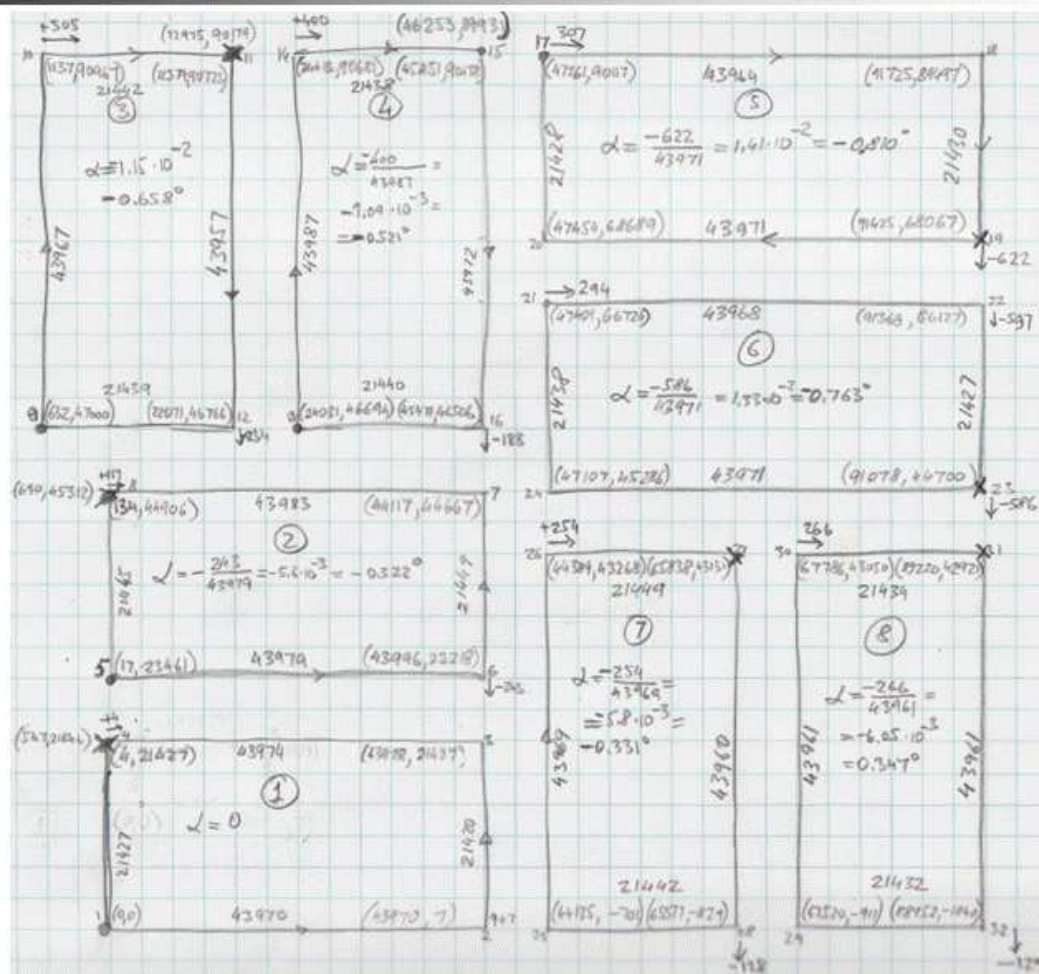


# I. CSPAD GEOMETRY FROM OPTICAL MEASUREMENT

TABLE I: CSpad geometry data from optical measurement (Christopher Kenney).

