

mTower test at DESY electron beam line data quality check

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DONE

- ✓ run-condition table is ready
- ✓ data decoding was finished

	A	B	C	G	H	J	K	L	M	R	T	U	V	W	X	Y	Z	AA
	run number	run type	run status	duration	beam energy	lead collimator	internal collimator	stage pos	stage pos	nr_event counted	strobe duration	VCASN	ITHR	W width in front	angle	maskpnt source	maskpnt threshold	data path
15	256	pedestal	good(a)	0:13	-	NO	60x60			50000	10	50	51	no	0			/result_20191125evening_pedestal/Run_0256 no
16	257	physics	good(a)	4:45	5	NO	60x60	188.3	737.1	1212688	10	50	51	no	0	Run_0256	0.02	/result_20191125evening_testbeam/Run_0257 applied mask from pedestal run 0256
17	258	physics	bad(a)	0:02	3	NO	60x60	188.3	737.1	5387	10	50	51	no	0	Run_0256	0.02	/result_20191126night_testbeam/Run_0258 first run with 3GeV (test)
18	259	physics	bad(a)	0:02	3	NO	60x60	188.3	737.1	5185	10	50	51	no	0	Run_0256	0.02	/result_20191126night_testbeam/Run_0259 same with Run 258 except decode level = 0
19	260	pedestal	good(a)	0:13	-	NO	60x60			50000	10	50	51	no	0			/result_20191126night_pedestal/Run_0260 nothing
20	261	physics	good(a)	4:40	3	NO	60x60	188.3	737.1	1168767	10	50	51	no	0	Run_0260	0.02	/result_20191126night_testbeam/Run_0261 physics run with 3 GeV
21	263	pedestal	good(a)	0:12	-					50000	10	50	51	no	0			/result_20191126night_pedestal/Run_0263 no
22	264	physics	bad(a)	0:01	5	6x6	14x14	188.3	737.1	4885	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0264 Position test expected position 2
23	265	physics	good(a)	0:44	5	6x6	14x14	188.3	737.1	283060	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0265 Beam position 2 (centered)
27	269	physics	bad(a)	0:08	5	2x2	10x10	188.3	744.7	2632	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0269 Trigger intrval increased to 1 sec , applied mask
28	270	physics	bad(a)	0:09	5	2x2	10x10	188.3	744.1	3348	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0270 Changed position
29	271	physics	bad(a)	0:35	5	2x2	10x10	188.3	744.1	9533	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0271 Ncycles = 50
30	272	physics	bad(a)	0:07	5	6x6	10x10	188.3	744.1	24816	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0272 collimeter changed to 6*6 internal collimeter is same 10*10
31	273	physics	good(a)	1:11	5	6x6	10x10	188.3	744.1	272561	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0273 NrRepeat 552
32	274	physics	bad(a)	0:02	5	6x6	10x10	188.3	751.6	4986	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0274 short run after changing the poition
33	275	physics	bad(a)	0:02	5	6x6	10x10	188.3	751.8	4993	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0275 changed position in Y
34	276	physics	bad(a)	0:03	5	6x6	10x10	188.3	152.2	4983	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0276 changed tower position
35	277	physics	good(a)	2:06	5	6x6	10x10	188.3	752.2	282505	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0277 Longer run with 600 cycles
36	278	physics	bad(a)	0:03	5	6x6	10x10	173.1	752.2	4991	10	50	51	no	0	Run_0263	0.02	/result_20191126morning_pos/Run_0278 test run to confirm move to position 4 successful (corner of the chip)
48	290	physics	good(a)	1:00	5	6x6	10x10	173.1	752.2	114077	10	50	51	no	0	Run_0263	0.02	/result_20191126evening_pos/Run_0290 resume run at position 4
49	291	physics	good(a)	1:15	5	6x6	10x10	173.1	752.2	139281	10	50	51	no	0	Run_0263	0.02	/result_20191126evening_pos/Run_0291 continuation of the run at position 4 after run 290 got stuck
50	292	physics	bad(a)	0:02	5	6x6	14x14	173.1	737.2	4942	10	50	51	no	0	Run_0263	0.02	/result_20191126evening_pos/Run_0292 Position 5 test run
51	293	physics	good(a)	0:54	5	6x6	14x14	173.1	752.2	295289	10	50	51	no	0	Run_0263	0.02	/result_20191126evening_pos/Run_0293 position 5
56	298	pedestal	good(a)	0:12	-	6x6	14x14			50000	10	50	51	no	0			/result_20191127night_pedestal/Run_0298 interval from 0.5 s to 0.05 s
57	299	physics	bad(a)	0:01	5	6x6	14x14	188.2	737.2	2448	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0299 test with new position #2 (short run)
58	300	physics	bad(a)	0:03	5	6x6	14x14	188.2	737.2	9825	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0300 test with new position #2 (short run)
59	301	physics	good(a)	0:54	5	6x6	14x14	188.2	737.2	247732	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0301 pos #2
60	302	physics	good(a)	0:14	5	6x6	14x14	188.2	737.2	73107	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0302 same with Run 301, more statistics
61	303	physics	bad(a)	0:02	1	6x6	14x14	188.2	737.2	9919	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0303 short run for the test
62	304	physics	good(a)	0:42	1	6x6	14x14	188.2	737.2	290669	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0304 nothing
63	305	physics	bad(a)	0:02	3	6x6	14x14	188.2	737.2	9693	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0305 short run
64	306	physics	good(a)	0:40	3	6x6	14x14	188.2	737.2	288853	10	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0306 nothing
65	307	physics	bad(a)	0:02	3	6x6	14x14	188.2	737.2	9878	5	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0307 strobe duration ~5 us (short run) preivoud maskpnt used
66	308	physics	bad(a)	0:02	3	6x6	14x14	188.2	737.2	10000	1	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0308 strobe duration ~1 us (short run)
67	309	physics	bad(a)	0:02	3	6x6	14x14	188.2	737.2	10000	0.2	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0309 strobe duration ~200ns (short run)
68	310	physics	bad(a)	0:02	3	6x6	14x14	188.2	737.2	9964	2	50	51	no	0	Run_0298	0.02	/result_20191127night_testbeam/Run_0310 strobe duration ~2 us (short run)
69	311	pedestal	good(a)	0:12	-	6x6	14x14			50000	2	50	51	no	0			/result_20191127night_pedestal/Run_0311 first pedestal run with strobe duration of 2 us
70	312	physics	good(a)	0:40	3	6x6	14x14	188.2	737.2	297345	2	50	51	no	0	Run_0311	0.02	/result_20191127night_testbeam/Run_0312 strobe duration ~2 us
71	313	physics	good(a)	0:49	5	6x6	14x14	188.2	737.2	292666	2	50	51	no	0	Run_0311	0.02	/result_20191127night_testbeam/Run_0313 strobe duration ~2 us
72	314	physics	good(a)	0:40	1	6x6	14x14	188.2	737.2	293392	2	50	51	no	0	Run_0311	0.02	/result_20191127night_testbeam/Run_0314 strobe duration ~2 us
75	317	pedestal	good(a)	0:13	-	6x6	14x14			50000	10	50	51	no	0			/result_20191127_analog/Run_0317 VCASN 50 ITHR 51
76	318	physics	bad(a)	0:01	5	6x6	14x14	188.2	737.2	3000	10	50	51	no	0			/result_20191127_analog/Run_0318 VCASN 50 ITHR 51 (default)

