Fiducial Cuts for DVCS Photons RG-K 6.5 GeV and 7.5 GeV DVCS Wagon

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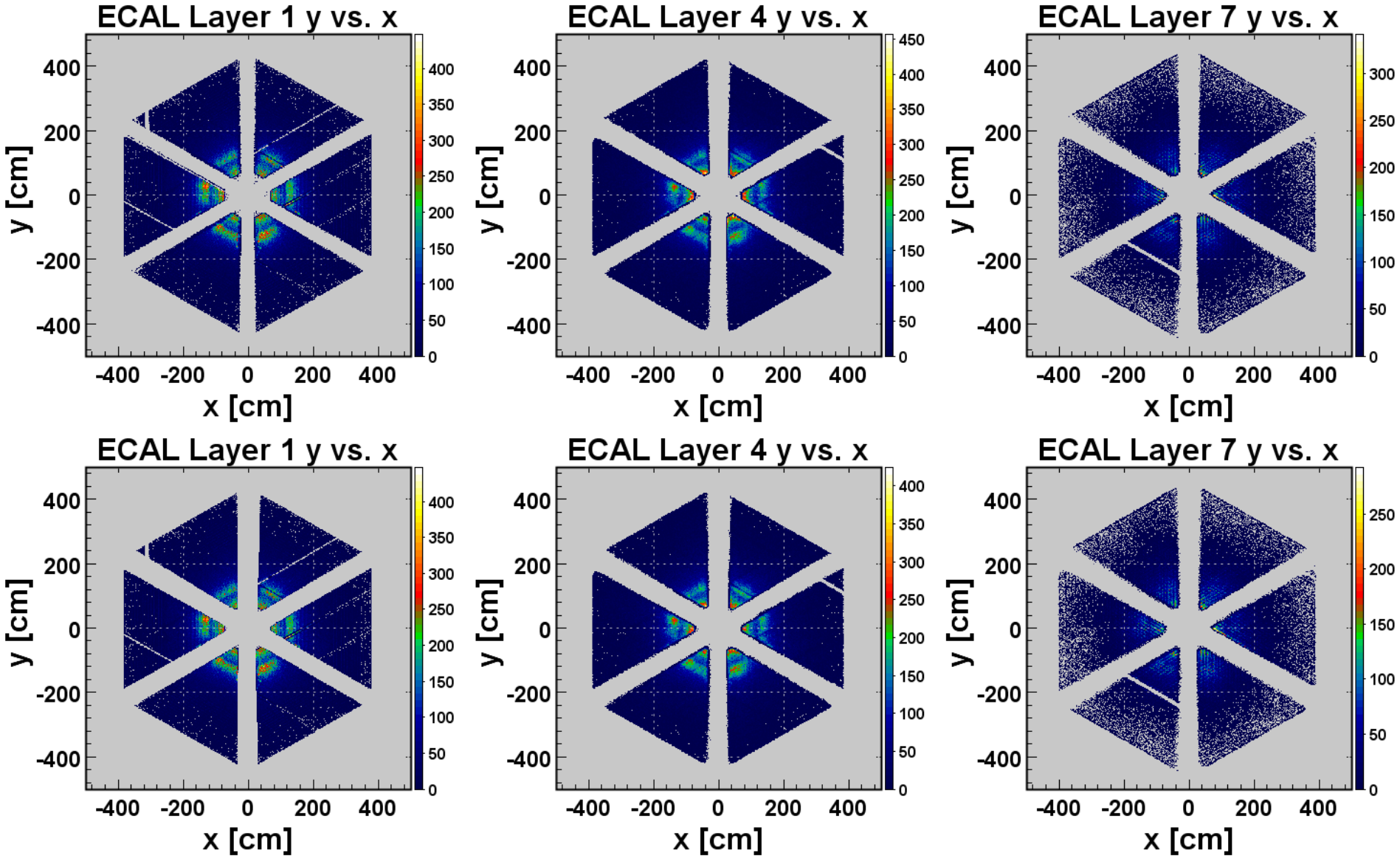
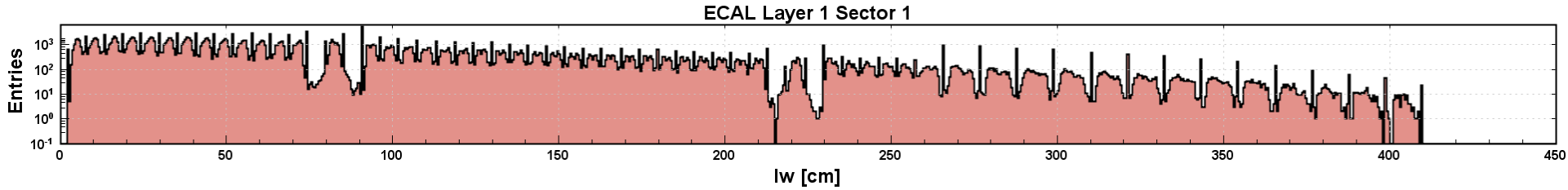
ECAL Fiducial Cuts:
RG-K 6.5 GeV and 7.5 GeV
DVCS Wagon

