

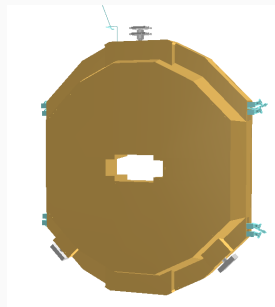
# EMC Forward Endcap simulation - current concerns

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Ben William Salisbury

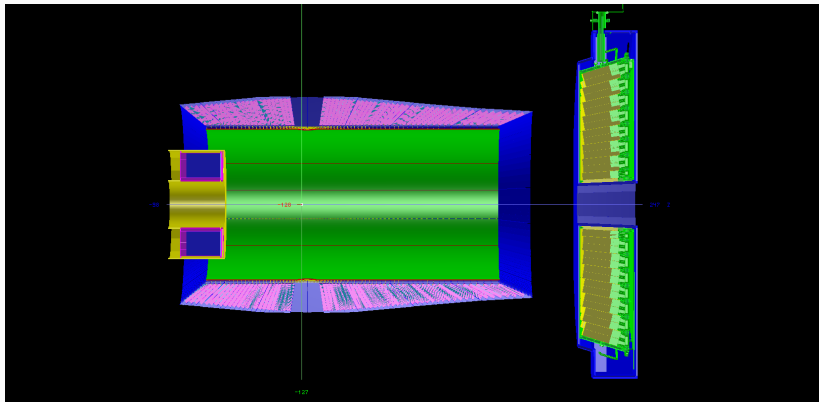
October 28, 2020

HISKP University Bonn

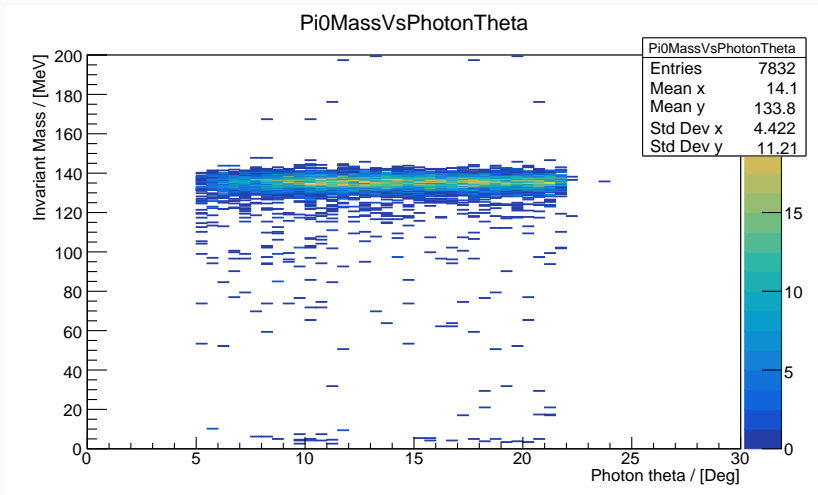


# $\pi^0$ simulation with only the Target-EMC

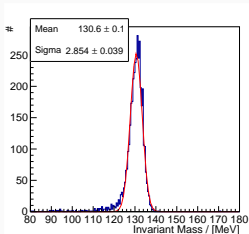
- I was looking at  $\pi^0$  for testing purposes of a new Energy-Correction for the FwEndcap while only simulating the Barrel and both Endcaps.



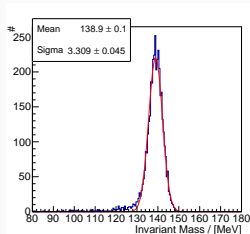
# $\pi^0$ simulation with only the Target-EMC



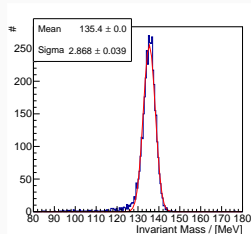
# $\pi^0$ simulation with only the Target-EMC



