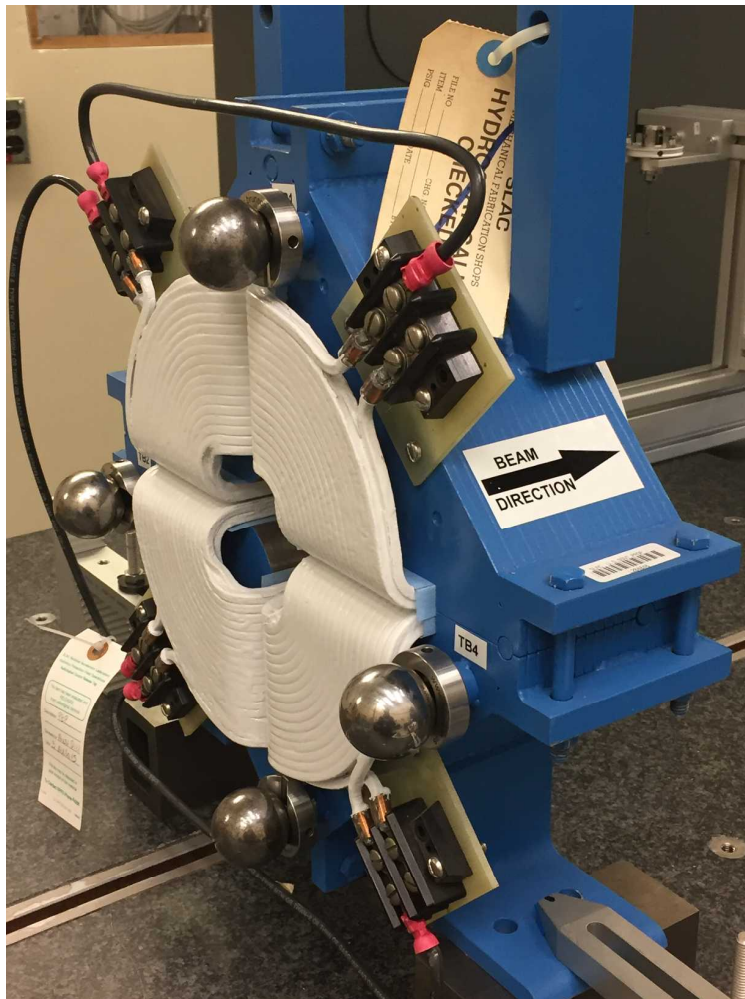


## LCLS II 2Q4 Fiducialization Report



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-344-112-01  
Barcode # : 4041  
Old S/N : P39  
Old MAD Element Name : LX04QU3  
Old Unit : QEB36540

## Coordinate System Setup

### Spatial Alignment

The Spatial Alignment of the magnet is created through a composite best-fit of the pole tips. Each pole tip scanned 0.150 inch inboard from the upstream magnet face and the downstream magnet face. A composite best-fit of the upstream poles and the downstream poles is made with the nominal pole tip shape and location. An axis is created through the two best-fit centerpoints. This axis is the spatial alignment of the magnet and defines the Z axis. The Terminals & Tooling Ball Sockets are UPSTREAM, therefore +Z (DOWNSTREAM) points away from the Terminals & Tooling Ball Sockets.

### Planar Alignment

The Planar Alignment of the magnet is the created by averaging the rotations of the composite best-fits of the upstream pole tips and downstream pole tips. This direction defines the Y and X directions of the magnet.

