ECLOUD tuning update

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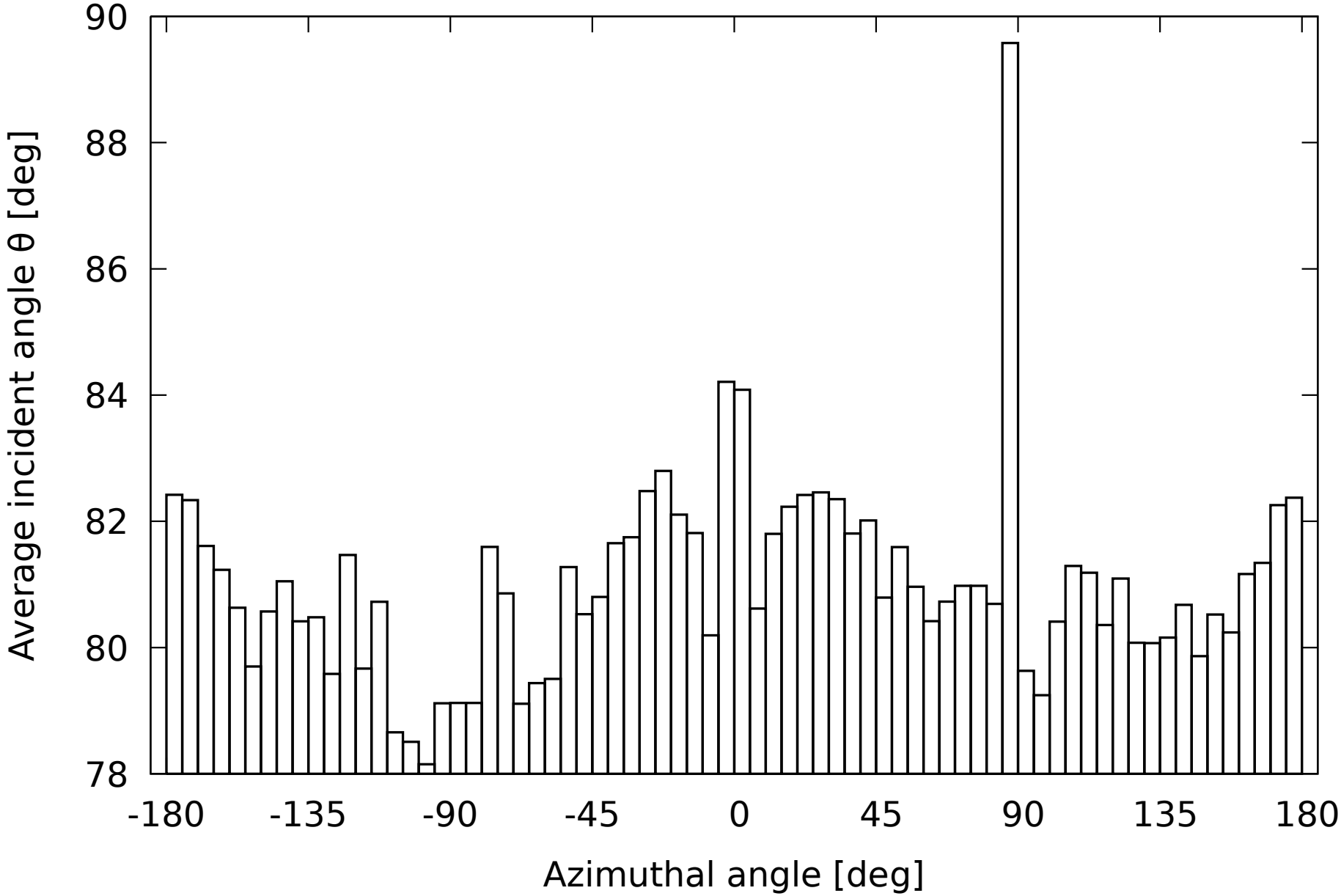
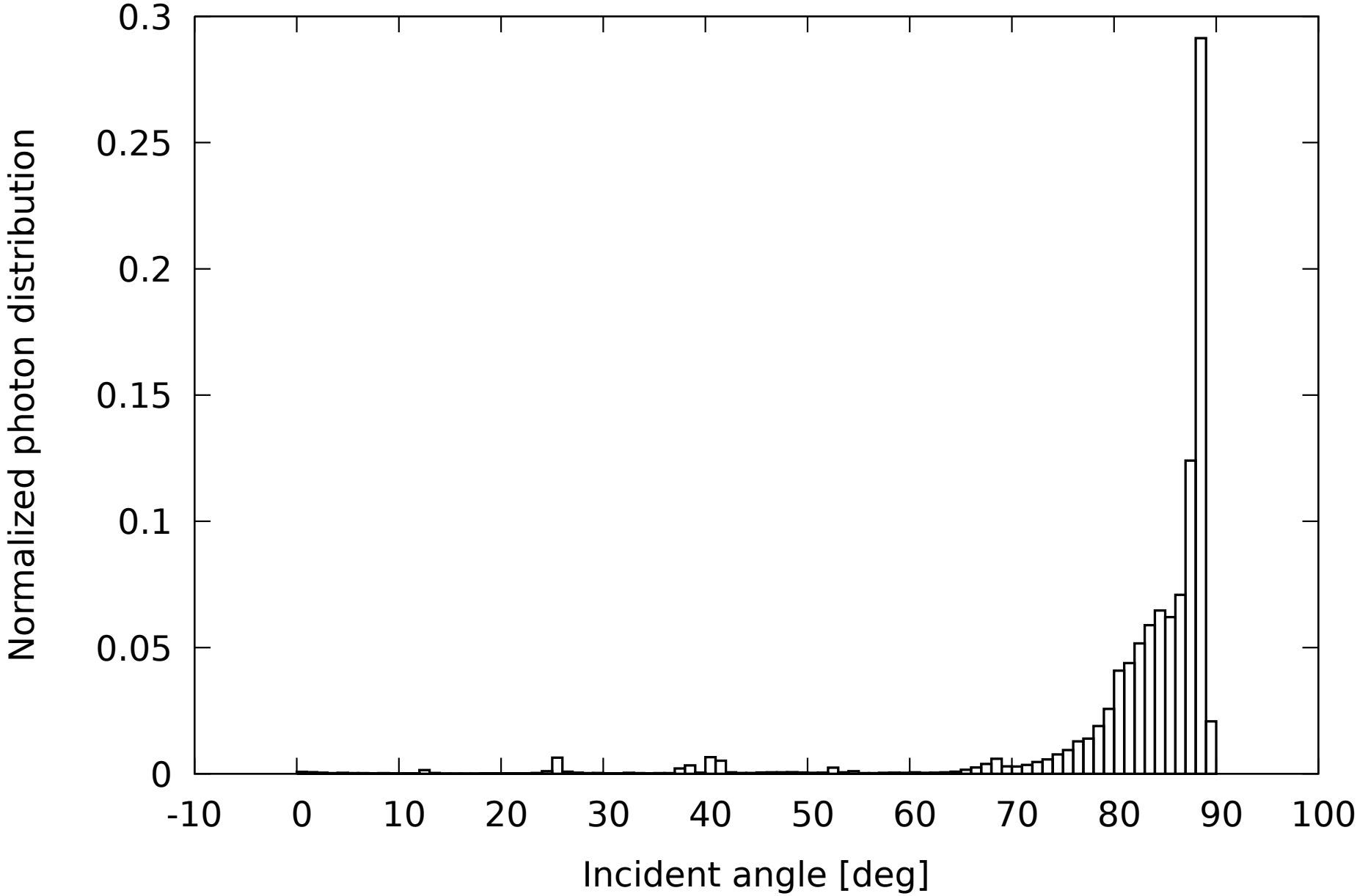
