

2014-05-15 CSPAD DS2 Alignment

Content

- [Content](#)
- [Optical measurements](#)
- [Quality check in X-Y plane](#)
- [Quality check in Z](#)
- [2014-07-09 Quads alignment](#)
 - [Plots for alignment](#)
- [2014-07-16 Qads alignment](#)
 - [Plots for alignment](#)

Optical measurements

Comments from Gabriel Blaj:

DS2 (also called DSD) was completely rebuilt; all 4 quads are different. Please process / clean up all of them.

These metrology files should be used for all experiments AFTER May 15th (until next upgrade/repair).

Metrology files:

- [2014-05-15-CSPAD-CXI-DS2-Metrology.xlsx](#)
- [2014-05-15-CSPAD-CXI-DS2-Metrology.txt](#)

Z-information is not available!

Quality check in X-Y plane

segm:	S1	S2	dS1	dS2	L1	L2	dL1	dL2	angle(deg)	D1	D2	dD
d(dS)	d(dL)											
Quad 0												
segm: 0	20937	20905	133	101	43544	43556	-59	-47	0.15393	48317	48311	
6	32	-12										
segm: 1	20911	20905	71	65	43551	43571	-31	-11	0.08944	48329	48308	
21	6	-20										
segm: 2	20910	20927	68	51	43548	43542	23	17	0.07763	48301	48316	
-15	17	6										
segm: 3	20916	20931	46	31	43591	43587	1	-3	0.04995	48333	48368	
-35	15	4										
segm: 4	20946	20943	-55	-58	43546	43544	29	27	-0.07368	48320	48319	
1	3	2										
segm: 5	20903	20916	-138	-125	43558	43543	73	58	-0.17235	48312	48308	
4	-13	15										
segm: 6	20942	20948	-52	-58	43510	43574	-30	34	-0.07237	48343	48292	
51	6	-64										
segm: 7	20941	20915	-24	2	43550	43571	-27	-6	-0.01447	48316	48337	
-21	-26	-21										
Quad 1												
segm: 0	20930	20960	-260	-230	43421	43416	105	100	-0.32331	48193	48221	
-28	-30	5										
segm: 1	20949	20955	-44	-38	43546	43562	17	33	-0.05394	48336	48326	
10	-6	-16										
segm: 2	20924	20936	-17	-29	43540	43572	-20	12	-0.03026	48330	48317	
13	12	-32										
segm: 3	20913	20952	46	7	43547	43592	10	55	0.03419	48354	48319	
35	39	-45										
segm: 4	20957	20942	-15	-30	43562	43553	5	-4	-0.02894	48324	48342	
-18	15	9										
segm: 5	20922	20924	-37	-35	43550	43569	19	38	-0.04735	48334	48313	

21	-2	-19										
segm: 6	20906	20964	306	248	43532	43556	120	144	0.36448	48315	48317	
-2	58	-24										
segm: 7	20939	20946	-41	-48	43546	43553	-16	-9	-0.05789	48331	48315	
16	7	-7										
Quad 2												
segm: 0	20944	20953	82	91	43585	43586	-40	-39	0.11305	48360	48356	
4	-9	-1										
segm: 1	20973	20937	-85	-121	43547	43574	53	80	-0.13548	48354	48323	
31	36	-27										
segm: 2	20953	20911	-32	10	43572	43566	13	7	-0.01447	48350	48322	
28	-42	6										
segm: 3	20909	20908	-53	-52	43546	43544	-25	-27	-0.06842	48303	48305	
-2	-1	2										
segm: 4	20911	20947	-58	-22	43547	43547	9	9	-0.05263	48306	48324	
-18	-36	0										
segm: 5	20911	20917	86	92	43548	43554	-44	-38	0.11709	48314	48310	
4	-6	-6										
segm: 6	20907	20908	67	66	43572	43545	53	26	0.08682	48323	48309	
14	1	27										
segm: 7	20909	20913	-42	-46	43480	43483	-26	-23	-0.05798	48245	48251	
-6	4	-3										
Quad 3												
segm: 0	20998	20955	128	85	43537	43540	-61	-58	0.13950	48320	48335	
-15	43	-3										
segm: 1	20906	20904	0	-2	43544	43566	-20	2	-0.00132	48303	48320	
-17	2	-22										
segm: 2	20910	20911	18	17	43579	43544	38	3	0.02236	48331	48309	
22	1	35										
segm: 3	20903	20932	-69	-98	43559	43548	-34	-45	-0.10919	48316	48315	
1	29	11										
segm: 4	20948	20967	18	37	43544	43548	-26	-22	0.03553	48317	48336	
-19	-19	-4										
segm: 5	20929	20935	110	116	43569	43549	-40	-60	0.14864	48331	48323	
8	-6	20										
segm: 6	20913	20911	30	32	43547	43547	13	13	0.04079	48306	48309	
-3	-2	0										
segm: 7	20909	20924	106	91	43554	43561	36	43	0.12891	48312	48326	
-14	15	-7										