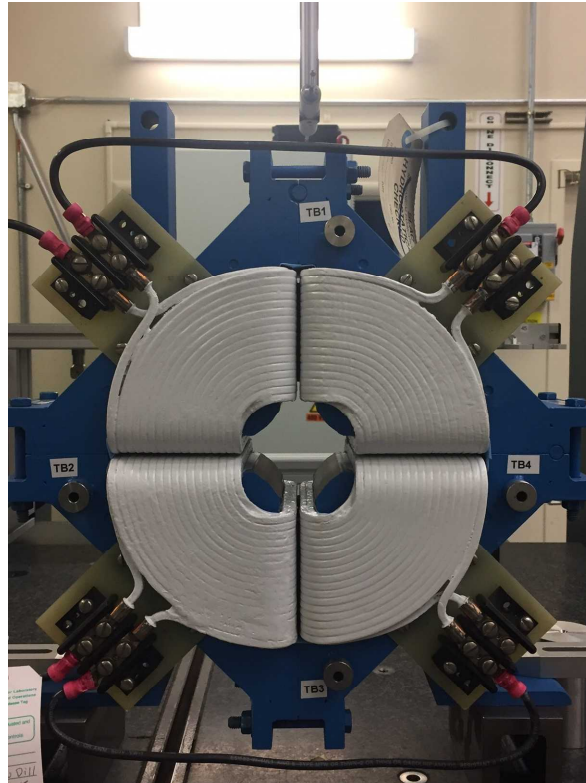
### Coordinate Origins

The origins of the magnet coordinate system are as follows. The XY origin lies on the axis of spatial alignment. The Z origin is the intersection of the mid-plane between the upstream and downstream magnet faces and the Z axis.

**Barcode # : 4041**

**Mfg. S/N : P39**

## Tooling Ball Locations



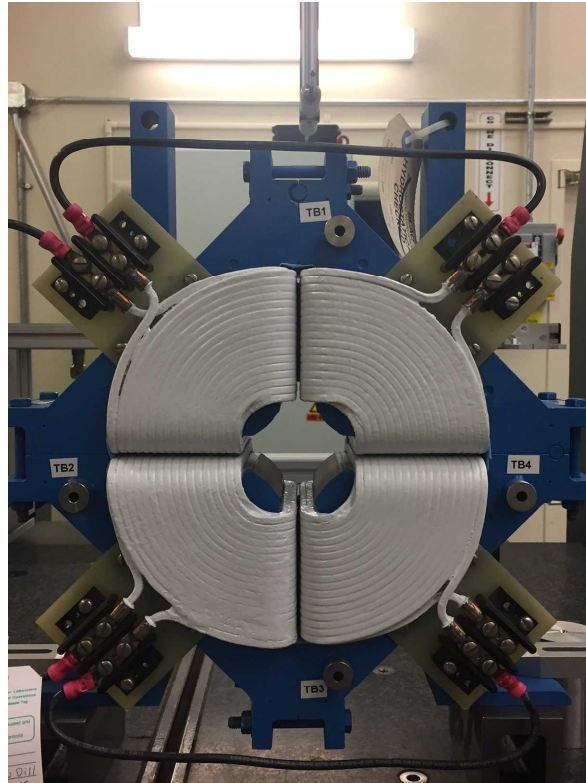
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-0.9979	5.4978	-3.4277
TB 2	5.5048	-1.0057	-3.4312
TB 3	-0.9995	-5.4996	-3.4417
TB 4	-5.5009	-1.0022	-3.4371

Tooling Ball Locations are 1 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