dataset

☑ base setting (beampos: center, [ITHR, VCASN]=[51,50] etc...)

▶ 6x6 mm² lead collimator, 14x14 mm² internal

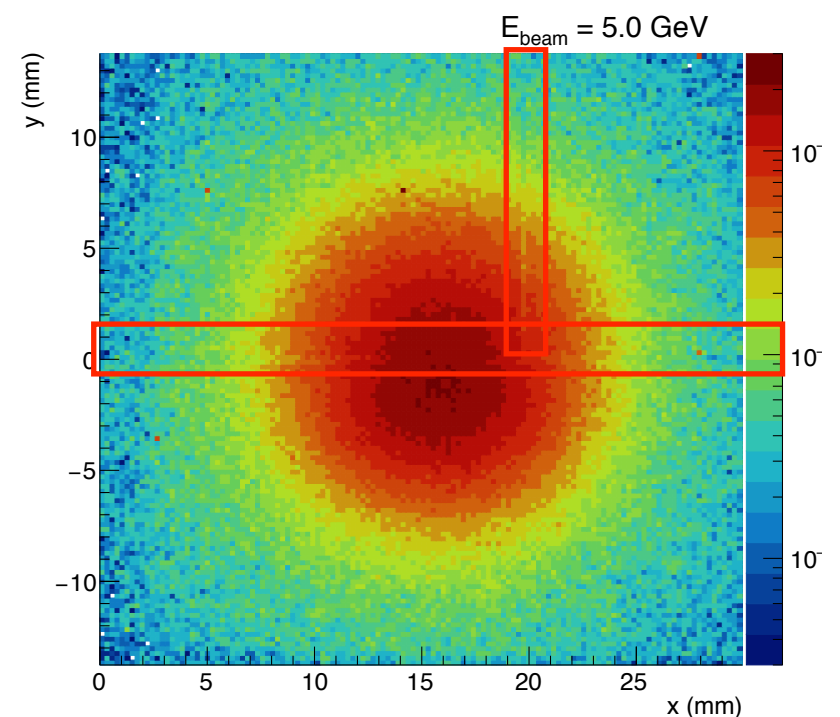
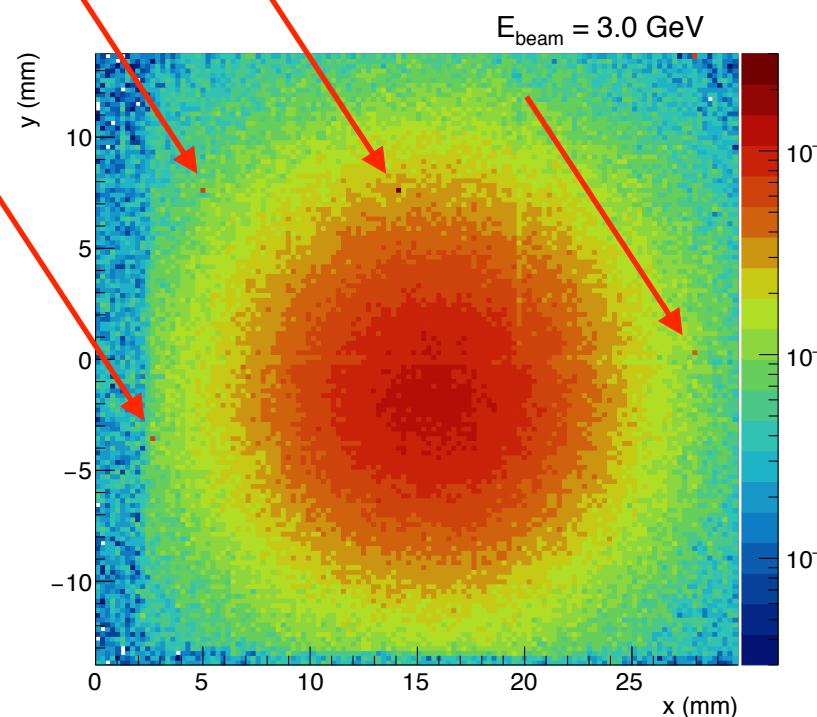
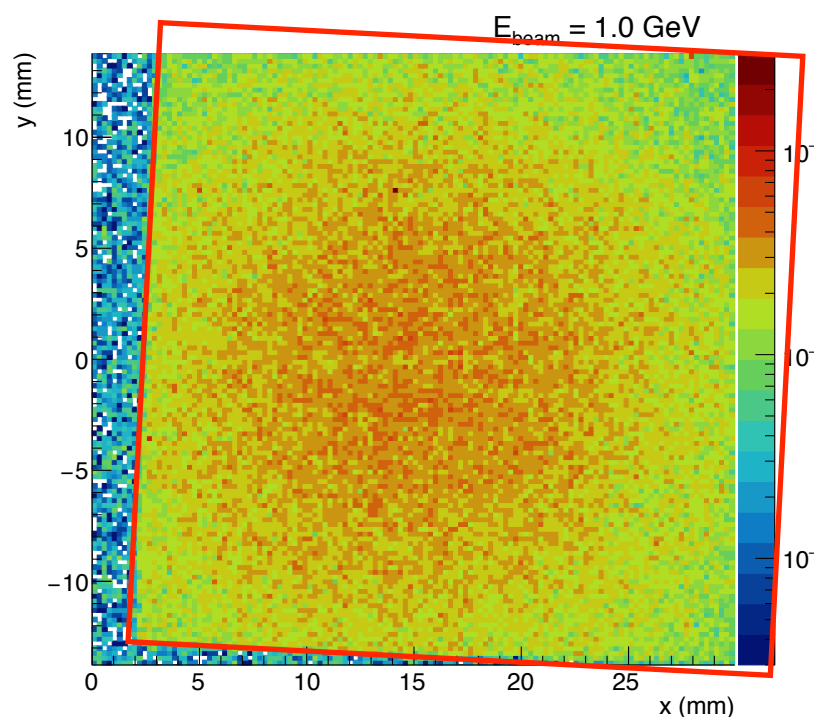
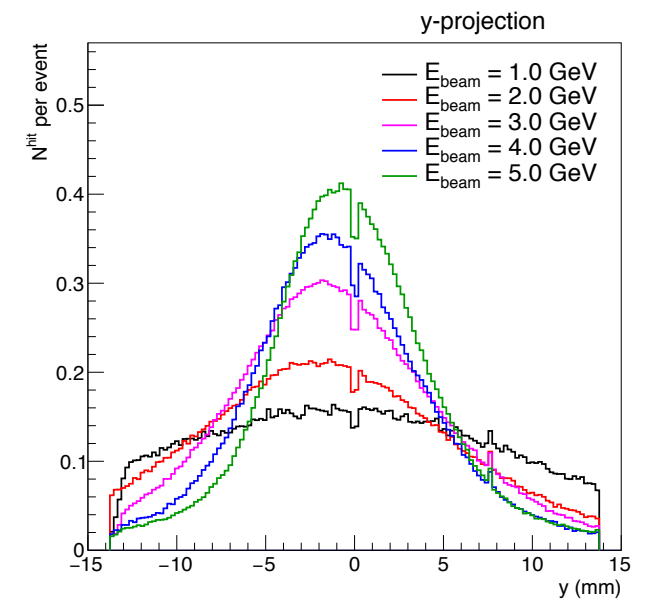
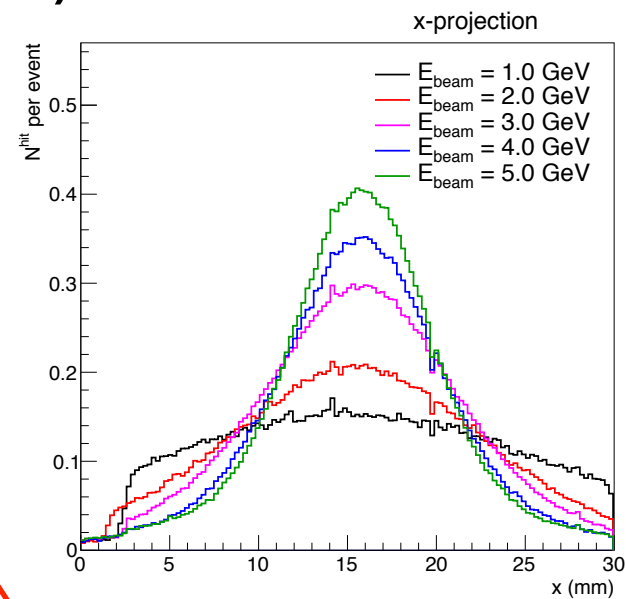
- * 1 GeV: Run 304 (291k)
- * 2 GeV: Run 371 (587k)
- * 3 GeV: Run 306, 405 (1.16M)
- * 4 GeV: Run 343, 372 (582k)
- * 5 GeV: Run 265, 301, 302, 404 (1.20M)

▶ no lead collimator, 60x60 mm² internal

- * 1 GeV: Run 433 (223k)
- * 2 GeV: Run 409, 410 (591k)
- * 3 GeV: Run 261 (1.18M)
- * 4 GeV: Run 406, 407 (573k)
- * 5 GeV: Run 257 (1.25M)

