Administrative rules for LCLS detectors

Content

In this note epix10ka2m is the specific example, but the conventions adopted would apply to any future multi-panel detector.

Detector name labels

Add **label with unique detector name** on each camera body

- preliminary agreed on unique detector names: 2M.0, 2M.1, 2M.2, ...
- if expected number of detectors more than 10 it is better to use 2M.00, 2M.01, 2M.02, ... (better for files sorting in catalogs).

Why it is important? We need to distinguish detectors in optical metrology and geometry constant files. It does not matter for intensity correction, where detector will be identified by the panels Id from data.

Optical metrology

epix10ka2m

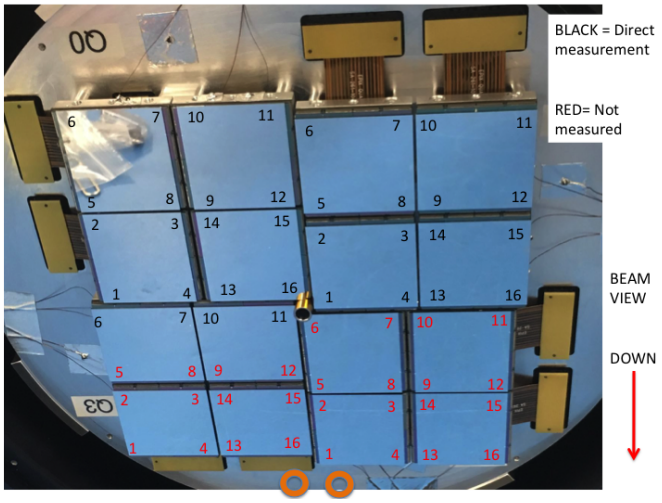
Use the same measurement pattern for all epix10ka2m detectors

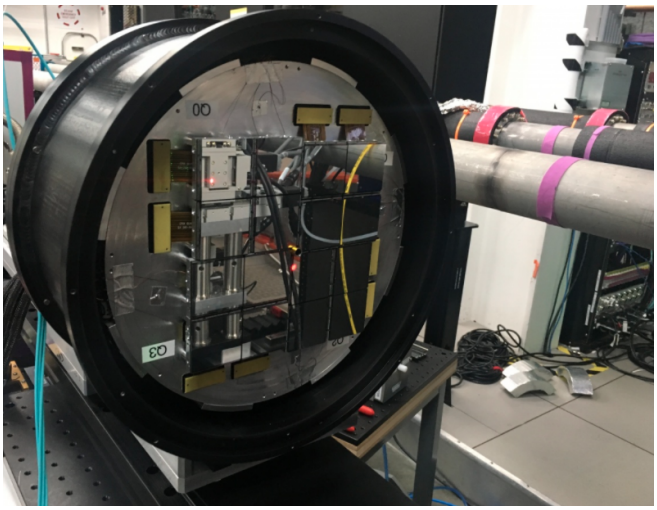
- orientation of all cameras in optical metrology should always be the same
- order of measured points should always be the same

Why it is important? We have to unambiguously map panels in optical metrology and in data from DAQ. Different detector orientation or different order of measurement need in special treatment in the processing script, that is error-prone and always needs in verification on real data.

Camera orientation in optical metrology

Preferred optical metrology pattern from 2018-11-18:





- orientation of camera should be consistent with its beam-view in hutch, quad **Q0 in the top left corner**.
  - orientation of quad labels should be human readable (from left to right) in hutch position;
    on current photo labels need to be rotated upside-down. Right photo shows how embarrassing labels look in the hutch.
  - add labels for vector of gravity or x-y for optical metrology in order to exclude wrong orientation
  - microscope origin should stay the same during the measurements.
    Origin location does not matter, but it can optionally be labeled somewhere for uniformity of metrology data.

Measurement order

- measurement order of points per quad should be done in style of Chris Kenney, as shown on photo, **clock-wise order for panels and corners, beginning from bottom-left**.
- metrology data is saved in spreadsheets xlsx or text format.
- units - signed micrometers, without decimal dot.
- example of data:

Example of optical metrology data in text format

```
quad 0
point   X       Y       Z
1       0       0       0
2       403     39683   -147
3       37088   39308   -472
4       36680  -378     -326
5       322     40433   -141
6       366     80129   -302
7       37056   80079   -657
8       37007   40391   -452
9       42053   40578   -470
10      42046   80274   -669
11      78743   80269   -961
12      78733   40576   -725
13      42083   219     -297
14      42078   39472   -413
15      78774   39473   -711
16      78767   214     -640
quad 1
point   X       Y       Z
1       81539   -4620   -731
2       81352   32062   -814
3       121034  32267   -1079
4       121225  -4420   -1015
5       81390   37579   -882
6       81497   74238   -993
7       121177  74148   -1219
8       121073  37468   -1127
9       122083  37596   -1104
10      122171  74281   -1329
11      161853  74189   -1620
12      161768  37499   -1433
13      122081  -4398   -916
14      122183  32283   -988
15      161877  32161   -1333
16      161765  -4520   -1286


Quad 2
...
Quad 3
...
```

MEC Quad Orientation

< Insert documentation on MEC Quad Orientation here >

Label on connectors and cables

- All **labels on detector connectors and cables** should show **THE ONLY WAY** to connect camera in hutch.

Detector name in DAQ

- Latest incident revealed by Philip on 2020-07-16 - "We've been mostly using the 2M.1 camera but the daq calls it 2M.0."
- Detector name like DetLab.0:Epix10ka2M.0 is used to access data in xtc file.
- it should be consistent with calibration constants, like /reg/d/psdm/det/detdaq18/calib/Epix10ka2M::CalibV1/DetLab.0:Epix10ka2M.0/pedestals/<run-range>.data
- To prevent mess with names it would be nice to use the same detector name on camera body (2M.0) and in DAQ (DetLab.0:Epix10ka2M.0).

Summary

- Engrave **detector name on camera body**.
- Add **labels for unambiguous detector orientation**:
    - vector of gravity,
    - x-y (and optional origin) for optical metrology,
    - all labels should be left-to-right readable in the hutch (now for 2M.0 they are upside-down).
- Use the same detector orientation in optical metrology, **Q0 is in upper left corner** in the hutch and in microscope x-y Cartesian frame.
    - Origin location does not matter, but it is better to label for uniformity of constants.
- Use the **same order of measuring points per quad**, as numerated on photo.
- Plug-in **properly labeled cables to the properly labeled camera connectors**.
- Use **the same detector name on camera body** (2M.0) **and in DAQ** (DetLab.0:Epix10ka2M.0).