**Barcode # : 4041**

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## Tooling Ball Locations



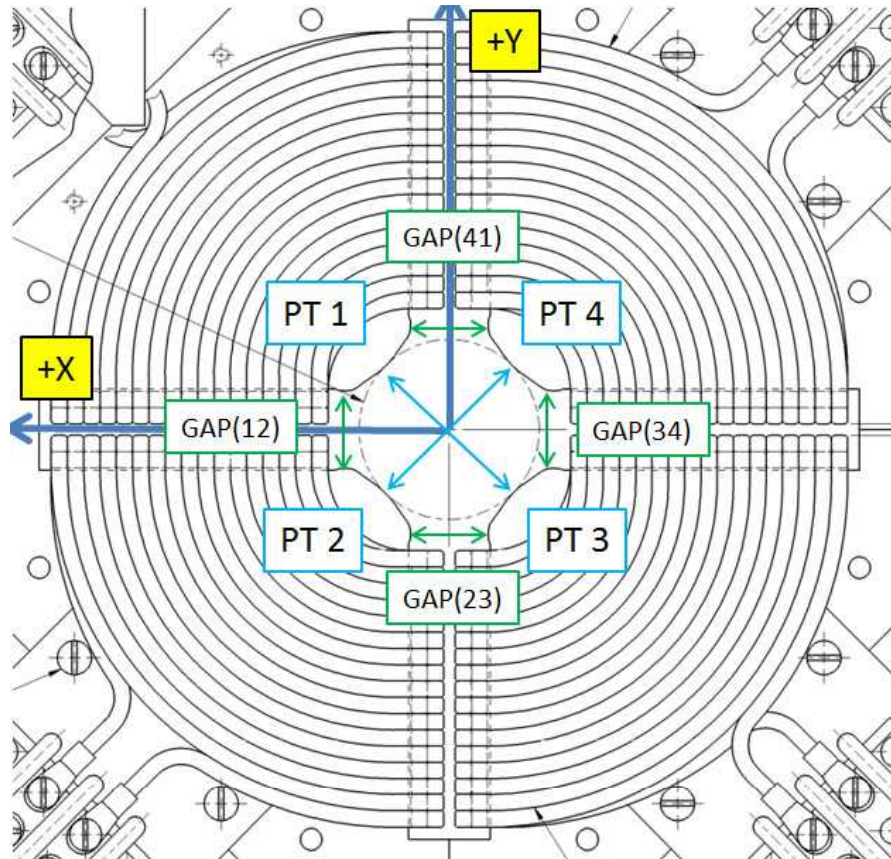
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-1.0000	5.4993	-2.7405
TB 2	5.5022	-1.0026	-2.7435
TB 3	-1.0012	-5.4974	-2.7539
TB 4	-5.5006	-0.9990	-2.7495

Tooling Ball Locations are 5/16 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

**Barcode # : 4041**

**Mfg. S/N : P39**

## Pole Tip Gap Measurements



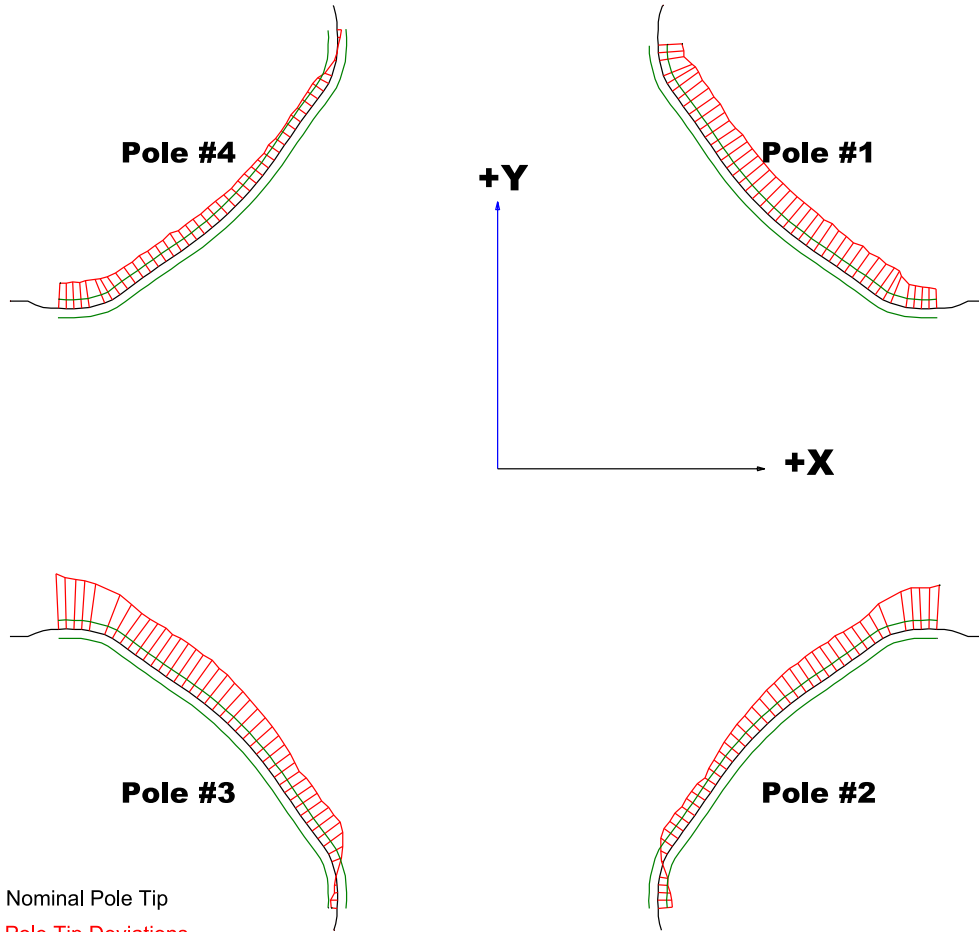
	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	2.086 ± .002	2.08613	2.08565
Pole Tip Distance 2-4	2.086 ± .002	2.08542	2.08707
Gap 1-2	0.900	0.8984	0.89675
Gap 2-3	0.900	0.90269	0.90534
Gap 3-4	0.900	0.89774	0.89779
Gap 4-1	0.900	0.89626	0.90396