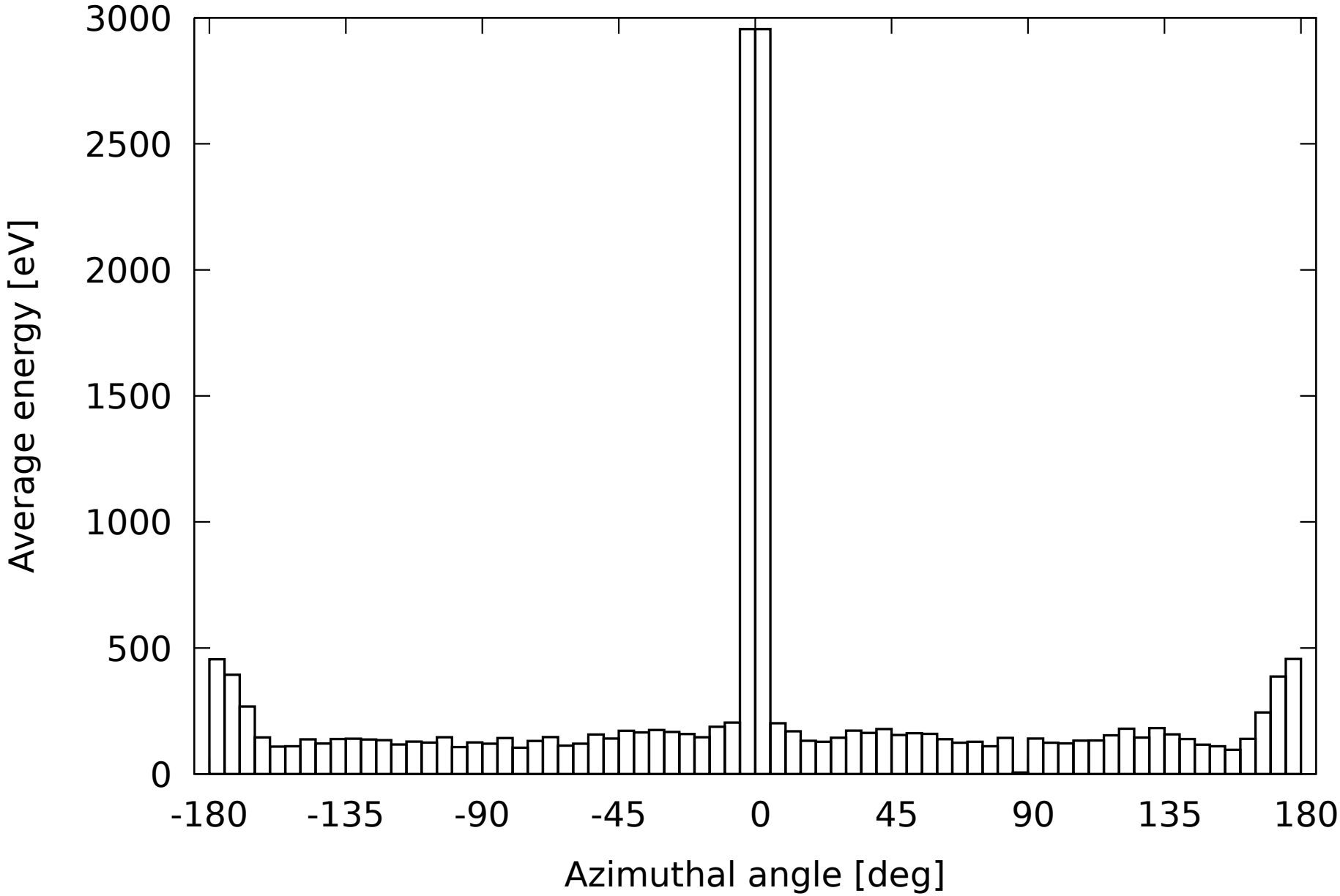
1 August 2017