Quality check in Z

[illegible]

segm: 0	20945	43418	43418	20945	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 1	20952	43554	43554	20952	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 2	20930	43556	20930	43556	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 3	20932	43569	20932	43569	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 4	20949	43557	43557	20949	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 5	20923	43559	43559	20923	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 6	20935	43544	20935	43544	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 7	20942	43549	20942	43549	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											

Quad 2

segm: 0	20948	43585	43585	20948	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 1	20955	43560	43560	20955	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 2	20932	43569	20932	43569	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 3	20908	43545	20908	43545	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 4	20929	43547	43547	20929	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 5	20914	43551	43551	20914	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 6	20907	43558	20907	43558	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 7	20911	43481	20911	43481	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											

Quad 3

segm: 0	20976	43538	43538	20976	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 1	20905	43555	43555	20905	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 2	20910	43561	20910	43561	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 3	20917	43553	20917	43553	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 4	20957	43546	43546	20957	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 5	20932	43559	43559	20932	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 6	20912	43547	20912	43547	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											
segm: 7	20916	43557	20916	43557	0	0	0	0	0	0	0	0	0	0
0.00000	0.00000		0.000											

197.75	198.00	301.45	95.97	623.79	624.47	707.80	499.34
198.24	198.19	304.34	96.68	624.95	624.94	705.13	498.42
197.99	198.38	302.65	96.30	623.07	622.57	703.18	497.79
197.11	198.00	302.55	96.64	623.23	623.09	709.28	496.75
299.40	95.76	621.88	621.77	517.33	724.11	196.36	196.69
303.37	95.08	622.53	621.39	516.56	721.28	191.88	191.55
302.90	94.91	621.91	621.75	518.61	722.37	197.52	197.22
299.32	95.08	624.14	623.75	516.82	722.27	195.66	195.69
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

or the same in um

21736	21764	33135	10548	68567	68641	77801	54887
21790	21785	33453	10627	68694	68693	77507	54786
21762	21805	33267	10584	68488	68432	77293	54717
21666	21764	33256	10622	68505	68490	77964	54602
32910	10525	68357	68345	56864	79593	21584	21619
33346	10451	68428	68302	56780	79283	21091	21054
33294	10433	68360	68343	57005	79403	21711	21678
32901	10451	68605	68562	56808	79392	21507	21509
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

✔ tilt/0-end.data (degree)

0.15393	0.08944	0.07763	0.04995	-0.07368	-0.17235	-0.07237	-0.01447
-0.32331	-0.05394	-0.03026	0.03419	-0.02894	-0.04735	0.36448	-0.05789
0.11305	-0.13548	-0.01447	-0.06842	-0.05263	0.11709	0.08682	-0.05798
0.13950	-0.00132	0.02236	-0.10919	0.03553	0.14864	0.04079	0.12891