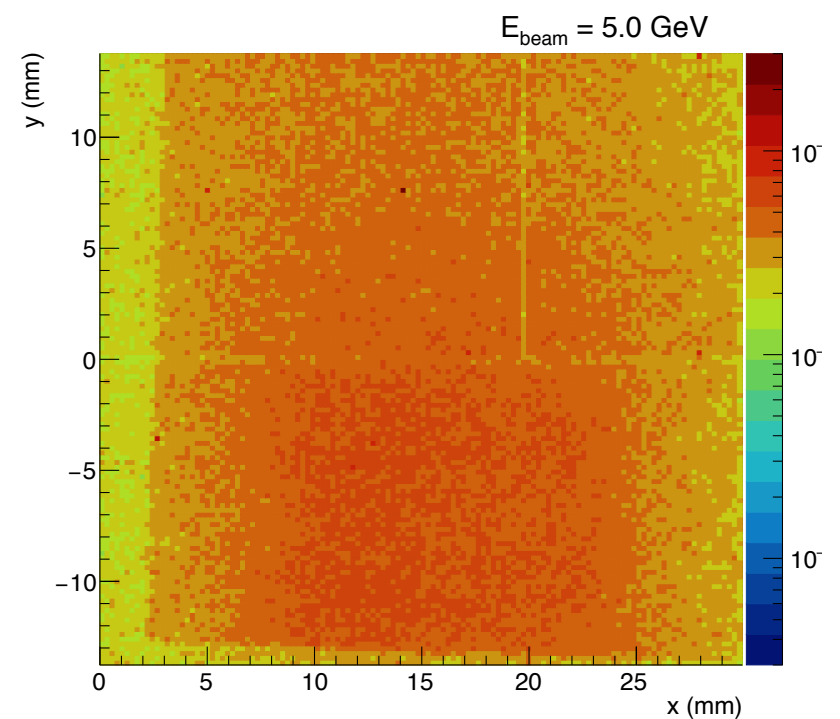
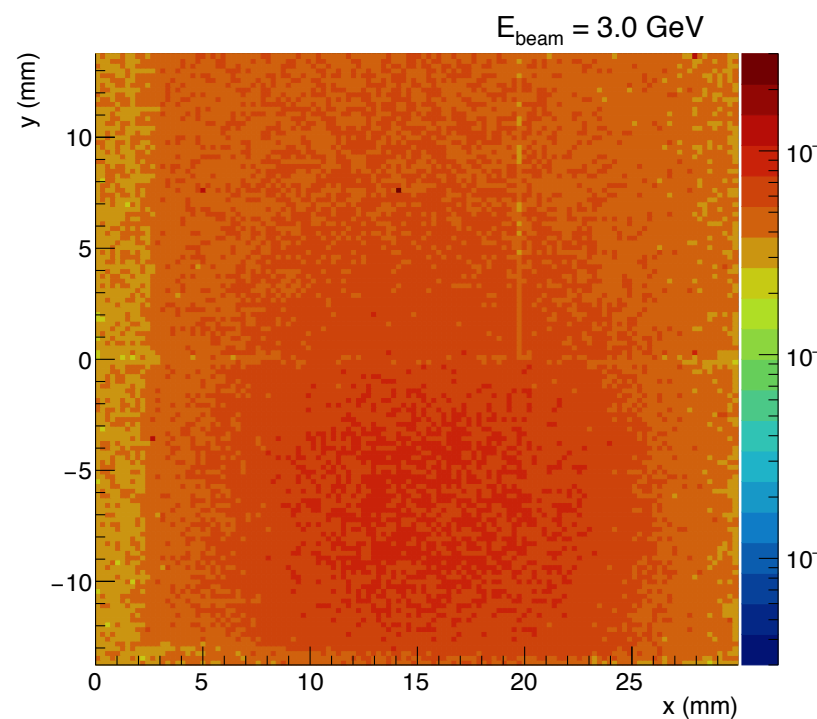
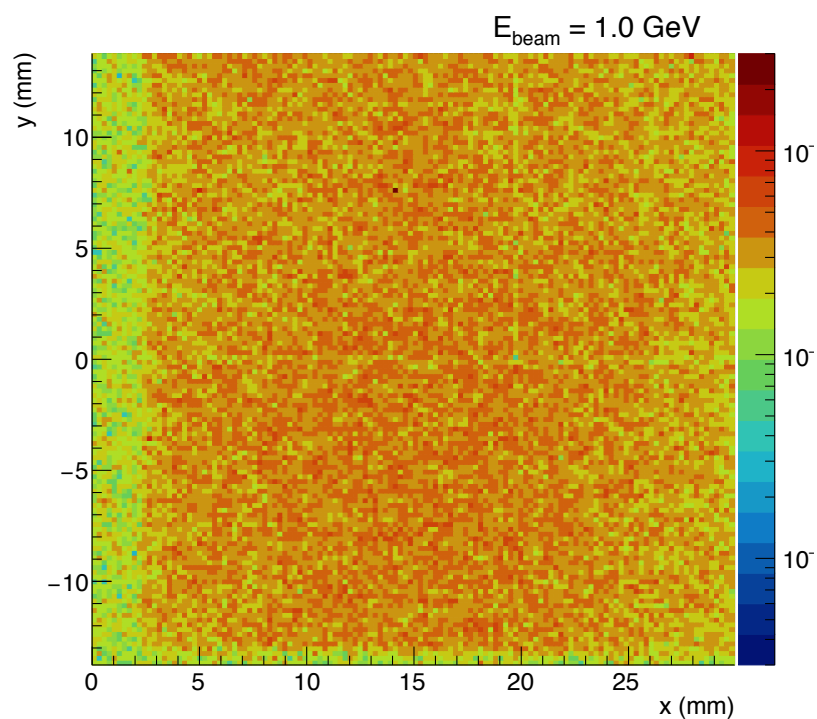
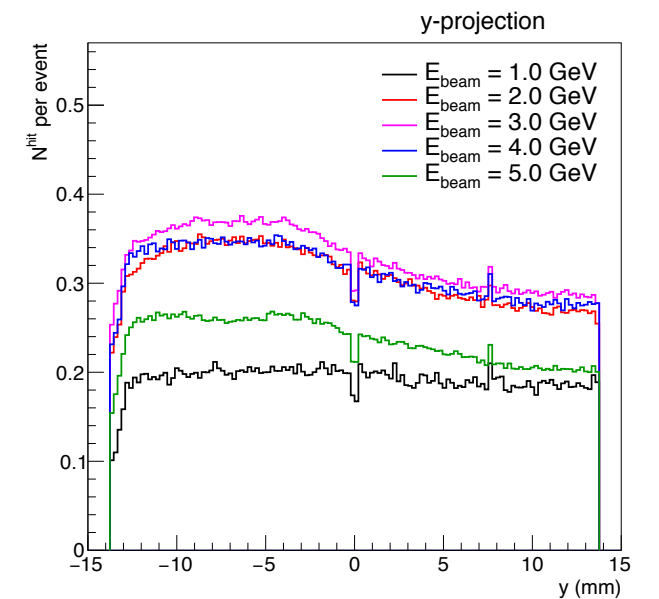
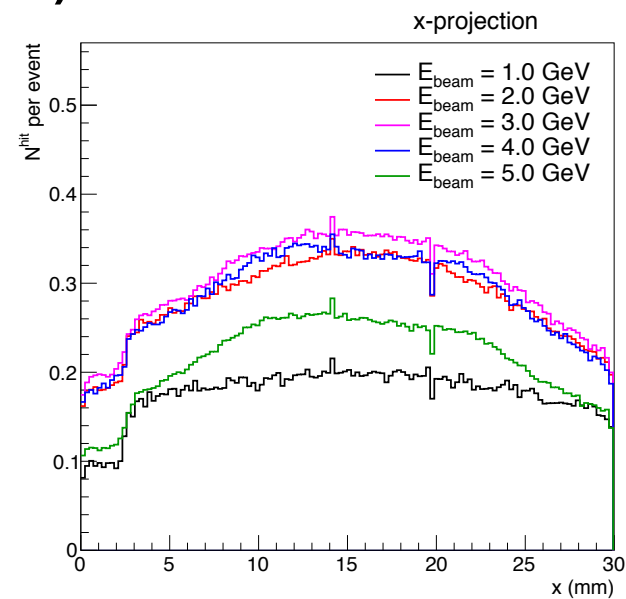
beam position

