

2012-02-26 CSPad XppGon alignment

Optical measurement

2012-02-26 XPP CSPad metrology files from Chris Kenney:

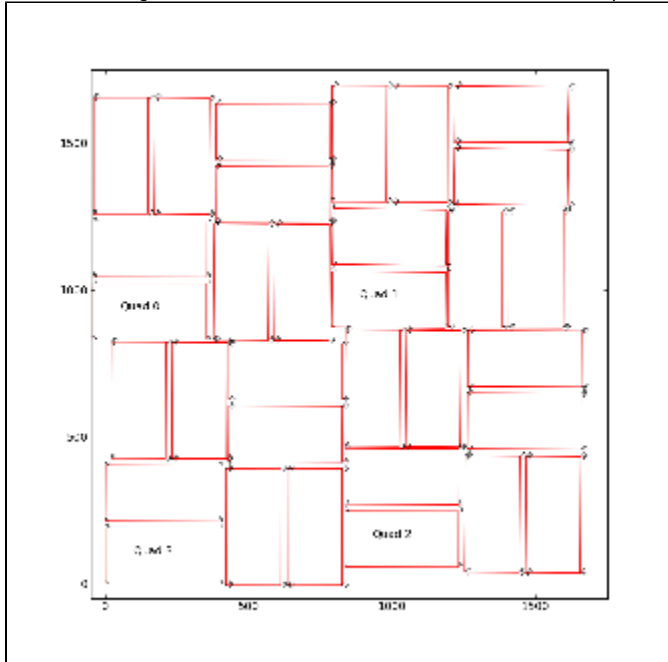
[2012-02-26-CSPAD-XPP-Configuration.pptx](#)

[2012-02-26-CSPAD-XPP-Metrology.xlsx](#)

identically converted to the text format:

[2012-02-26-CSPAD-XPP-Metrology.txt](#)

Chris has changed the order of measurement: in stead of individual quads entire detector sensor positions are measured in changed order:



The new script

`/reg/neh/home/dubrovin/LCLS/test_optical/convertOpticalToStandard.py`

converts the new measurement to the standard file format:

[2012-02-26-CSPAD-XPP-Metrology-standard.txt](#)

Procedure and table of results

We calculate

S1 - 1st short side of 2x1

S2 - 2nd short side of 2x1

L1 - 1st long side of 2x1

L2 - 2nd long side of 2x1

dS and dL are the deviations of the 1st and 2nd corner along the short and long sides, respectively. The sign of all dS are chosen in order to provide correct sign for the tilt angle (the same direction for all 2x1 sensors).

Everything, excluding <dS/L> and angle(deg), are in micrometers.