✔ geometry/0-end.data

```

# TITLE      Geometry parameters of CSPAD-CXI
# DATE_TIME  2014-10-03 12:12:05 PDT
# METROLOGY  /reg/neh/home1/dubrovin/LCLS/CSPadMetrologyProc/2014-05-15-CSPAD-CXI-DS2-Metrology.txt
# AUTHOR     dubrovin
# EXPERIMENT Any
# DETECTOR   CSPAD-CXI
# CALIB_TYPE geometry
# COMMENT:01 Table contains the list of geometry parameters for alignment of 2x1 sensors, quads, CSPAD, etc
# COMMENT:02 All translation and rotation pars of the object are defined w.r.t. parent object Cartesian frame
# PARAM:01 PARENT      - name and version of the parent object
# PARAM:02 PARENT_IND  - index of the parent object
# PARAM:03 OBJECT      - name and version of the object
# PARAM:04 OBJECT_IND  - index of the new object
# PARAM:05 X0          - x-coordinate [um] of the object origin in the parent frame
# PARAM:06 Y0          - y-coordinate [um] of the object origin in the parent frame
# PARAM:07 Z0          - z-coordinate [um] of the object origin in the parent frame
# PARAM:08 ROT_Z       - object design rotation angle [deg] around Z axis of the parent frame
# PARAM:09 ROT_Y       - object design rotation angle [deg] around Y axis of the parent frame
# PARAM:10 ROT_X       - object design rotation angle [deg] around X axis of the parent frame
# PARAM:11 TILT_Z      - object tilt angle [deg] around Z axis of the parent frame
# PARAM:12 TILT_Y      - object tilt angle [deg] around Y axis of the parent frame
# PARAM:13 TILT_X      - object tilt angle [deg] around X axis of the parent frame

```

#	HDR	PARENT	IND	OBJECT	IND	X0[um]	Y0[um]	Z0[um]	ROT-Z	ROT-Y	ROT-X	TILT-Z	TILT-Y	TILT-X
QUAD:V1		0	SENS2X1:V1	0	21736	32910	0	0	0	0	0.15393	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	1	21764	10525	0	0	0	0	0.08944	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	2	33135	68357	0	270	0	0	0.07829	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	3	10548	68345	0	270	0	0	0.05061	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	4	68567	56864	0	180	0	0	-0.07434	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	5	68641	79593	0	180	0	0	-0.17300	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	6	77801	21584	0	270	0	0	-0.07237	0.00000	0.00000	
QUAD:V1		0	SENS2X1:V1	7	54887	21619	0	270	0	0	-0.01447	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	0	21790	33346	0	0	0	0	-0.32330	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	1	21785	10451	0	0	0	0	-0.05394	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	2	33453	68428	0	270	0	0	-0.03026	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	3	10627	68302	0	270	0	0	0.03485	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	4	68694	56780	0	180	0	0	-0.02960	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	5	68693	79283	0	180	0	0	-0.04735	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	6	77507	21091	0	270	0	0	0.36448	0.00000	0.00000	
QUAD:V1		1	SENS2X1:V1	7	54786	21054	0	270	0	0	-0.05855	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	0	21762	33294	0	0	0	0	0.11371	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	1	21805	10433	0	0	0	0	-0.13548	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	2	33267	68360	0	270	0	0	-0.01447	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	3	10584	68343	0	270	0	0	-0.06908	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	4	68488	57005	0	180	0	0	-0.05263	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	5	68432	79403	0	180	0	0	0.11709	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	6	77293	21711	0	270	0	0	0.08747	0.00000	0.00000	
QUAD:V1		2	SENS2X1:V1	7	54717	21678	0	270	0	0	-0.05798	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	0	21666	32901	0	0	0	0	0.14015	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	1	21764	10451	0	0	0	0	-0.00132	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	2	33256	68605	0	270	0	0	0.02302	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	3	10622	68562	0	270	0	0	-0.10985	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	4	68505	56808	0	180	0	0	0.03618	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	5	68490	79392	0	180	0	0	0.14864	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	6	77964	21507	0	270	0	0	0.04079	0.00000	0.00000	
QUAD:V1		3	SENS2X1:V1	7	54602	21509	0	270	0	0	0.12957	0.00000	0.00000	
CSPAD:V1		0	QUAD:V1	0	-4500	-4500	0	90	0	0	0.00000	0.00000	0.00000	
CSPAD:V1		0	QUAD:V1	1	-4500	4500	0	0	0	0	0.00000	0.00000	0.00000	
CSPAD:V1		0	QUAD:V1	2	4500	4500	0	270	0	0	0.00000	0.00000	0.00000	
CSPAD:V1		0	QUAD:V1	3	4500	-4500	0	180	0	0	0.00000	0.00000	0.00000	

