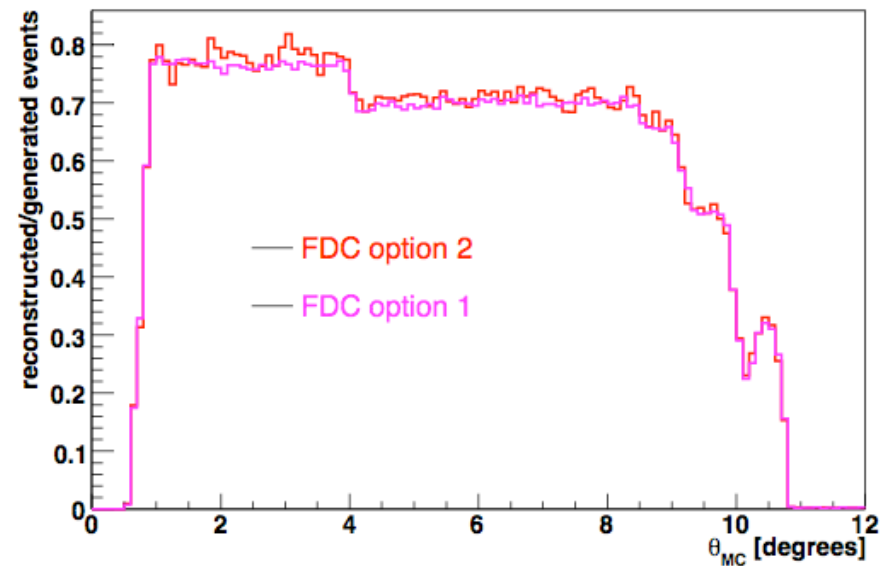
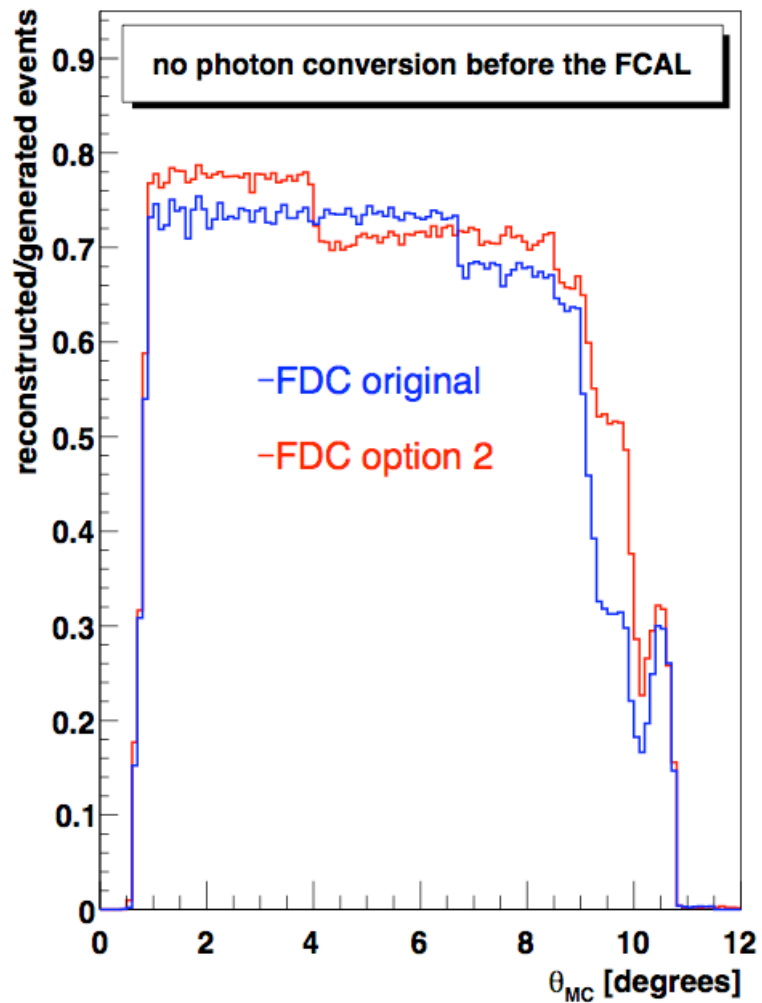


