

CSPAD Alignment

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Alignment procedure and parameters

Description of the detector geometry and alignment procedure can be found in [CSPAD Geometry and Alignment](#).

CSPAD alignment history

CXI DS1

- [2011-03-11 After Run 3 metrology](#) - the 1-st metrology for entire camera w/o two panels.
Missing panels measurements were substituted from calib-cxi-ds1-2011-06-20.
Quad 2, point 15 is corrected for ~0.6mm offset both in x and y.
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2011-03-11/`
Deployed: `/reg/d/psdm/cxi/cxi22010/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/0-end.data`
- [2011-05-25 CSPad alignment parameters](#), see for detail [CSPad alignment after run 3, cxi80410-r0628](#)
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2011-03-11/`
Deployed: `/reg/d/psdm/CXI/cxi80410/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/`
- [2011-06-20 CSPad alignment parameters](#), see for detail [CSPad alignment before run 4, cxi35711-r0009](#)
[Numerous attempts of quad alignment have been done with this optical measurements.](#)
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2011-06-20`
Deployed: `/reg/d/psdm/CXI/cxi35711/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/`
`cxi37411,cxi80410,cxi43312,cxi39112,cxi49812,cxi49012,cxi0212,cxi64813`
- [2013-04-19 CSPad CxiDs1 alignmen](#)
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2013-04-19/*0-end.data`
- [2013-12-20 CSPAD DS1 Alignment](#) - new optical measurements for the refurbished DS1 camera
and 2014-03-05 alignment of quads using lysozyme image from cxi83714 run 136.
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2013-12-20/`
Deployed: `/reg/d/psdm/cxi/cxi8914/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/*0-end.data`
`cxi83714, cxi6714, cxii0114`
- [2014-03-19 CSPAD DS1 Alignment](#) - refurbished DS1 camera, optically re-measured quads 1 and 3
and 2014-03-21 alignment of quads using bright ring from cxii0114 run 227.
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2014-03-19/*0-end.data`
Deployed: `/reg/d/psdm/cxi/cxii0114/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/*4-end.data`
`cxid8114`
- [2014-05-15 CSPAD DS1 Alignment](#) - refurbished DS1 camera, optically re-measured quad 2.
2014-06-05 alignment of quads using lysozyme image from cxid2714 run 23.
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-ds1-2014-05-15/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/*0-end.data`
Deployed: `/reg/d/psdm/cxi/cxid6214/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/*0-end.data` or `1-end.data`
`cxid9114, cxie1514, cxie1414, cxie2614, cxie2214, cxie3014, cxie3214, cxie4314, cxie3914, cxid6014, cxid5714, cxic4414, cxid2714, cxic8214`

CXI DSD

- [2011-08-DD DSD CSPad alignment parameter](#), cxi37411, CxiDsd.0 - alignment is based on optical measurement only
Archive: `/reg/g/psdm/detector/alignment/cspad/`
Deployed: `/reg/d/psdm/CXI/cxi37411/calib/CsPad::CalibV1/CxiDsd.0:Cspad.0/`
- [2012-01-19 CSPad CxiDsd alignment](#) for cxi80410-r1150, cxi43312, cxi39912, etc.
Archive: `/reg/g/psdm/detector/alignment/cspad/calib-cxi-dsd-2012-01-10/`

Deployed: /reg/d/psdm/CXI/cxi80410/calib/CsPad::CalibV1/CxiDsd.0:Cspad.0/
cxi43312,
should be copied to cxi39912 (are the Ds1 and Dsd detectors swaped ?)

- [2012-11-08 Run6 DSD CSPad alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-dsd-2012-11-08/*0-end.data
- [2013-12-12 CSPAD DSD Alignment](#) - new optical measurements for the refurbished DSD camera
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-dsd-2013-12-12
Deployed: /reg/d/psdm/cxi/cxi8914/calib/CsPad::CalibV1/CxiDsd.0:Cspad.0/*0-end.data
cxi83714, cxib6714, cxii0114

CXI DS2 (formed DSD)

- [2014-05-15 CSPAD DS2 Alignment](#) - all quads remeasured, Z information is missing
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-ds2-2014-05-15/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/*0-end.data
Deployed: /reg/d/psdm/cxi/cxi9114/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/*1-end.data
cxid6214, cxie1514, cxie1414, cxie2614, cxie2214, cxie3014, cxie3214, cxie4314, cxie3914, cxid6014, cxid5714, cxic4414, cxid2714(as dsd), cxic8214
- [2014-08-27 CSPAD DS2 Alignment](#) - Z information is discarded
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-ds2-2014-08-27/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/*0-end.data

CXI Camera1 (formed DS1)

- [2014-09-24 CSPAD Camera1 Alignment](#) (formed DS1)
Archive:
 - /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera1-2014-09-24/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/0-end.data
 - /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera1-2014-09-24/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/geometry-camera1-in-ds2-cxi8015-r176.data
 - /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera1-2014-09-24/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/geometry-camera1-in-ds1-cxi10416-r0028.data

CXI Camera2 (formed DS2)

- [2015-01-20 CSPAD Camera2 Alignment](#) (formed DS2)
Archive:
 - /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera2-2015-01-20/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/* .data
 - /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera2-2015-01-20/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/geometry/* .data