pair:	S1	S2	dS1	dS2	L1	L2	dL1	dL2	<dS/L>	angle(deg)
Quad 0										
pair: 0	20903	20913	-321	-311	43536	43528	154	146	-0.00726	-0.41591
pair: 1	20937	20904	-255	-288	43532	43534	130	132	-0.00624	-0.35733
pair: 2	20904	20905	-64	-65	43535	43536	-30	-29	-0.00148	-0.08489
pair: 3	20903	20902	-4	-3	43541	43539	-2	-4	-0.00008	-0.00461
pair: 4	20909	20893	-313	-329	43541	43534	153	146	-0.00737	-0.42244
pair: 5	20903	20902	-9	-10	43543	43541	3	1	-0.00022	-0.01250
pair: 6	20905	20898	83	90	43541	43548	38	45	0.00199	0.11382
pair: 7	20900	20901	139	138	43539	43541	66	68	0.00318	0.18226
Quad 1										
pair: 0	20904	20903	-576	-577	43543	43536	280	273	-0.01324	-0.75864
pair: 1	20904	20902	-409	-411	43544	43540	201	197	-0.00942	-0.53951
pair: 2	20906	20895	-104	-93	43537	43536	-43	-44	-0.00226	-0.12963
pair: 3	20902	20909	-159	-166	43539	43539	-76	-76	-0.00373	-0.21384
pair: 4	20898	20904	-539	-533	43542	43538	262	258	-0.01231	-0.70534
pair: 5	20909	20689	-192	-412	43301	43542	192	433	-0.00695	-0.39810
pair: 6	20904	20903	-90	-89	43538	43543	-40	-35	-0.00206	-0.11777
pair: 7	20901	20903	-20	-22	43538	43538	-9	-9	-0.00048	-0.02764
Quad 2										
pair: 0	20899	20916	-369	-352	43537	43537	169	169	-0.00828	-0.47443
pair: 1	20919	20896	-287	-310	43539	43545	136	142	-0.00686	-0.39279
pair: 2	20906	20909	-222	-225	43542	43542	-108	-108	-0.00513	-0.29410
pair: 3	20906	20904	-185	-183	43542	43542	-83	-83	-0.00423	-0.24212
pair: 4	20911	20906	-331	-336	43537	43536	160	159	-0.00766	-0.43890
pair: 5	20897	20907	-294	-284	43536	43538	131	133	-0.00664	-0.38033
pair: 6	20895	20912	-55	-72	43535	43539	-28	-24	-0.00146	-0.08357
pair: 7	20903	20903	-178	-178	43531	43543	-98	-86	-0.00409	-0.23425
Quad 3										
pair: 0	20897	20904	-188	-181	43539	43533	98	92	-0.00424	-0.24281
pair: 1	20902	20907	3	8	43543	43536	2	-5	0.00013	0.00724
pair: 2	20906	20904	-60	-58	43538	43537	-26	-27	-0.00136	-0.07764
pair: 3	20907	20906	57	58	43535	43540	27	32	0.00132	0.07567
pair: 4	20909	20896	-137	-150	43530	43543	61	74	-0.00330	-0.18885
pair: 5	20904	20904	35	35	43541	43544	-15	-12	0.00080	0.04606
pair: 6	20905	20907	-143	-145	43540	43539	-64	-65	-0.00331	-0.18950
pair: 7	20905	20909	-150	-154	43537	43539	-68	-66	-0.00349	-0.20003

- All ds1, dl1 are well consistent (within +/-10um) with ds1, dl1, respectively
- Angles of 2x1 are in the range from -0.76 to +0.18 degree.
- All tilts are measured for entire detector. No need to apply any tilt for quads.

Configuration parameters

center/0-end.data

200.40	198.61	311.79	99.25	629.11	629.68	712.05	500.23
201.15	198.98	308.78	95.96	625.01	626.79	712.68	499.87
200.62	198.68	311.91	99.60	627.98	629.45	713.34	500.04
198.70	198.06	309.46	96.33	627.20	627.47	710.18	497.82
305.89	94.00	624.26	625.19	512.45	725.32	196.23	197.12
306.38	93.22	623.61	624.40	510.94	724.06	195.52	195.79
306.15	93.80	623.01	624.23	511.13	723.50	195.84	197.00
307.67	95.10	624.72	624.64	510.01	722.80	192.77	193.90
-0.27	0.03	-0.64	-0.42	-0.93	-1.16	-0.66	-0.41
0.22	0.45	-0.16	-0.39	0.44	0.03	0.83	-0.27
0.90	0.65	1.26	1.22	1.27	1.52	0.73	0.88
0.32	0.23	0.31	0.42	-0.08	0.04	-0.36	-0.09

tilt/0-end.data

-0.41591	-0.35733	-0.08489	-0.00461	-0.42244	-0.01250	0.11382	0.18226
-0.75864	-0.53951	-0.12963	-0.21384	-0.70534	-0.39810	-0.11777	-0.02764
-0.47443	-0.39279	-0.29410	-0.24212	-0.43890	-0.38033	-0.08357	-0.23425
-0.24281	0.00724	-0.07764	0.07567	-0.18885	0.04606	-0.18950	-0.20003