- ☑ lead collimator: $6 \times 6 \text{ mm}^2$
- ☑ internal collimator $14 \times 14 \text{ mm}^2$
- ☑ hitmap of first layer (no alignment applied)
 - ▶ hot pixels
 - ▶ inefficient regions
 - ▶ (trigger scintillator shape)



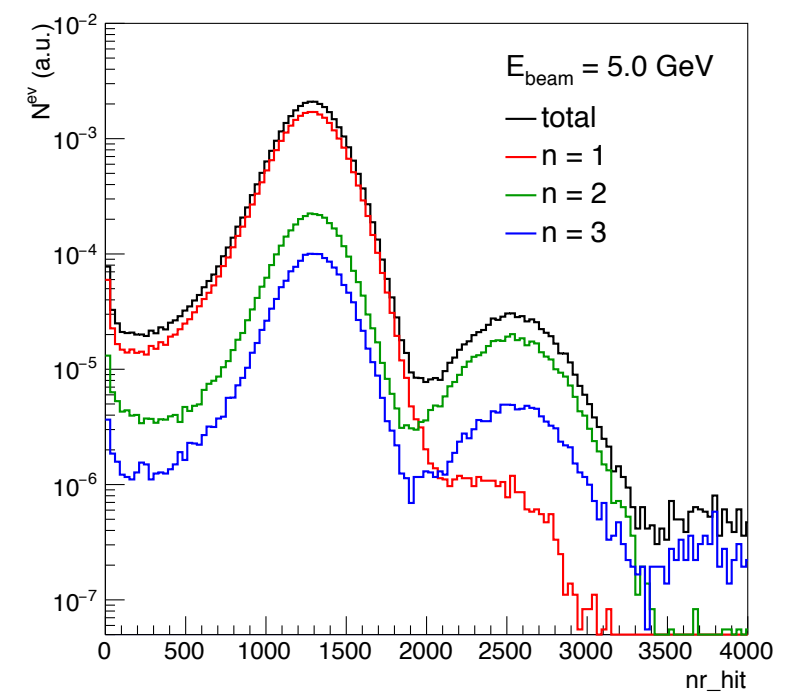
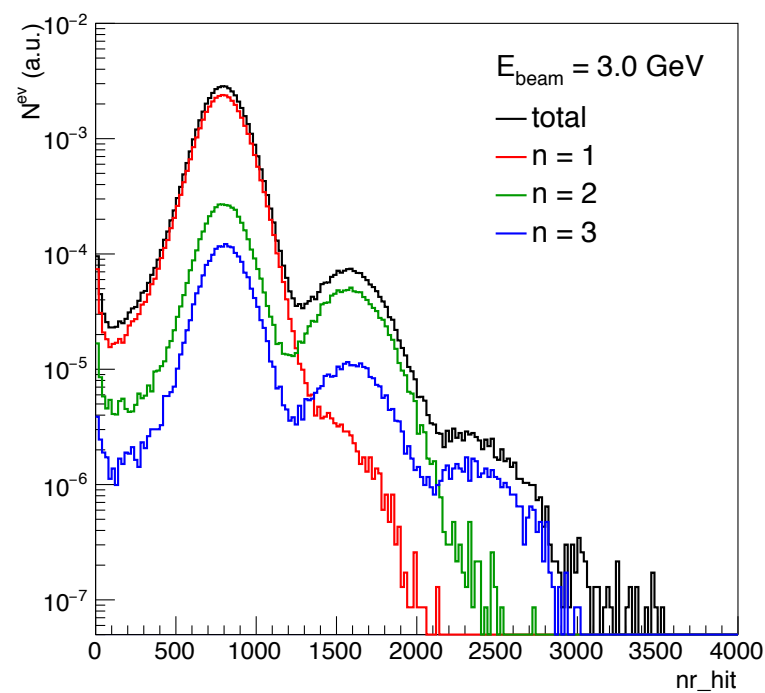
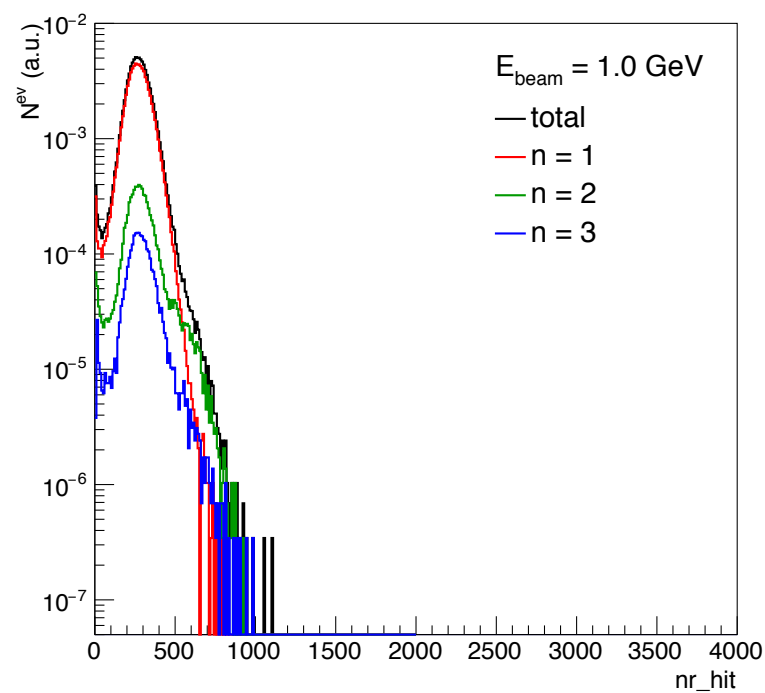
beam position