2014-07-09 Quads alignment

Use data exp=cxid9114:run=170

✔ marg_gap_shift/0-end.data

15	40	4	40
15	40	4	40
0	0	0	0

✔ offset/0-end.data

0	0	820	820
0	820	820	0
0	0	0	0

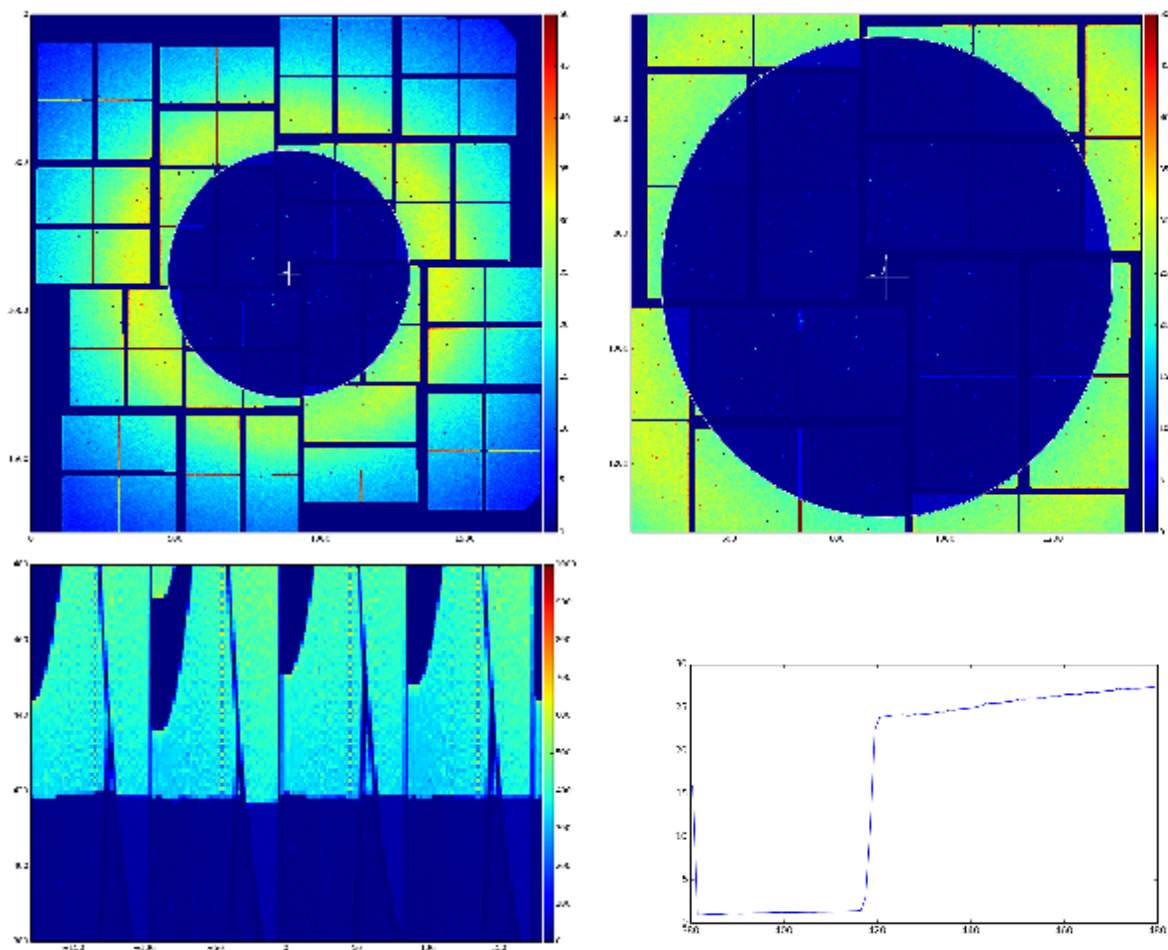
✔ offset_corr/0-end.data

0	-12	-3	6
0	9	9	4
0	0	0	0

Plots for alignment

Circle radius [pix] = 418

For non-cropped image coordinates of the center (xc,yc) = (892,875)



2014-07-16 Qads alignment

Image in previous alignment was not a shadow of a disk, but it was a gain map, so it is not correct to use it for alignment.

For further alignment we use data from exp=cxid6014:run=50

✓ offset_corr/1-end.data

```
0  -8  -1  6
0   8   6  3
0   0   0  0
```

Plots for alignment

Circle radius [pix] = 150

For non-cropped image coordinates of the center (xc,yc) = (892,875)