offset/0-end.data

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

offset_corr/0-end.data

0	3	3	0
0	0	0	0
0	0	0	0

marg_gap_shift/0-end.data

15	40	2	25
15	40	2	25
0	0	0	0

geometry/[0-end.data](#)

```

# TITLE      Geometry parameters of CSPAD-XPP
# DATE_TIME  2014-10-03 11:59:59 PDT
# METROLOGY  /reg/neh/home1/dubrovin/LCLS/CSPadMetrologyProc/2012-02-26-CSPAD-XPP-Metrology.txt
# AUTHOR     dubrovin
# EXPERIMENT Any
# DETECTOR   CSPAD-XPP
# 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

CSPAD:V2      0  SENS2X1:V1      0      52033  113005  -29      90      0      0      -0.41590  0.08769  -0.07239
CSPAD:V2      0  SENS2X1:V1      1      75324  112808      3      90      0      0      -0.35733  0.00548  -0.04475
CSPAD:V2      0  SENS2X1:V1      2      17038  125249  -70      0      0      0      -0.08489  0.05528  0.09867
CSPAD:V2      0  SENS2X1:V1      3      16936  101886  -46      0      0      0      -0.00461  0.07632  -0.00274
CSPAD:V2      0  SENS2X1:V1      4      29328  160129  -102     270      0      0      -0.42243  -0.02741  0.08554
CSPAD:V2      0  SENS2X1:V1      5      5930   160191  -127     270      0      0      -0.01250  -0.10691  0.08553
CSPAD:V2      0  SENS2X1:V1      6      64087  169245  -73      0      0      0      0.11382  0.05658  0.12336
CSPAD:V2      0  SENS2X1:V1      7      63990  145961  -44      0      0      0      0.18226  0.05922  0.04386
CSPAD:V2      0  SENS2X1:V1      8      108743 129761      24      0      0      0      -0.75860  0.06448  0.10964
CSPAD:V2      0  SENS2X1:V1      9      108504 106332      49      0      0      0      -0.53949  0.06843  0.06304
CSPAD:V2      0  SENS2X1:V1     10      120574 164631     -18     270      0      0      -0.12963  -0.09047  0.11844
CSPAD:V2      0  SENS2X1:V1     11      97181  164719  -43     270      0      0      -0.21384  -0.11511  0.12370
CSPAD:V2      0  SENS2X1:V1     12      155334 152248      48     180      0      0      -0.70531  -0.08290  -0.07401
CSPAD:V2      0  SENS2X1:V1     13      155529 175673      2     180      0      0      -0.39849  -0.05674  -0.17355
CSPAD:V2      0  SENS2X1:V1     14      164970 117576      91     270      0      0      -0.11777  -0.01096  0.07764
CSPAD:V2      0  SENS2X1:V1     15      141579 117606     -30     270      0      0      -0.02764  -0.29604  0.05001
CSPAD:V2      0  SENS2X1:V1     16      125593  73085      99     270      0      0      -0.47442  -0.05481  0.03027
CSPAD:V2      0  SENS2X1:V1     17      102251  73298      71     270      0      0      -0.39278  -0.12606  0.02105
CSPAD:V2      0  SENS2X1:V1     18      160422  60852     138     180      0      0      -0.29410  -0.06185  -0.03015
CSPAD:V2      0  SENS2X1:V1     19      160556  84189     133     180      0      0      -0.24212  -0.05790  -0.06030
CSPAD:V2      0  SENS2X1:V1     20      148124  26109     139      90      0      0      -0.43889  0.08495  -0.02895
CSPAD:V2      0  SENS2X1:V1     21      171468  25948     167      90      0      0      -0.38033  0.02193  -0.01184
CSPAD:V2      0  SENS2X1:V1     22      113467  16726      80     180      0      0      -0.08357  -0.07370  0.02467
CSPAD:V2      0  SENS2X1:V1     23      113595  40172      97     180      0      0      -0.23425  -0.04738  -0.04112
CSPAD:V2      0  SENS2X1:V1     24      68896  56100      35     180      0      0      -0.24281  -0.06449  0.01371
CSPAD:V2      0  SENS2X1:V1     25      68966  79466      25     180      0      0      0.00724  -0.08159  -0.06304
CSPAD:V2      0  SENS2X1:V1     26      56721  21251      34      90      0      0      -0.07764  0.09593  -0.00263
CSPAD:V2      0  SENS2X1:V1     27      80148  21259      46      90      0      0      0.07567  0.07400  -0.02106
CSPAD:V2      0  SENS2X1:V1     28      21795  33860      -8      0      0      0      -0.18885  0.03553  0.05208
CSPAD:V2      0  SENS2X1:V1     29      21765  10469      4      0      0      0      0.04606  0.02632  0.01645
CSPAD:V2      0  SENS2X1:V1     30      12674  68730     -40      90      0      0      -0.18950  0.07674  -0.03290
CSPAD:V2      0  SENS2X1:V1     31      36016  68606     -10      90      0      0      -0.20003  0.03289  -0.02500

```

Alignment check

Use xppcom10-r1437 for wire image and r1442 for dark image:

