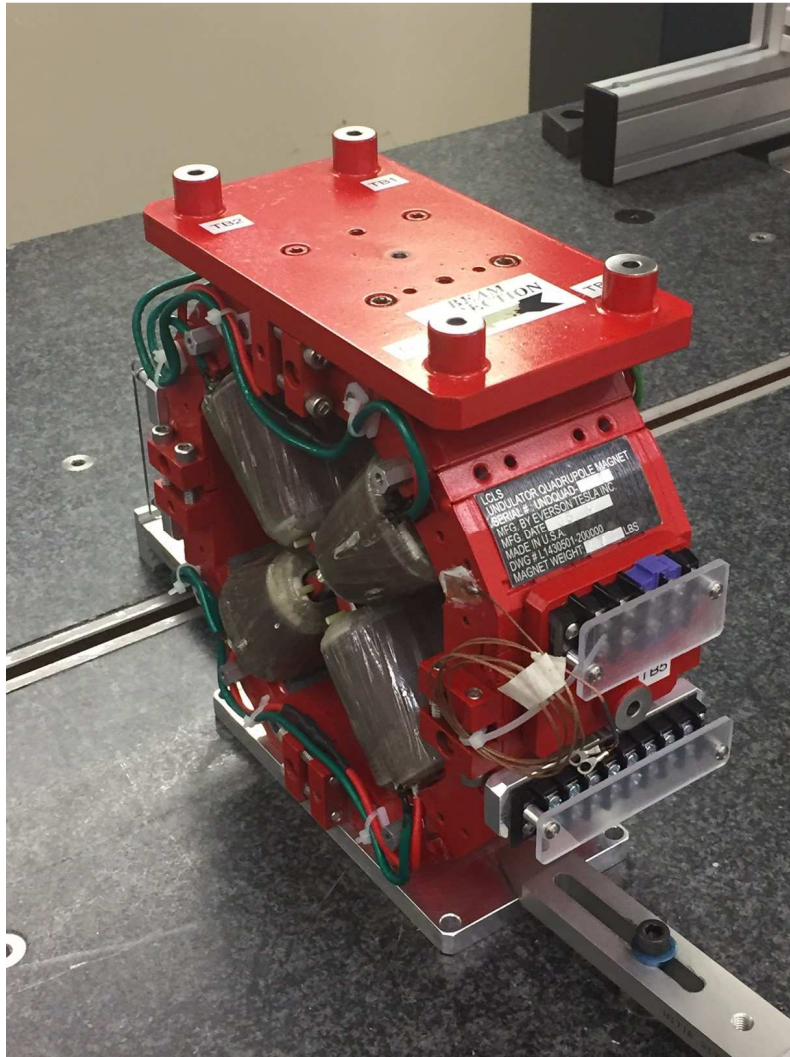


LCLS II Undulator Quadrupole Fiducialization Report



Inspector : K. Caban
Engineer : J. Amann
Drawing No. : SA-381-012-22
Barcode # : 4073
Mfg. S/N : 006

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 .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.

Planar Alignment

The Planar Alignment of the magnet is 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.