ECAL Boundary Fiducial Cuts

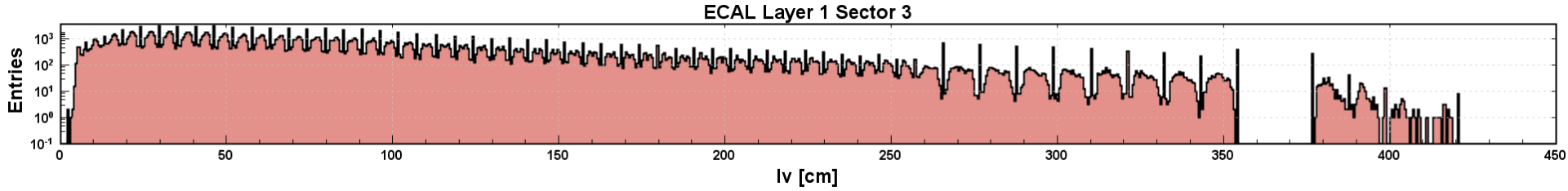


ECAL surface hit map of γ before (top) and after (bottom) implementing boundary fiducial cuts based on sampling fraction (SF).

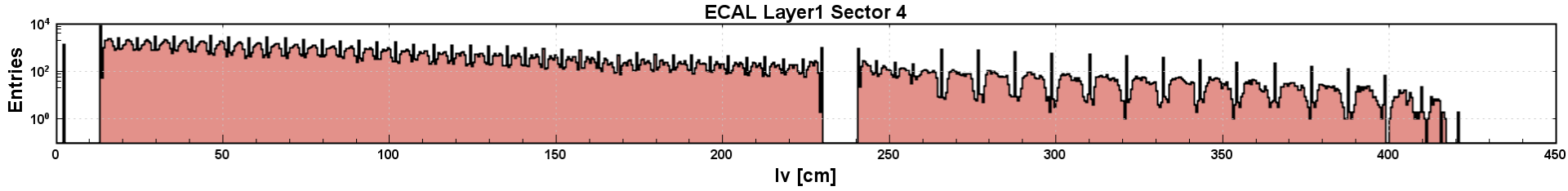
Faulty ECAL Channels



Faulty channel positions {(74.5,79.5), (85.5,90.5), (213,218), (224.5,229.5)} cm: dead for some time



Faulty channel position (354.5,376.5) cm: dead for the whole run



Faulty channel position 13) cm: (practically) dead for the whole run

ECAL Faulty Channels: Sector 1

Sector	Layer	Orientation	Position [cm]
1	1	lu	-
		lv	-
		lw	(74.5, 79.5), (85.5,90.5), (213,218), (224.5,229.5), (410
	4	lu	-
		lv	(70, 93)
		lw	-
	7	lu	(410.5
		lv	24), (36.5,60), (411
		lw	21.5)

ECAL Faulty Channels: Sector 2

Sector	Layer	Orientation	Position [cm]
2	1	lu	-
		lv	(102, 113)
		lw	-
	4	lu	(396
		lv	-
		lw	(363
	7	lu	12)
		lv	-
		lw	10.5), (376