Point	X	Y	Z	SB	Pad X	Pad Y
1	0	0	0	15L		
2	43970	7	44	15L		
3	43978	21427	9	15L		
4	4	21427	20	15L	547	21846
5	17	23461	28	15s		
6	43996	23218	17	15s		
7	44117	44667	2	15s		
8	134	44906	24	15s	690	45312
9	632	47000	39	26L		
10	1137	90967	62	26L		
11	22579	90723	52	26L	22975	90179
12	22071	46766	30	26L		
13	24031	46694	25	26S		
14	24413	90681	62	26S		
15	45851	90478	39	26S	46253	89931
16	45471	46506	55	26S		
17	47761	90117	52	27L		
18	91725	89497	63	27L		
19	91425	68067	44	27L	90871	67667
20	47454	68689	34	27L		
21	47401	66724	32	27S		
22	91369	66127	41	27S		
23	91078	44700	5	27S	90523	44299
24	47107	45286	3	27S		
25	44135	-701	42	30L		
26	44389	43268	19	30L		
27	65838	43131	23	30L	66245	42592
28	65577	-829	30	30L		
29	67520	-911	38	30S		
30	67786	43050	24	30S		
31	89220	42921	2	30S	89628	42372
32	88952	-1040	51	30S		

# Optical geometry measurements



2010/11/03

Mikhail Dubrovin

CSpad alignment

FIG. 1: Processing of data obtained in the optical measurement.

TABLE II: Derived pads' geometry from the optical measurement.

Sequence of measu.	ASIC pair	Pad length $L$ ( $\mu m$ )	Pad width $W$ ( $\mu m$ )	$\alpha W$ ( $\mu m$ )	$\alpha L$ ( $\mu m$ )	Tilt angle $\alpha$ ( $^\circ$ )	$\alpha - \bar{\alpha}$ ( $^\circ$ )	My ( $^\circ$ )
1	02-03	43970	21420	8	7	$0 \pm 0.011$	0.466	0.7
		43974	21427	4	0			
2	00-01	43979	21449	121	-243	$-0.322 \pm 0.011$	0.144	0.2
		43983	21445	117	-239			
3	06-07	43967	21442	-234	505	$-0.658 \pm 0.011$	-0.186	0.1
		43957	21439	-244	508			
4	04-05	43987	21438	-188	382	$-0.498 \pm 0.011$	-0.049	-0.1
		43972	21440	-203	380			
5	10-11	43964	21430	300	-622	$-0.810 \pm 0.011$	-0.338	-0.4
		43971	21428	307	-620			
6	08-09	43968	21427	291	-586	$-0.763 \pm 0.011$	-0.291	-0.4
		43971	21438	294	-597			
7	14-15	43969	21449	-128	254	$-0.331 \pm 0.011$	0.135	0.1
		43960	21442	-137	261			
8	12-13	43961	21434	-129	266	$-0.347 \pm 0.011$	0.119	0.1
		43961	21432	-129	268			
Mean		43969.6	21436.3			$-0.466 \pm 0.011$	0	
Dispers.		8.3	8.4			0.271	0.271	

TABLE III: Configuration parameters from optical measurement and from image-based alignment.

gap = 194+4 (pixel).

ASIC	Optical measurement			Image-based alignment		
	orientation ( $\circ$ )	$x_c$ (pixel)	$y_c$ (pixel)	tilt ( $\circ$ )	$x_c$ (pixel)	$y_c$ (pixel)
00	0 +0.144	15.76	932.65	+0.1	15.76	932.65
01	0 +0.144	15.76	932.65-gap	+0.1	15.76	932.65-gap
02	0 +0.466	-197.73	933.95	+0.6	-200.19	930.88
03	0 +0.466	-197.73	933.95-gap	+0.6	-200.19	930.88-gap
04	270 -0.049	423.53	713.17	-0.2	422.26	716.34
05	270 -0.049	423.53-gap	713.17	-0.2	422.26-gap	716.34
06	270 -0.186	426.16	924.98	0.0	412	926
07	270 -0.186	426.16-gap	924.98	0.0	412-gap	926
08	180 -0.291	206.91	512.75-gap	-0.5	220.84	494.37-gap
09	180 -0.291	206.91	512.75	-0.5	220.84	494.37
10	180 -0.338	419.73	509.46-gap	-0.5	414.12	512.26-gap
11	180 -0.338	419.73	509.46	-0.5	414.12	512.26
12	270 +0.119	-9.82	318.53	0.0	26.95	303.53
13	270 +0.119	-9.82-gap	318.53	0.0	26.95-gap	303.53
14	270 +0.135	-7.74	531.40	0.0	11.13	517.40
15	270 +0.135	-7.74-gap	531.40	0.0	11.13-gap	517.40