**(a)** Raw mass



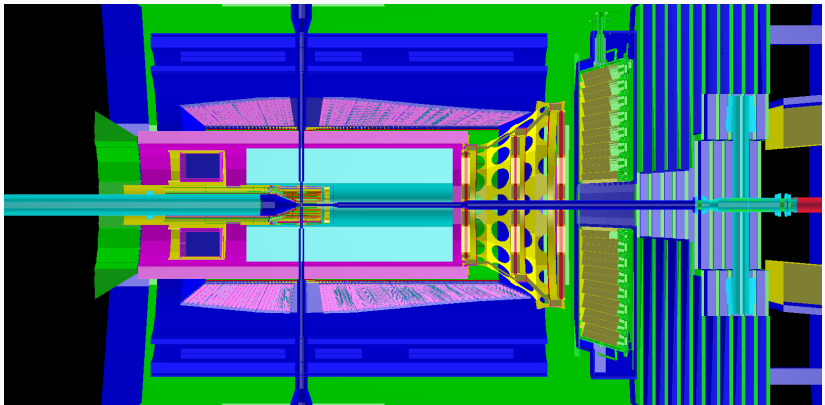
**(b)** Old  $\theta-$  and energy-dependent Energy Correction applied



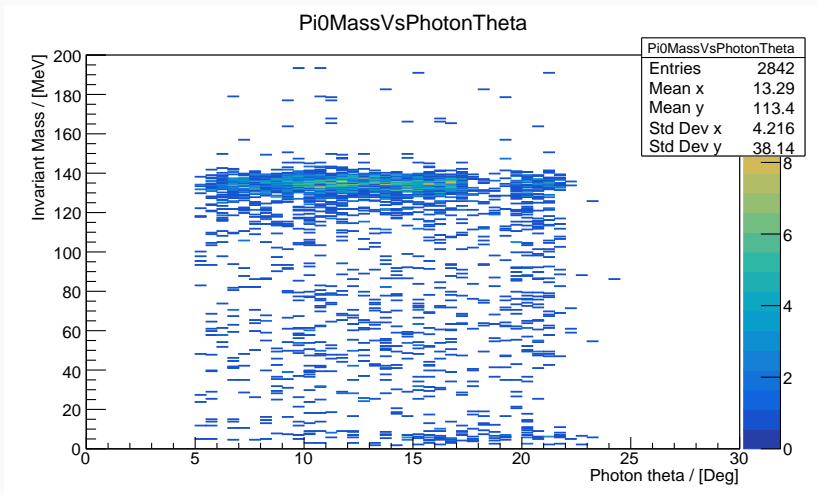
**(c)** New  $\theta-$ ,  $\phi-$  and energy-dependent but preliminary Energy Correction applied

# $\pi^0$ simulation with the whole PANDA-Detector

- I was then attempting to test it with the full PANDA-Geometry.



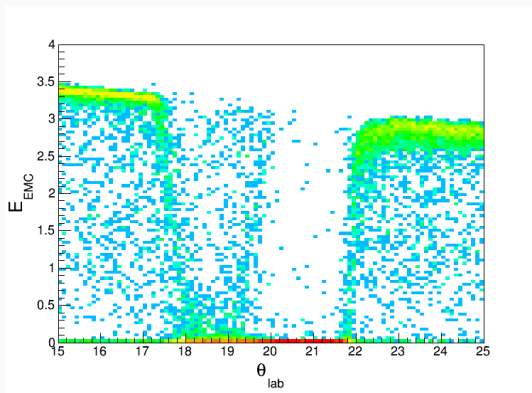
# $\pi^0$ simulation with the whole PANDA-Detector



- A hole like structure emerged at  $\theta \gtrsim 18^\circ$

## Hole like structure at $\theta \approx 18^\circ$

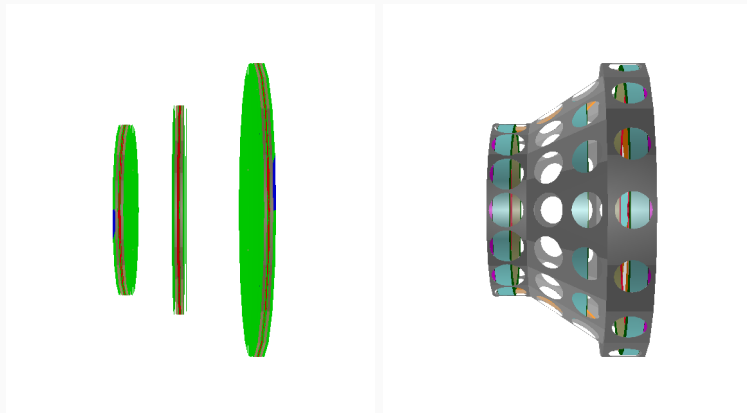
- This reminded me of an observation of Alaa Dbeyssi