- ☑ no lead collimator
- ☑ internal collimator 60x60 mm²
- ☑ hitmap of first layer (no alignment applied)



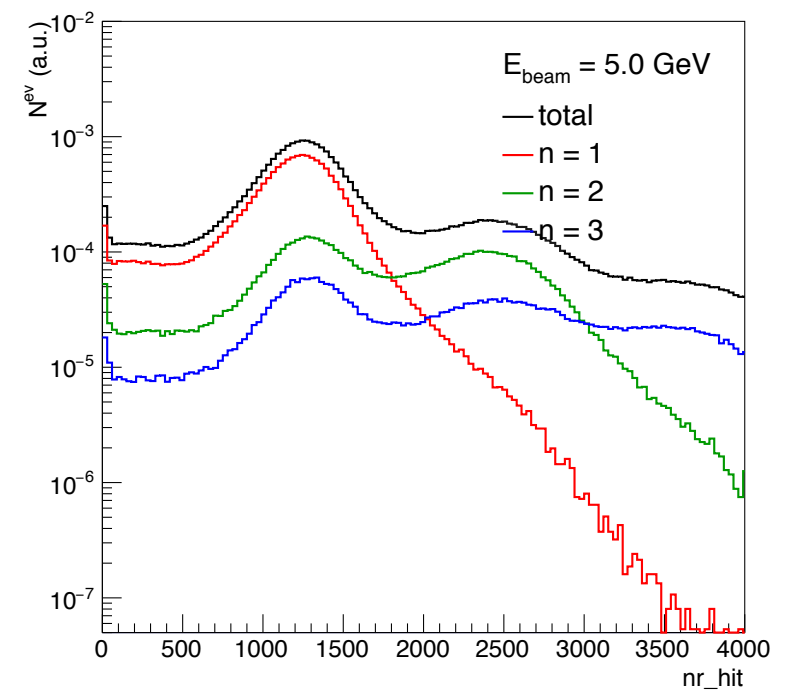
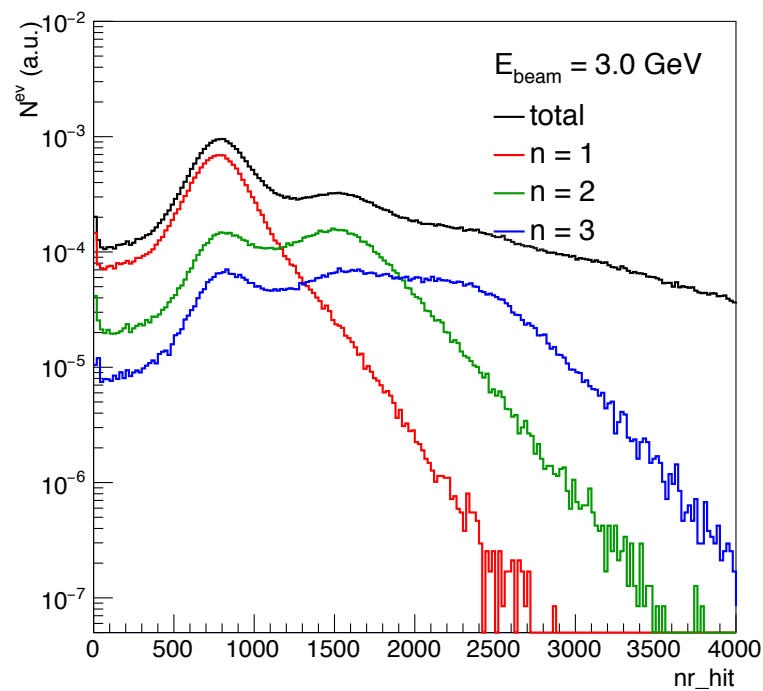
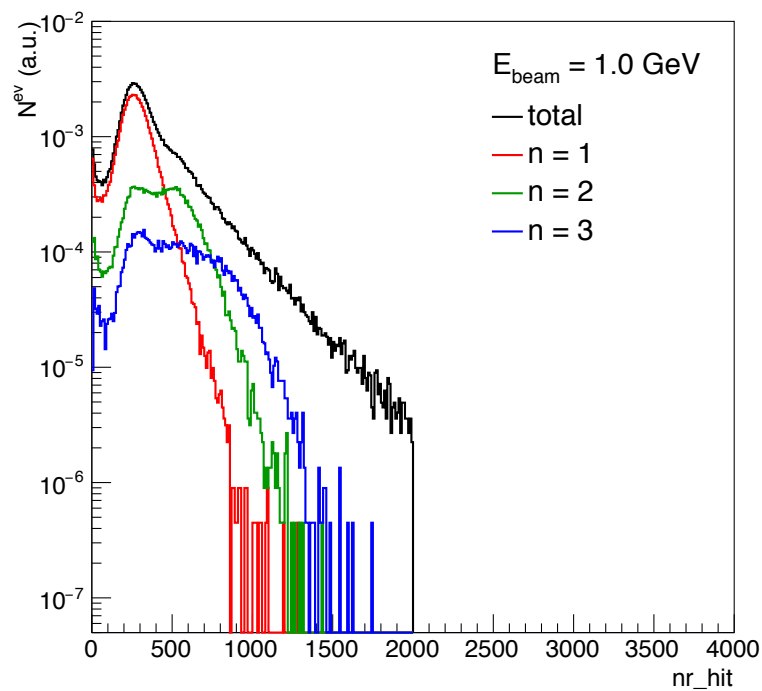
total number of hit