## II. BEAM POSITION CALIBRATION

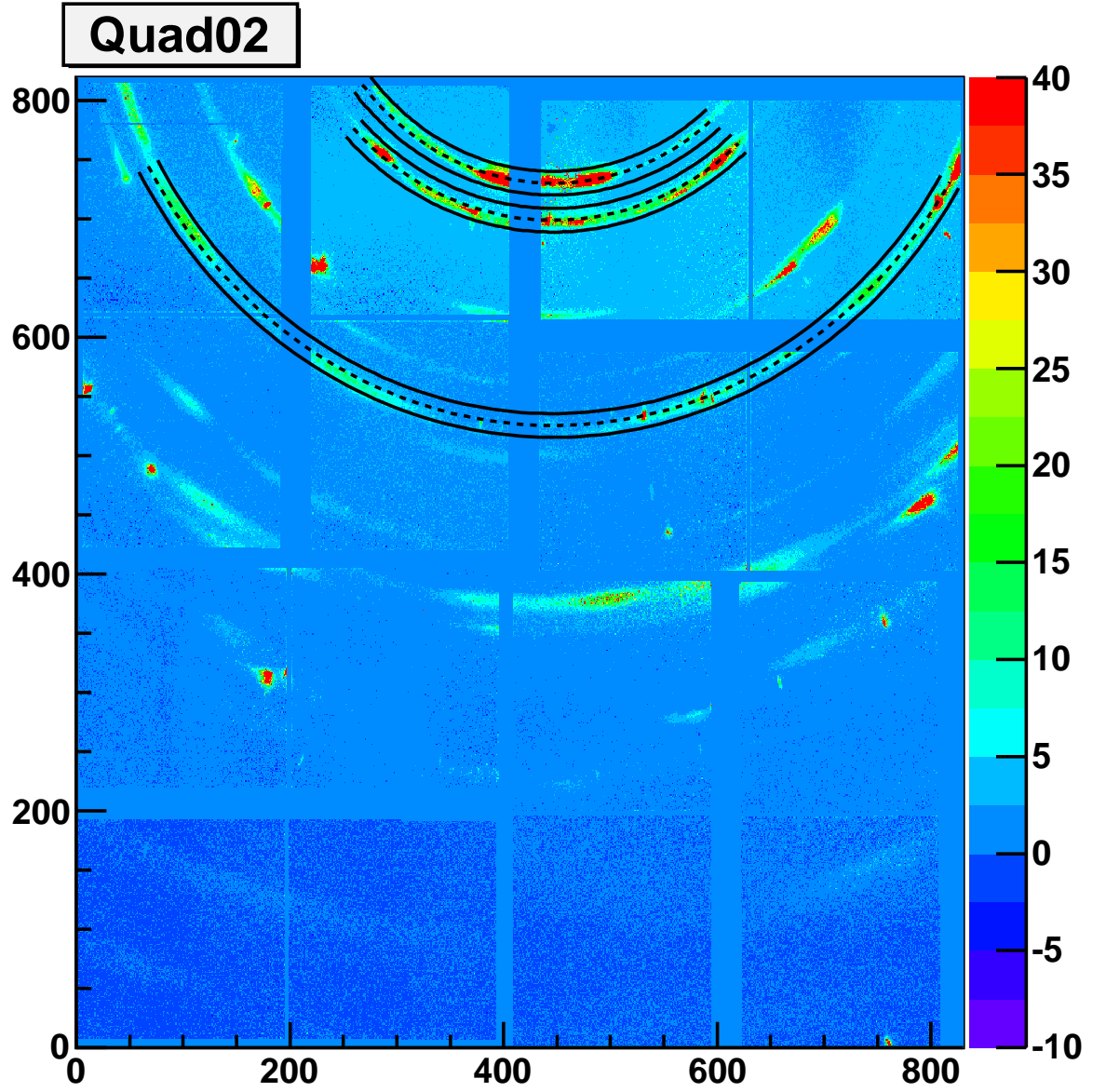


FIG. 2: Combined image with geometry based on optical measurement and example of the beam position calibration. [Common rotation angle  $\approx 3^\circ$  was not accounted. Actual difference is smaller...]