- A hole like structure emerged at  $\theta \gtrsim 18^\circ$  when moving from PandaROOT version **dec17p2b** to **dec18**

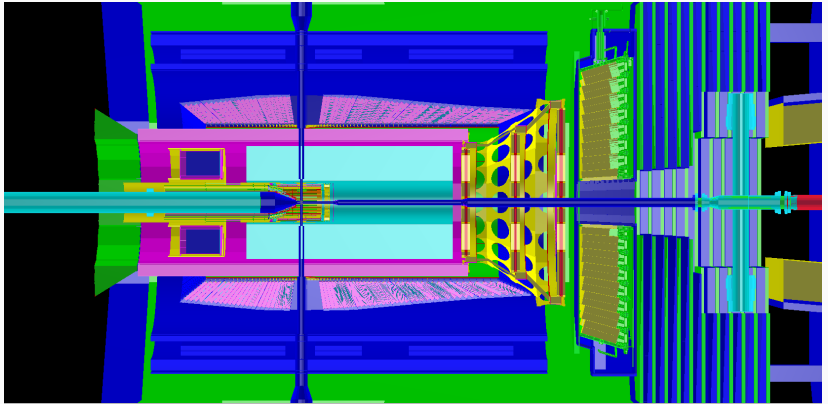
## Hole like structure at $\theta \gtrsim 18^\circ$

- Based on my observation a geometry must be cause of the hole
- One geometry that effects that  $\theta$  area and had changed from **dec17p2b** to **dec18** was the GEM