**Barcode # : 4041**

Dimensions in Inch

**Mfg. S/N : P39**

## Composite Best-fit of Pole Tips, Downstream



Black = Nominal Pole Tip  
 Red = Pole Tip Deviations  
 Green = +/- .001 Tolerance

Dimensions in Inch

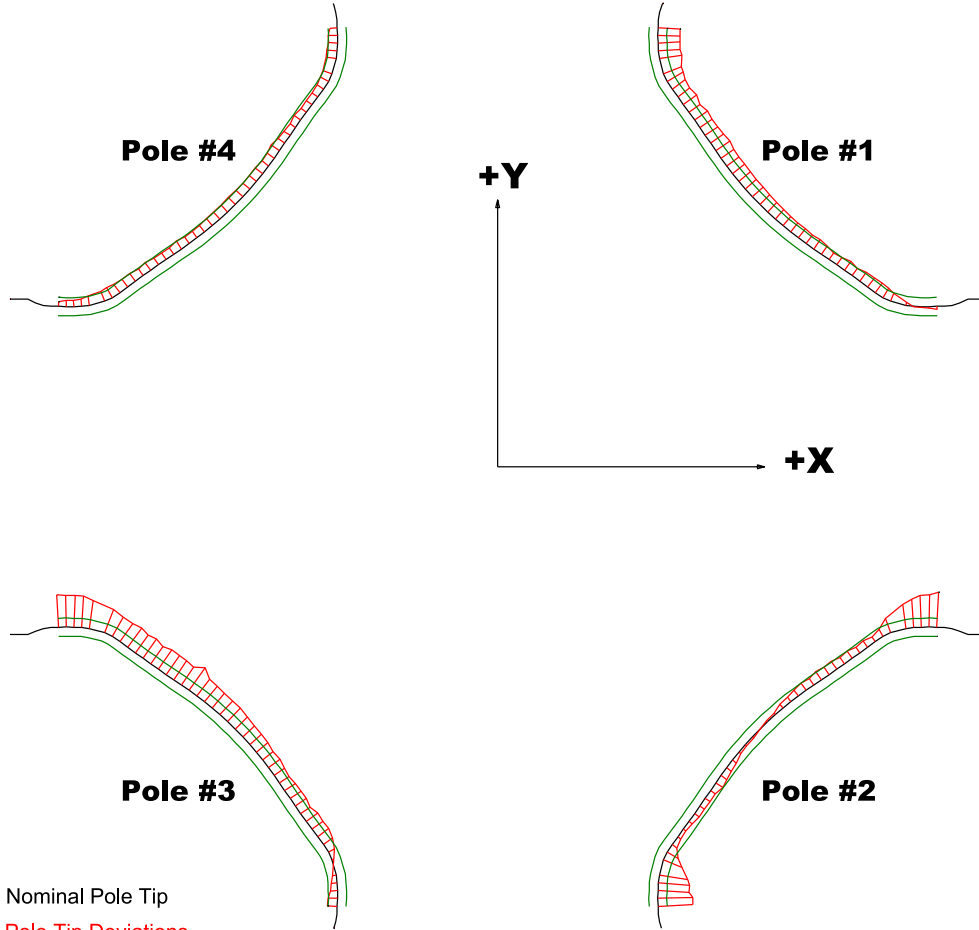
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	0.00216	-0.00486	-0.00619	-0.00048
Max. Dev.	0.00367	0.00158	0.00073	0.00298