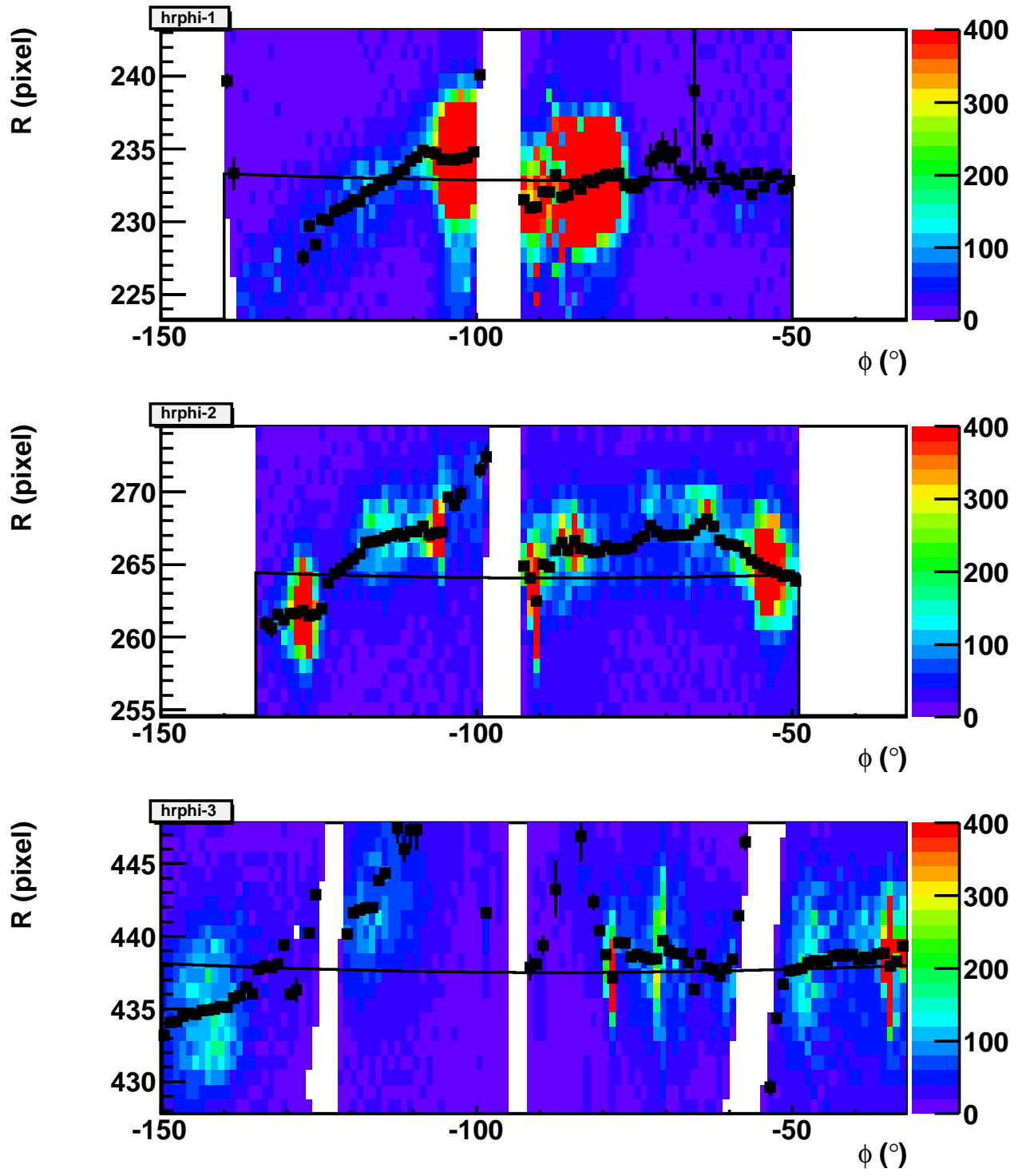


FIG. 3:  $r - \phi$  histograms for beam position calibration procedure.