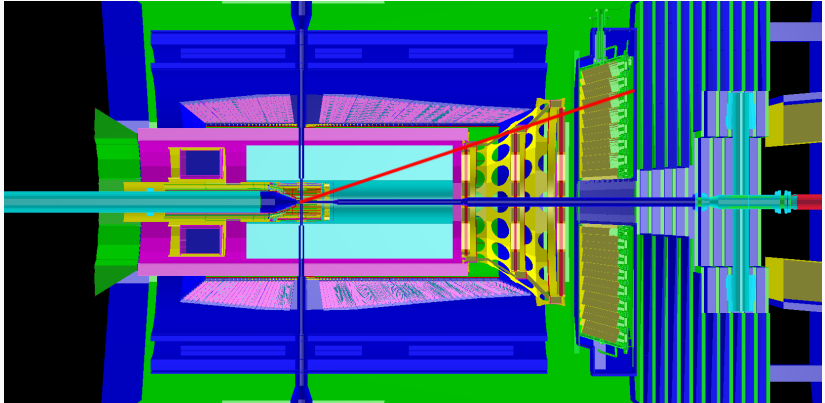




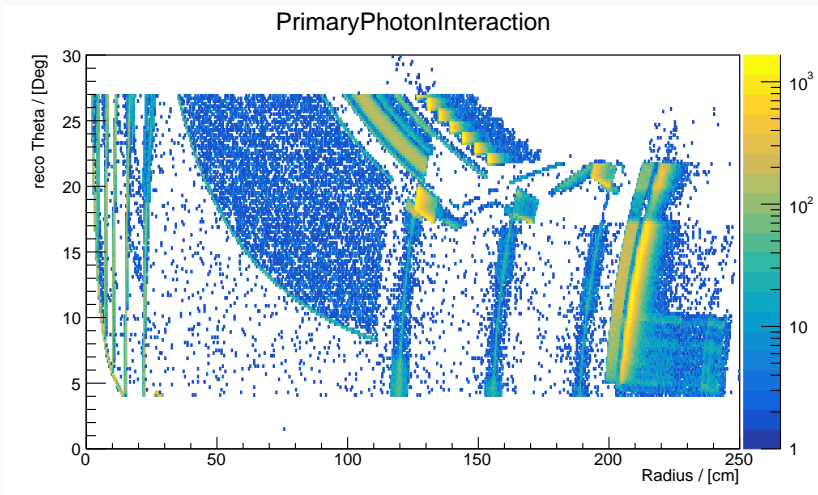
# PANDA-Simulation Geometry



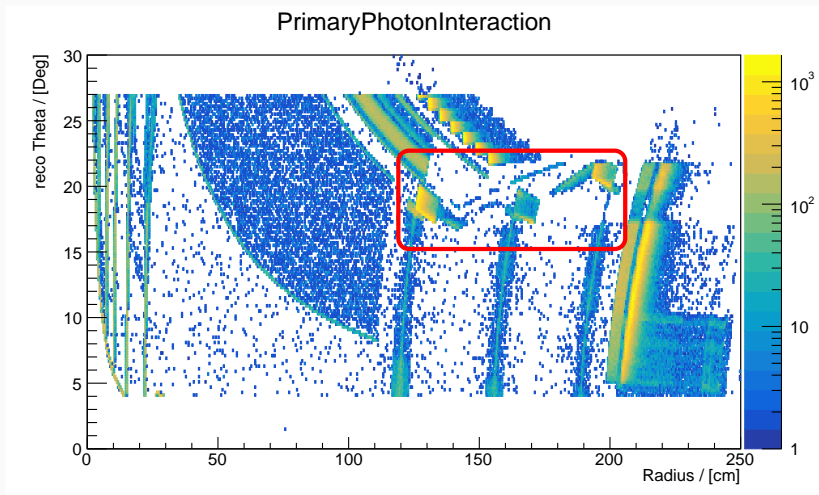
# PANDA-Simulation Geometry

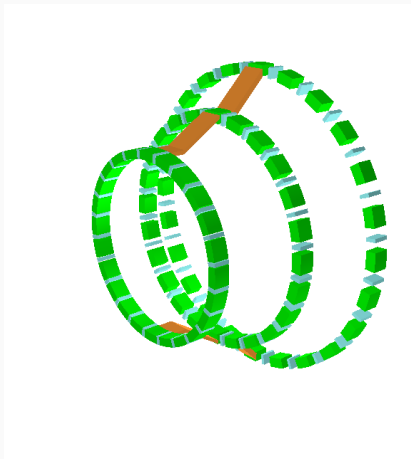


# Interaction map for primary Photons(!)



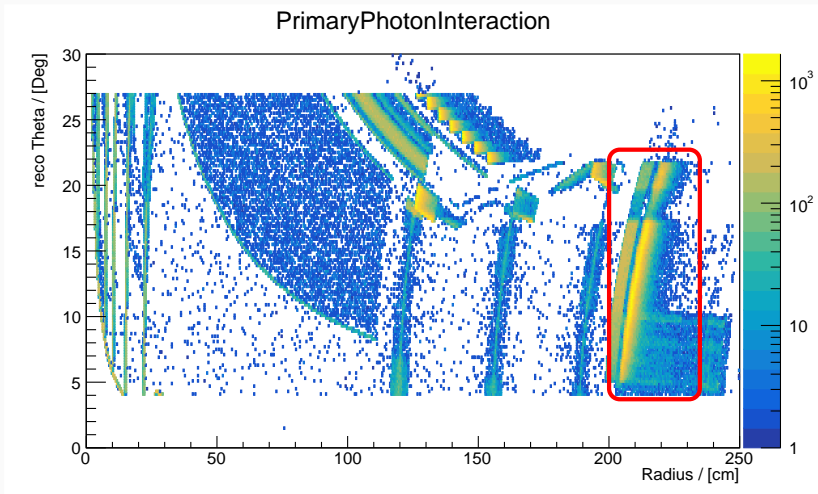
# Interaction map for primary Photons(!)