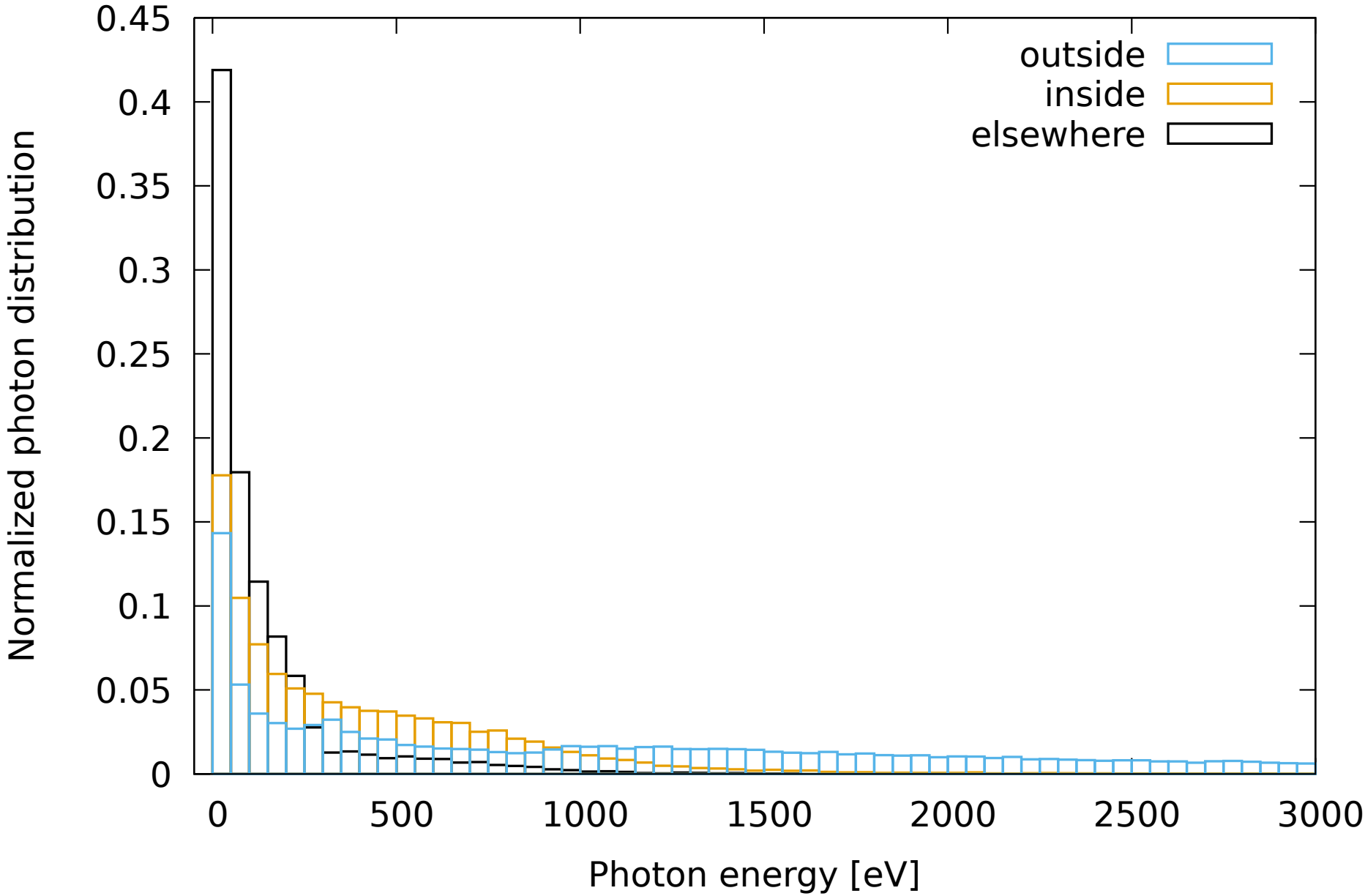
Motivation

- Up to now, use different QEs in ECLOUD for sides of vacuum chamber wall and top/bottom
- What is considered side or top is determined by the opening angle `alimit` (as a fraction of $180°$)
- Optimization of parameters to tune shift measurements had preferred a large value of `alimit`
- Sean noticed a "rectangular" cloud in dipoles at 5 GeV which is a side effect of this
- Instead of alimit, we now use 2 angles to specify in outside, inside, and elsewhere (top/bottom) of BP, with 3 independent QEs
- Angles are determined after studying energy and incident angle of absorbed photons from Synrad3D


90
88
86
84
82
80
78
Average incident angle θ [deg]
-180
-135
-90
-45
0
45
90
135
180
Azimuthal angle [deg]


0.3
0.25
0.2
0.15
0.1
0.05
0
Normalized photon distribution
-10
0
10
20
30
40
50
60
70
80
90
100
Incident angle [deg]