# FCAL Efficiency

(with bug)

*Plots by Mihajlo Kornicer*

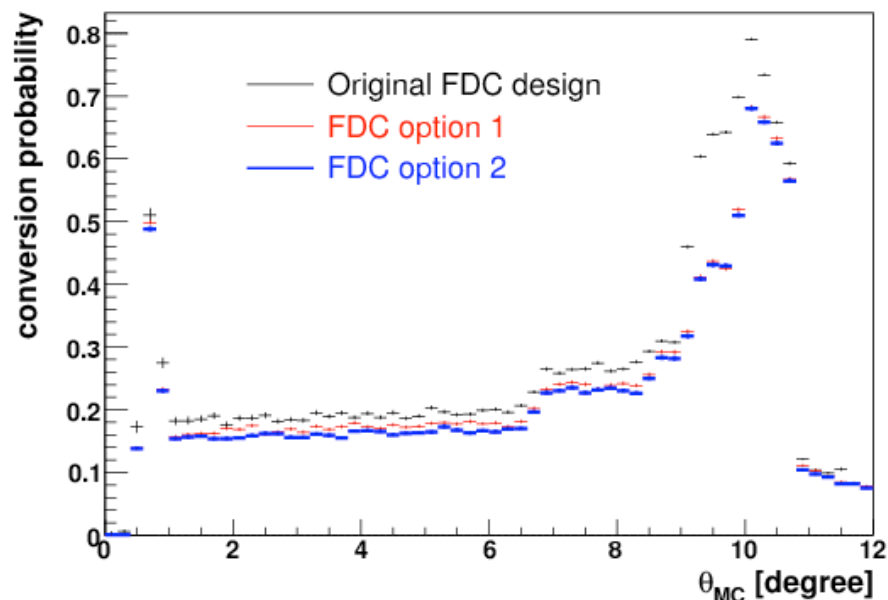
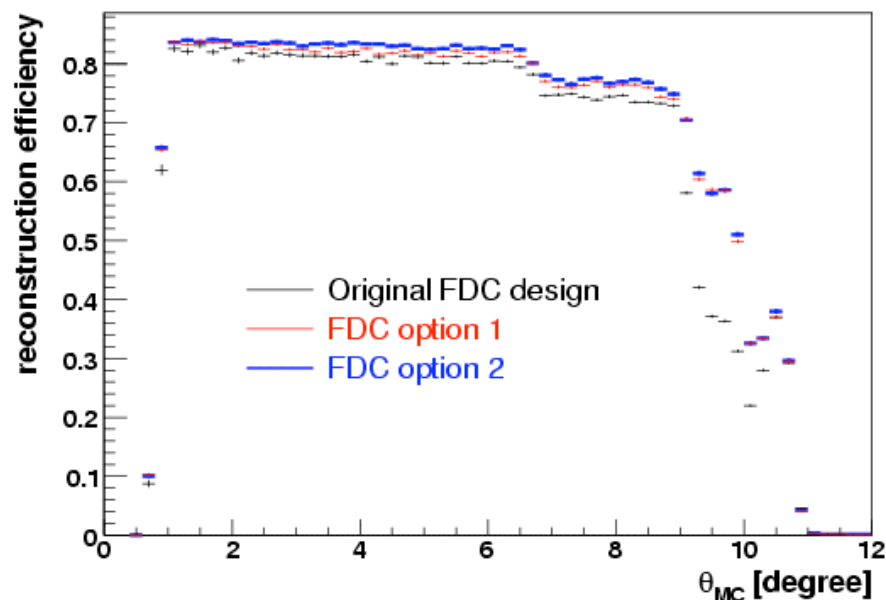
Single cluster reconstruction efficiency