- ✓ lead collimator: $6 \times 6 \text{ mm}^2$
- ✓ internal collimator $14 \times 14 \text{ mm}^2$
- ✓ clustering for the first layer
 - ▶ fast-jet anti-kt, $R = 0.5 \text{ mm}$, identical weight for pixel amplitude
- ✓ total number of hits



total number of hit

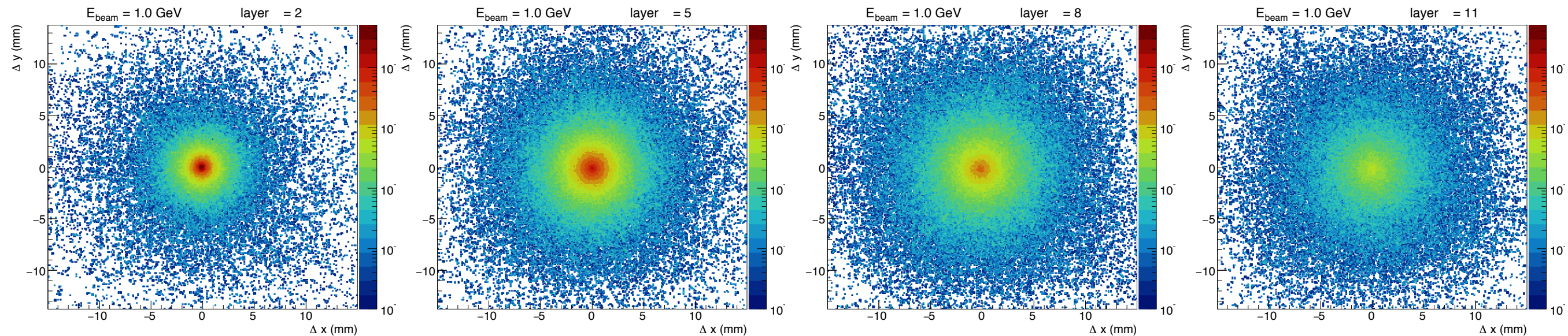
- ☑ no lead collimator
- ☑ internal collimator 60x60 mm²
- ☑ clustering for the first layer
 - ▶ fast-jet anti-kt, R = 0.5 mm, identical weight for pixel amplitude
- ☑ total number of hits



x-y profile

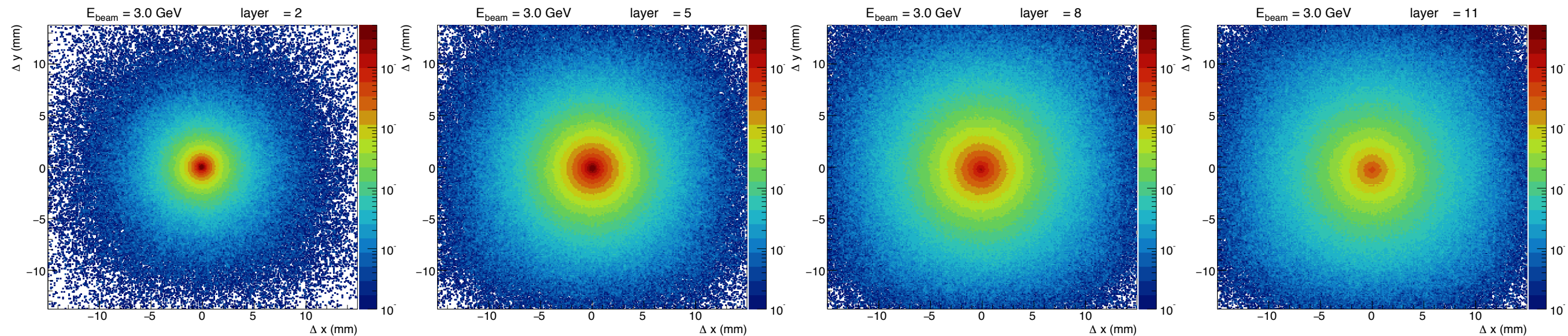
lead collimator: 6x6 mm²
internal collimator 14x14 mm²