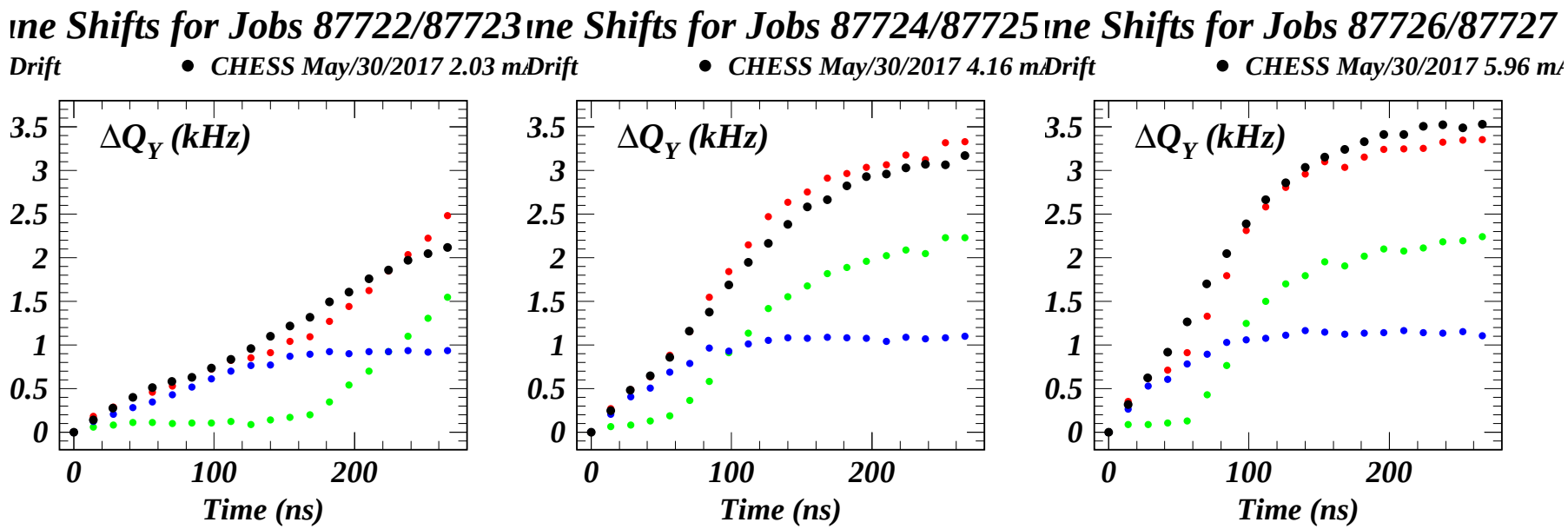

3000
2500
2000
1500
1000
500
0
Average energy [eV]
-180
-135
-90
-45
0
45
90
135
180
Azimuthal angle [deg]


outside
inside
elsewhere
Normalized photon distribution
Photon energy [eV]
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
500
1000
1500
2000
2500
3000