# FCAL Efficiency

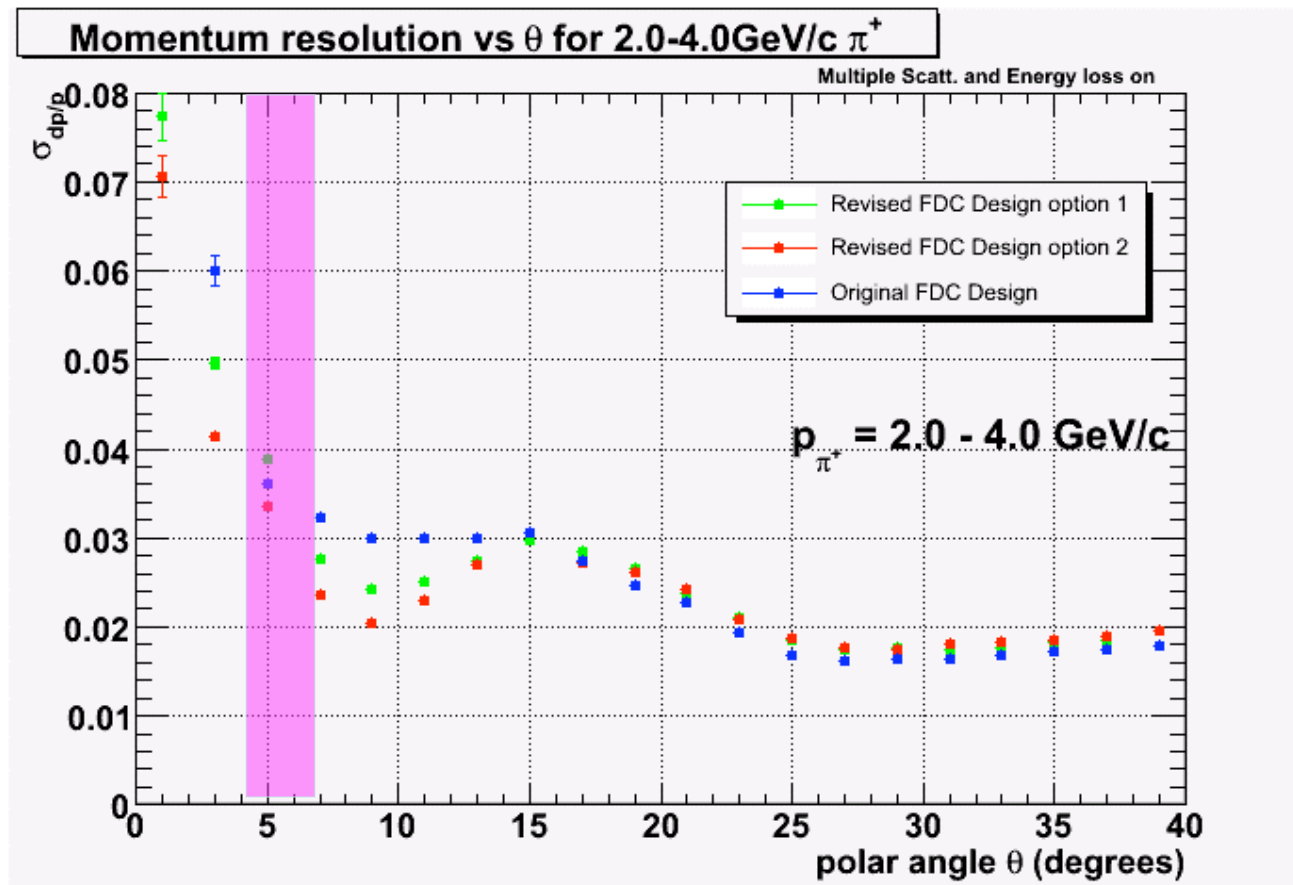
(without bug)