ECAL Faulty Channels: Sector 3

Sector	Layer	Orientation	Position [cm]
3	1	lu	-
		lv	(354.5,376.5)
		lw	-
	4	lu	23)
		lv	-
		lw	10), (363
	7	lu	-
		lv	-
		lw	(387

ECAL Faulty Channels: Sector 4

Sector	Layer	Orientation	Position [cm]
4	1	Iu	-
		Iv	13), (230,240.5)
		Iw	(410
	4	Iu	-
		Iv	-
		Iw	20.5)
	7	Iu	-
		Iv	-
		Iw	32.5)

ECAL Faulty Channels: Sector 5

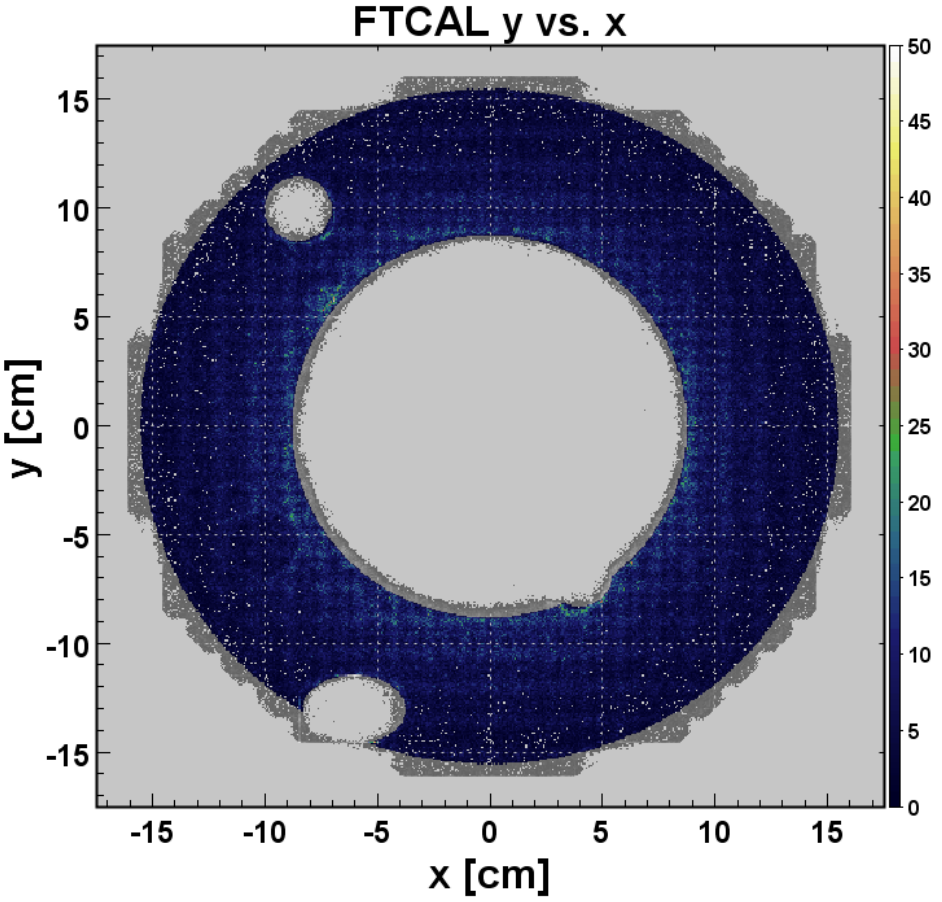
Sector	Layer	Orientation	Position [cm]
5	1	lu	-
		lv	-
		lw	-
	4	lu	-
		lv	23)
		lw	10)
	7	lu	(193.5, 217)
		lv	24)
		lw	-