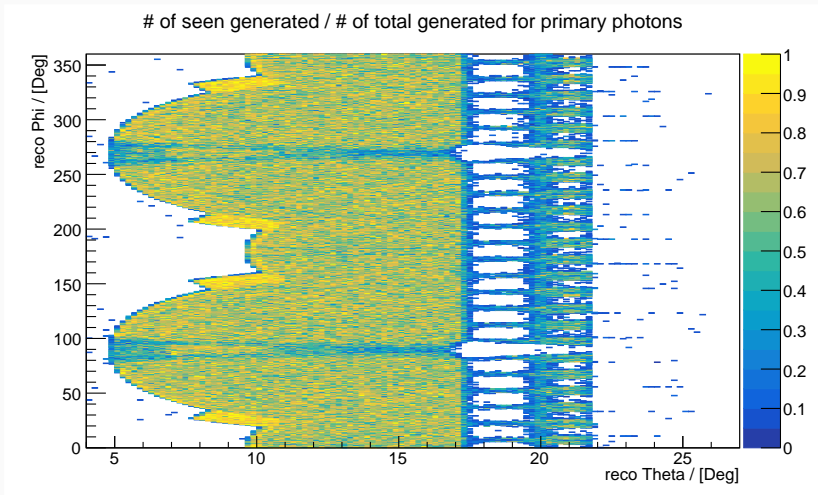


- These parts are mock ups for the front-end-electronics and cables made out of blocks of copper and aluminum

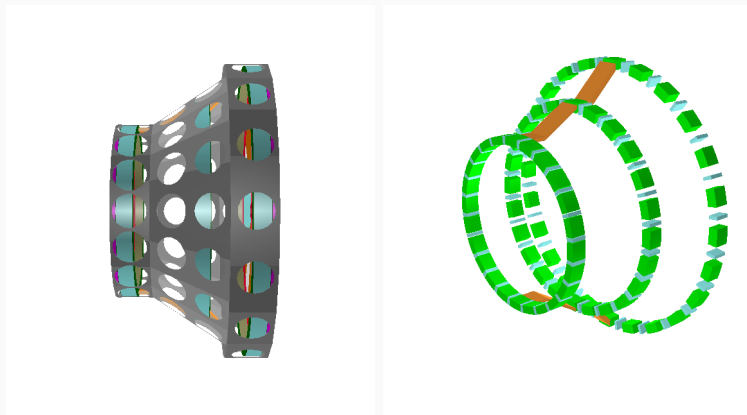
# Interaction map for primary Photons(!)



# FwEndcap Hit map for primary Photons(!) MC Position Info

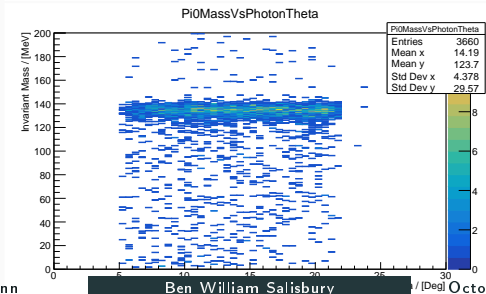
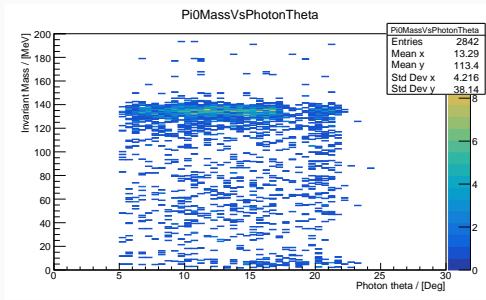


# Removing GEM-FEE from the GEM-Geometry as test and redoing simulation

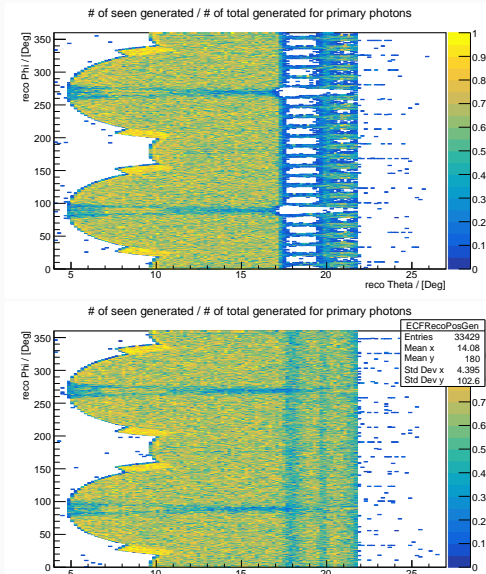




# Redoing simulation without GEM-FEE removes hole



# Redoing simulation without GEM-FEE removes hole



- Front-end-electronic mock ups of the new GEM geometry cause hole in photon reconstruction at  $\theta \approx 18^\circ$
- GEM may also be the cause of Alaa Dbeyssi's electron hole he encountered over a year ago but I do not know for certain

Thank you for your attention!

# FwEndcap Hit map for primary Photons(!) MC Position Info