*Plots by Mihajlo Kornicer*

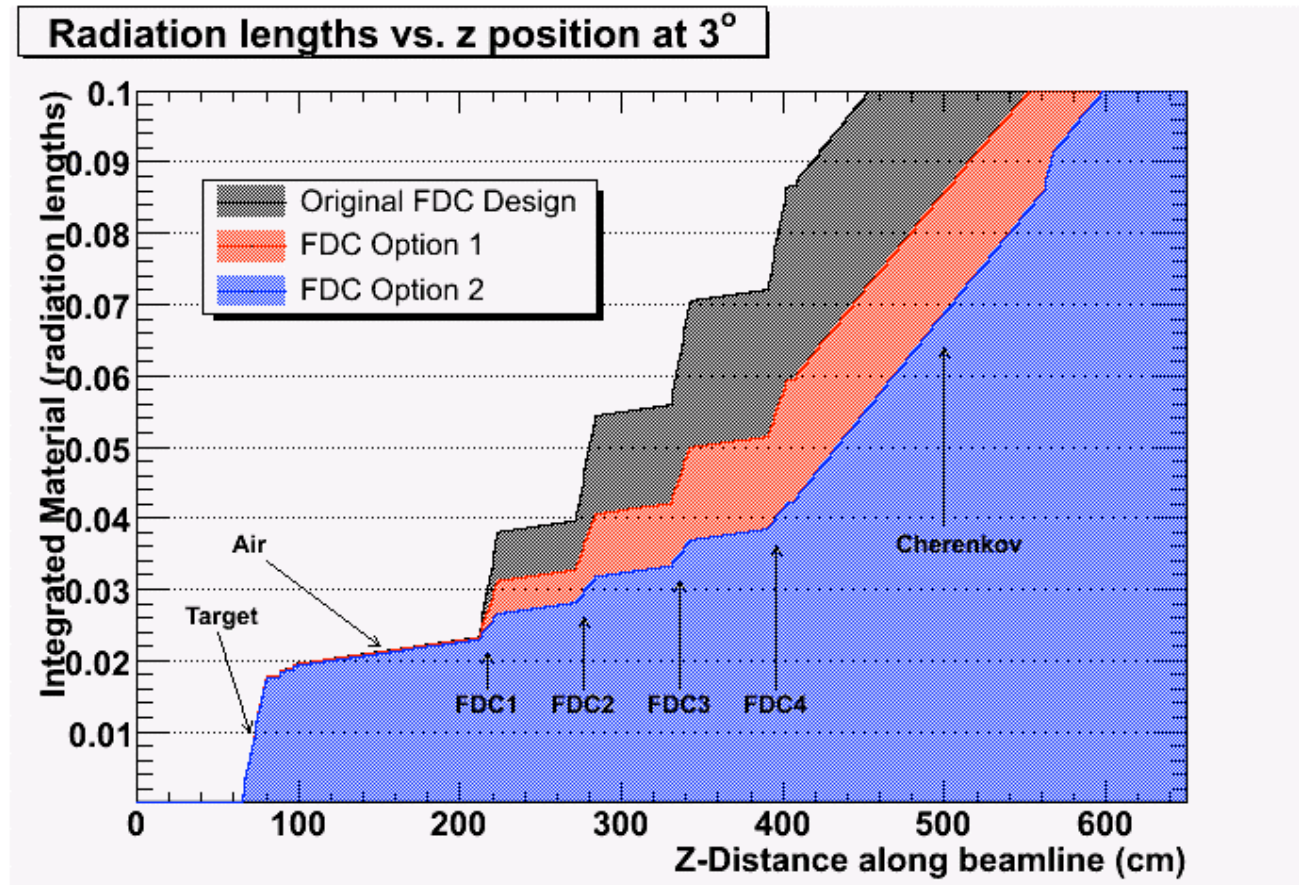


FCAL reconstruction efficiency; photon conversion probability as a function of angle.