- ☑ event cut (required to clusters in first layer)
 - ▶ nr_cluster = 1, within 5x5 mm² window from module centre (assuming no gap)
- ☑ no alignment applied
 - ▶ assuming other modules are placed in the same (x, y) position
- ☑ (dx, dy) b/w pos_pixel(i-th layer) and pos_cluster_first_layer



x-y profile

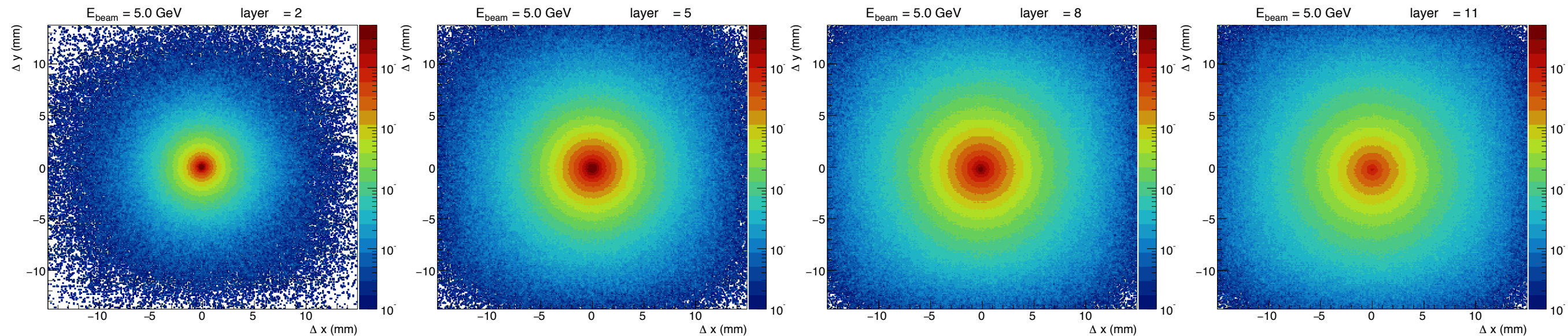
- ☑ event cut (required to clusters in first layer)
 - ▶ nr_cluster = 1, within 5x5 mm² window from module centre (assuming no gap)
- ☑ no alignment applied
 - ▶ assuming other modules are placed in the same (x, y) position
- ☑ (dx, dy) b/w pos_pixel(i-th layer) and pos_cluster_first_layer



lead collimator: 6x6 mm²
internal collimator 14x14 mm²

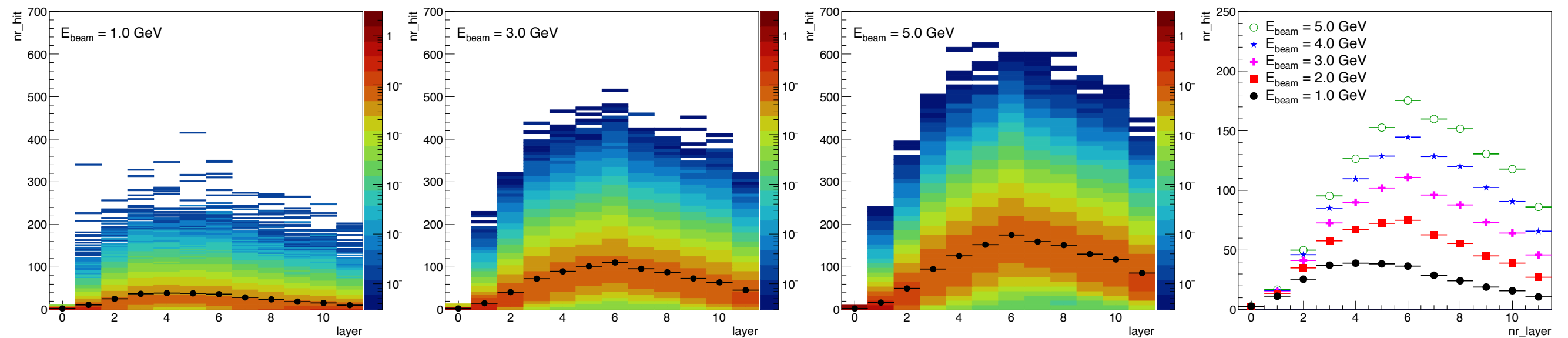
x-y profile

- ☑ event cut (required to clusters in first layer)
 - ▶ nr_cluster = 1, within 5x5 mm² window from module centre (assuming no gap)
- ☑ no alignment applied
 - ▶ assuming other modules are placed in the same (x, y) position
- ☑ (dx, dy) b/w pos_pixel(i-th layer) and pos_cluster_first_layer



longitudinal profile

- ☑ event cut (required to clusters in first layer)
 - ▶ nr_cluster = 1, within 5x5 mm² window from module centre (assuming no gap)
- ☑ average nr_hits vs. layer



summary

- ☑ checked some basic observables with typical(default) configuration
 - ▶ beam shape is broaden in lower beam energy
 - ▶ 2nd, 3rd peaks in nr_hit distribution due to pileup events are clearly seen
 - ▶ longitudinal profile (roughly) looks reasonable

backup

total number of hit

- ☑ no lead collimator
- ☑ internal collimator 60x60 mm²
- ☑ clustering for the first layer
 - ▶ fast-jet anti-kt, $R = 0.5$ mm, identical weight for pixel amplitude
- ☑ event cut (required to clusters in first layer)
 - ▶ no other cluster within 2 mm each other
 - ▶ all clusters sit within 20x20 mm² window from module centre (assuming no gap)
- ☑ total number of hits