2015-03-04 quad alignment is done for cxig0715-r0023, archived in geometry/1-end.data
Deployed: /reg/data/ana04/cxi/cxif5315/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/geometry/1-end.data (cables are swapped)
⚠ quad index-swapped for swapped-cable geometry file is deployed for cxi86415: /reg/d/psdm/CXI/cxi86415/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/geometry/1-end.data (and renamed to 0-end.data)
2015-05-01 quad alignment is done for cxii2415, deployed as /reg/d/psdm/CXI/cxi2415/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/1-end.data
and corrected for quad=0 for cxii5615, deployed as /reg/d/psdm/CXI/cxi5615/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/geometry/1-end.data
- [2016-02-05 CSPAD Camera2 Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera2-2016-02-05/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/geometry/1-end.data
- [2016-05-25 CSPAD Camera2 Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-camera2-2016-05-25/calib/CsPad::CalibV1/CxiDs2.0:Cspad.0/geometry/0-end.data

CXI SC3

- [2023-02-22 CSPAD CXI SC3 Alignment](#)
- Archive: /reg/g/psdm/detector/alignment/cspad/calib-cxi-SC3-2023-02-22/2023-02-22-CSPAD-CXI-SC3-geometry-v2.txt

XPP/XCS

- [2011-08-10 XPP CSPAD alignment parameters](#), see for detail [CSPad alignment for xpp36211-r0544](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2011-08-10
Deployed: /reg/d/psdm/XPP/xpp36211/calib/CsPad::CalibV1/XppGon.0:Cspad.0/
xpp47712
- [2012-02-26 CSPad XppGon alignment](#) for xppcom10 etc.
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2012-02-26/*0-end.data
copied to: ~dubrovin/LCLS/CSPadAlignment-v01/calib-xppcom10-r1437-XppGon/*1423-end.data
Deployed: /reg/d/psdm/XPP/xppcom10/calib/CsPad::CalibV1/XppGon.0:Cspad.0/*1423-end.data

- [2013-01-24 CSPad XPP alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2013-01-24/calib/CsPad::CalibV1/XppGon.0:Cspad.0/*0-end.data
Deployed: /reg/d/psdm/XPP/xppcom13/calib/CsPad::CalibV1/XppGon.0:Cspad.0/*0-end.data
- [2013-01-29 CSPad XPP alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2013-01-29/calib/CsPad::CalibV1/XppGon.0:Cspad.0/geometry/1-end.data
on 2013-06-14 deployed in /reg/d/psdm/xcs/xcs72913/calib/CsPad::CalibV1/XcsEndstation.0:Cspad.0/*0-end.data
on 2013-06-25 deployed in /reg/d/psdm/xpp/xpptut13/calib/CsPad::CalibV1/XppGon.0:Cspad.0/*0-end.data
- [2013-10-09 CSPAD XPP alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2013-10-09/calib/CsPad::CalibV1/XppGon.0:Cspad.0/geometry/0-end.data
on 2014-02-24 deployed in /reg/d/psdm/XPP/xppi0613/calib/CsPad::CalibV1/XppGon.0:Cspad.0/*0-end.data
on 2014-12-17 deployed for xcs84213
- [2016-08-22 XPP CSPAD Camera3 Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2016-08-22-camera3/calib/CsPad::CalibV1/XppGon.0:Cspad.0/geometry/0-end.data
- [2017-11-03 XPP CSPAD Camera3 Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-xpp-2017-11-03-camera3/calib/CsPad::CalibV1/XppGon.0:Cspad.0/geometry/0-end.data

MEC

- [2013-12-10 Qaud MEC Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2013-12-10/
Deployed: /reg/d/psdm/mec/meca1113/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/*0-end.data
Archive with corrected z coordinates: /reg/g/psdm/detector/alignment/cspad/calib-mec-2013-12-10-improved-Z/
- [2013-12-20 Qaud MEC Alignment](#) - new optical measurements after quad repair
Deployed: /reg/d/psdm/MEC/meci0114/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/*0-end.data
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2013-12-20/calib/
- [2015-04-03 Quad1 MEC Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2015-04-03/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/1-end.data
data - corrected, 0-end.data is non-corrected
- [2015-06-08 Quad1 MEC Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2015-06-08/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data
- ⚠ MEC camera got two other quads (quad 1 and 2), but there is no optical measurements for them.
- [2016-02-16 Quad-0,1,2 MEC Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2016-02-16/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data
Deployed for: mecl8216, mec07016, mecl7816, mecl3616, mecl2016 and mecl5816 as 1-end.data by Eric Galtier request.
- [2016-04-21 Quad-1 MEC Alignment](#)
Archive: /reg/g/psdm/detector/alignment/cspad/calib-mec-2016-04-21/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data
- [2017-04-22 CSPAD MEC Alignment](#)
/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data-2017-04-19-CSPAD-MEC-Before-corr
/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/1-end.data-2017-04-22-CSPAD-MEC-After
- [2017-10-20 CSPAD MEC Alignment](#)
/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-10-20/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data

Known detectors

on 2016-06-15:

```
CxiDg4.0:Cspad.0
CxiDs1.0:Cspad.0
CxiDs2.0:Cspad.0
CxiDsd.0:Cspad.0
MecTargetChamber.0:Cspad.0
NoDetector.0:Cspad.0 ... NoDetector.12:Cspad.0
SxrBeamline.0:Cspad.1
XcsEndstation.0:Cspad.0
XppGon.0:Cspad.0
```

References

- [CSPAD Geometry and Alignment](#)
- [Calibration Management Tool](#)
- [Geometry History](#)
- [CSPAD2x2 Alignment](#)
- [CSPad metrology and calibration files, links](#) - maintained by Philip Hart
- [CSPad detector](#) - maintained by Philip Hart
- [CSPAD Geometry Software \(depricated\)](#) - explains how the alignment parameters are used for reconstruction of the CSPAD image in PSANA.
- [CSPad image producer in Python \(DEPRICATED\)](#) - **depricated**
- [CSPAD pixel coordinates and image producer in Python](#) - **depricated**