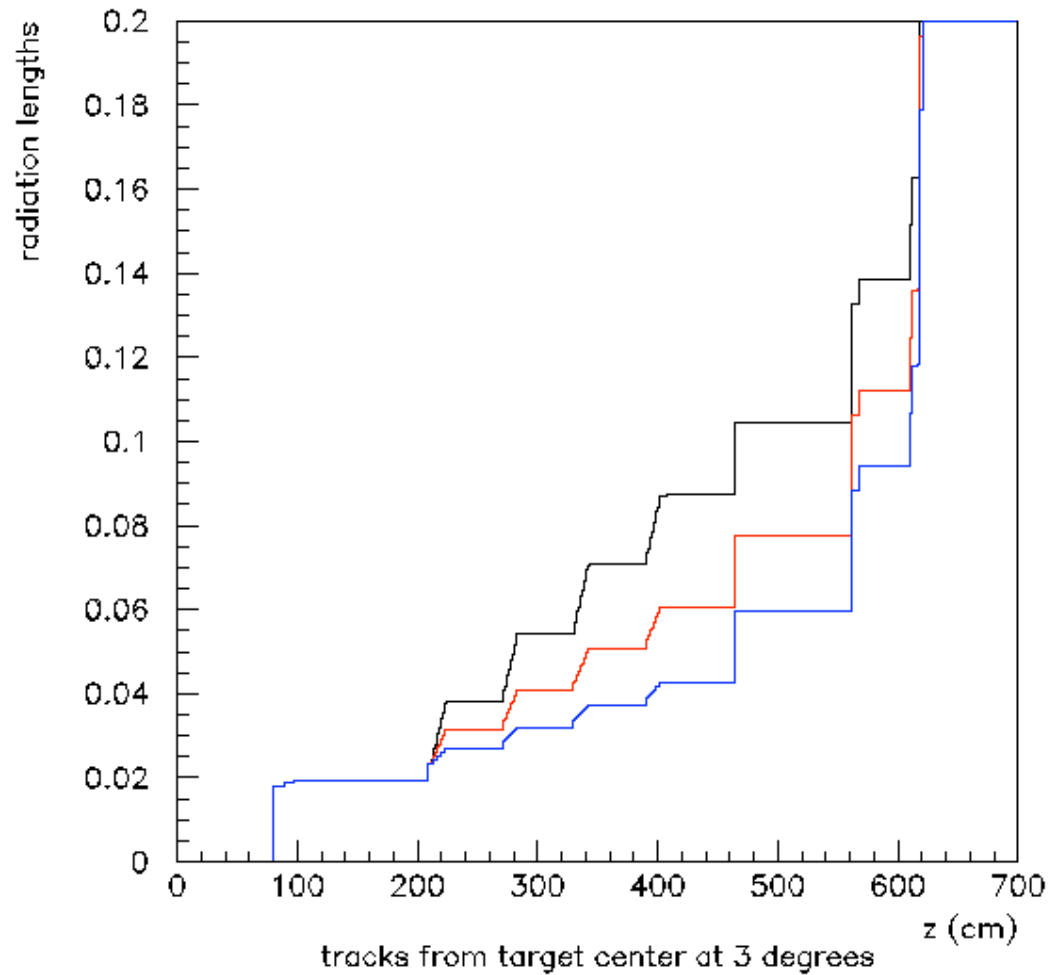
# Momentum Resolution (with bug)



# Radiation Length Scans



# Radiation Length Scans



# Summary

- Background rate studies for a geometry close to FDC option2 have been done and compared to the original design
- Radiation length scans have been made for both FDC geometry options and compared with the original design
- Relative photon conversion probabilities have been determined for both FDC geometry options compared to the original design.
- Charged pion tracking resolutions have been determined for both FDC geometry options and compared to the original design (with the CDC inner radius bug)