**Barcode # : 4041**

**Mfg. S/N : P39**

## Composite Best-fit of Pole Tips, Upstream



Black = Nominal Pole Tip  
 Red = Pole Tip Deviations  
 Green = +/- .001 Tolerance

Dimensions in Inch

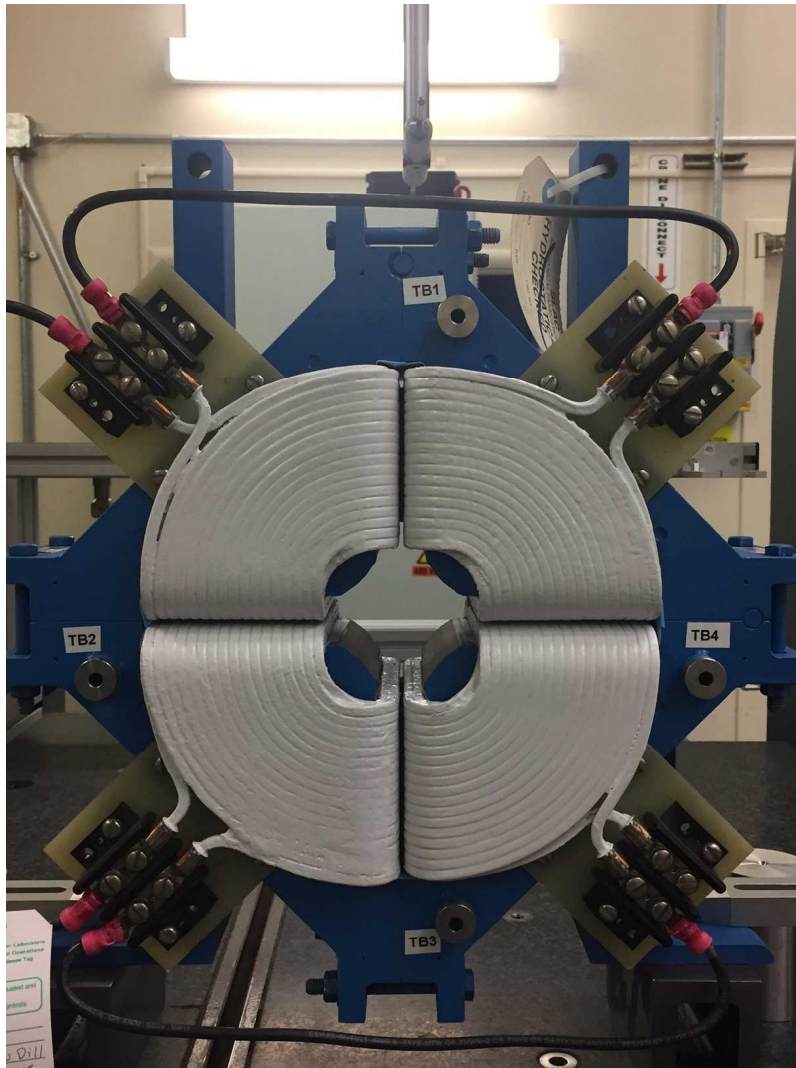
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00032	-0.0039	-0.00363	0.00049
Max. Dev.	0.00256	0.00386	0.00107	0.0013

**Barcode # : 4041**

**Mfg. S/N : P39**

## Angle of the Composite Pole Tip Best-Fit In Relation to Base



Angle in Decimal Degrees ° :0.10954

Angle in Milliradians :1.91186

**Barcode # : 4041**

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