5.3 GeV positrons

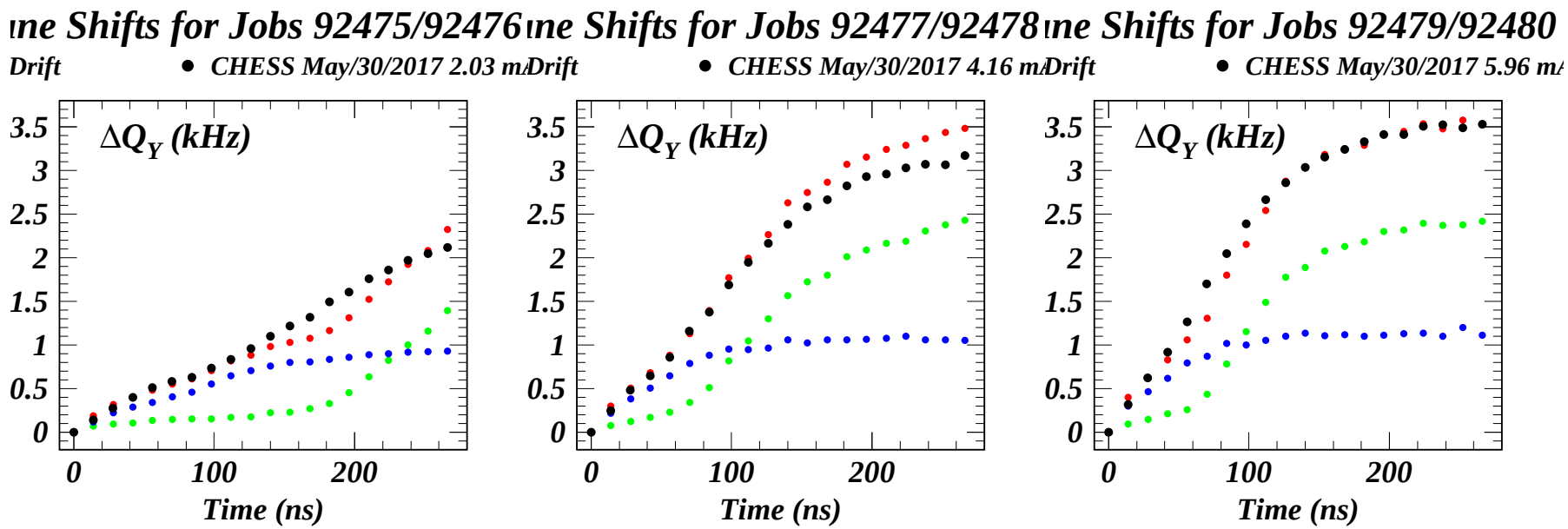
Synrad3D, 5 GeV, alimit

Tune only to the 2,4,6 mA/b data



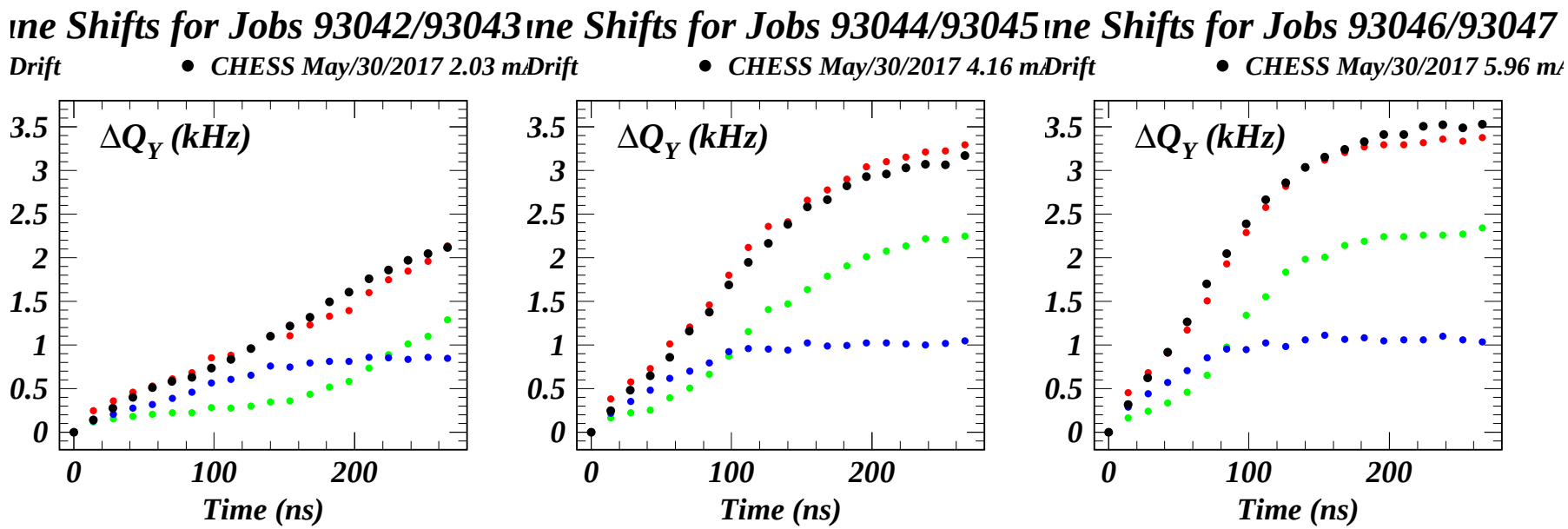
Synrad3D, 5 GeV, QEin, χ^2 weights

Tune only to the 2,4,6 mA/b data



Synrad3D, 5 GeV, QEin

Tune only to the 2,4,6 mA/b data



Comparison of tuned parameters

	Nominal	5 GeV, alimit	5 GeV, QEin, weights	5 GeV, QEin
epeak	310	317	312	301
seys	1.54	1.50	1.40	1.39
rediffused	0.24	0.38	0.36	0.37
deltamax	1.88	1.65	1.56	1.38
qesides	0.10	0.049		
qeout			0.016	0.015
qein			0.063	0.023
qetop	0.10	0.24	0.19	0.29
highedir	0.0	0.20		
peakhedir	80	79		
semax	1.8	1.80		
tpar3	0.7	0.69		
alimit	0.015	0.16		