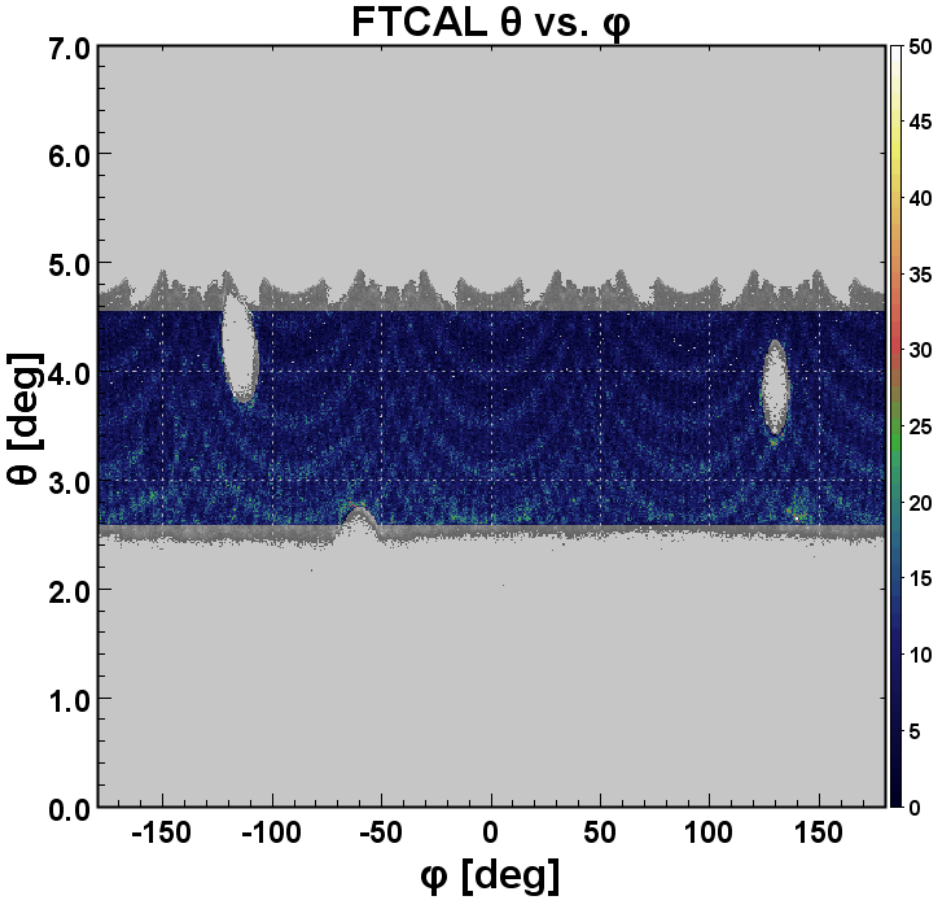
ECAL Faulty Channels: Sector 6

Sector	Layer	Orientation	Position [cm]
6	1	lu	-
		lv	-
		lw	(174.5,179.5), (185.5, 190.5)
	4	lu	-
		lv	11.5)
		lw	20.5)
	7	lu	-
		lv	12), (423
		lw	32.5)

FTCAL Fiducial Cuts:
RG-K 7.5 GeV DVCS Wagon

FTCAL Boundary Fiducial Cuts





Elliptical boundaries are used to define the fiducial cuts (as shown by the solid 2D histograms) and are selected to smoothen the rough edges of the detector and the holes due to dead channels (as shown by the superimposed “shadow” histogram).

FTCAL Fiducial Cuts

Given the REC::ForwardTagger bank entries x and y satisfying the conditions:

- detector == 1
- layer == 1

, the acceptance fid is defined with the following conditions:

- IF ($x^2 + y^2 > 8.8^2$ AND $x^2 + y^2 < 15.5^2$) fid = TRUE
- IF $((x+8.5)^2 + (y-10)^2 < 1.5^2$
  OR $(x-4)^2 + (y+6.8)^2 < 1.5^2$
  OR $((x+6)^2/2.3^2 + (y+13)^2/1.6^2 < 1)$ fid = FALSE.

Summary

- Photons from RG-K 6.5 GeV and 7.5 GeV DVCS wagon are used to map ECAL detector hits.
- Faulty channel positions are identified as:
  1. Corresponding to channels dead during the whole run, *or*
  2. Corresponding to channels dead some time during the run.
- Empty hit position on the edges are evaluated as faulty if:
  1. There are no hits adjacent to the scintillator spike on the empty side, *and*
  2. The edge starts farther or ends closer compared to its corresponding edges from other sectors.
- Elliptical boundaries which carve out the rough edges of the detector and the holes due to dead channels are selected as FTCAL fiducial cuts.

Thank You!!!