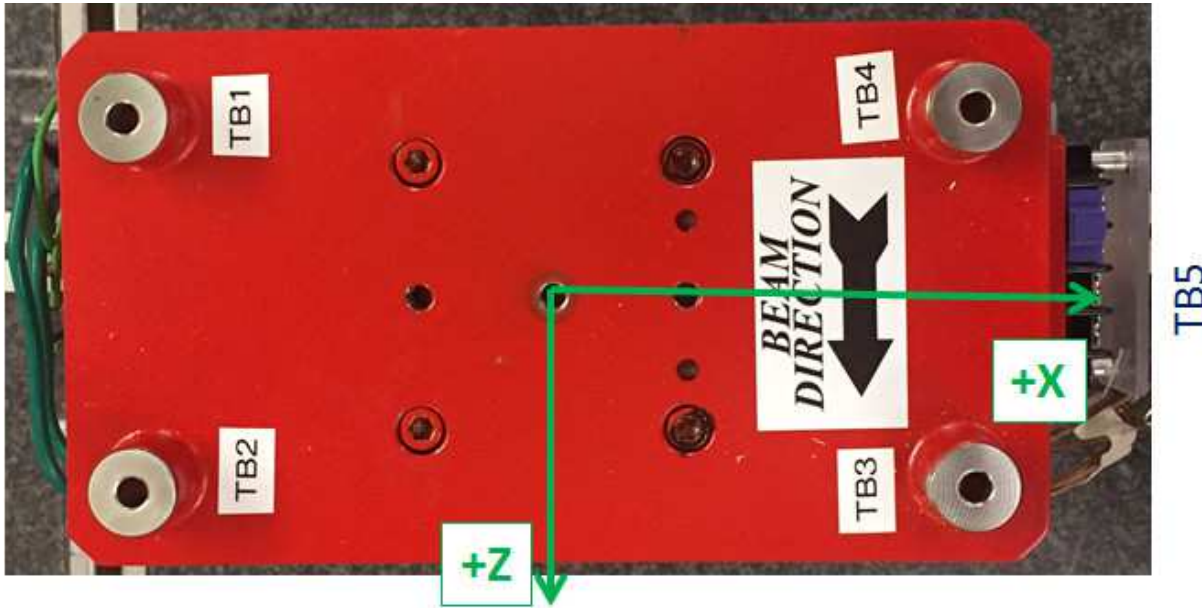
Coordinate Origins

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.

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Tooling Ball Locations



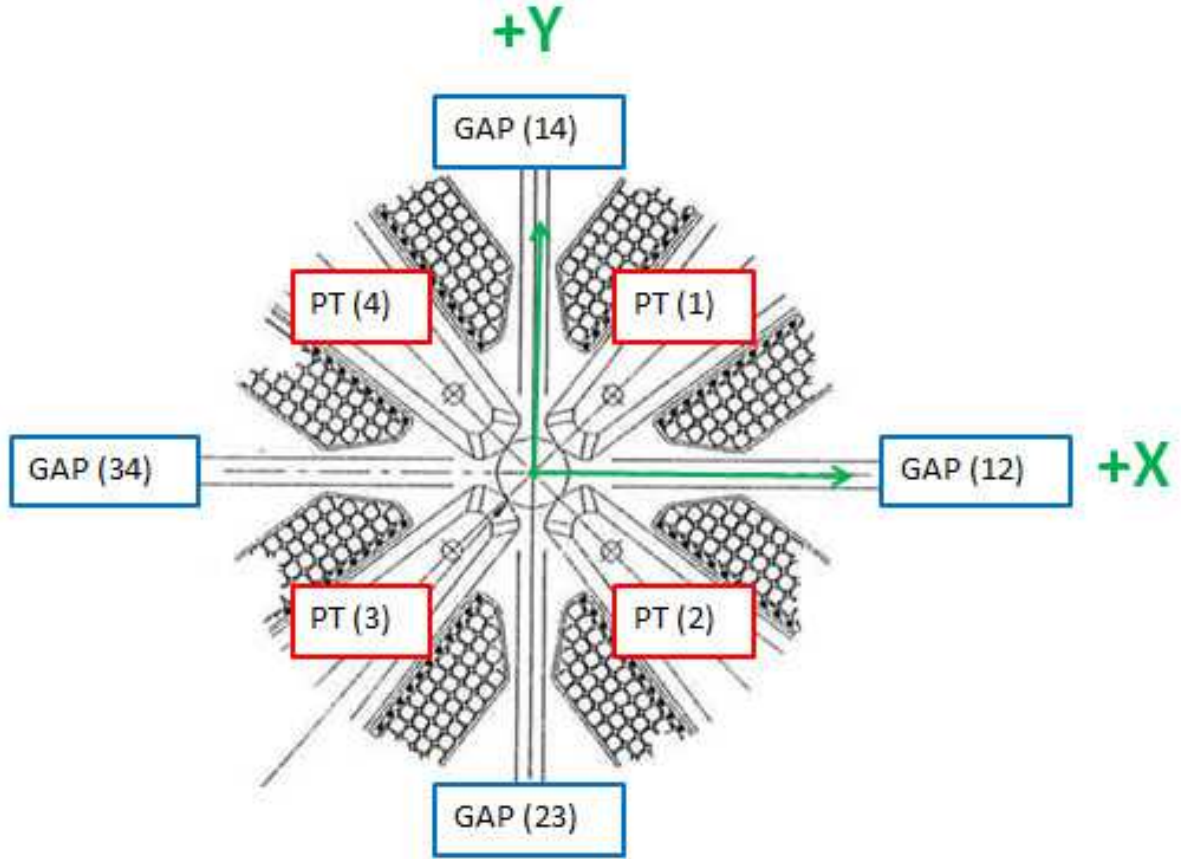
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-3.37609	6.80489	-1.49460
TB 2	-3.36643	6.80662	1.50285
TB 3	3.38273	6.80374	1.48211
TB 4	3.37548	6.80436	-1.51462
TB 5	6.58875	0.12427	-0.01592
TB A	-3.37617	6.11799	-1.49567
TB B	-3.36647	6.11972	1.50340
TB C	3.38268	6.11638	1.48327
TB D	3.37555	6.11729	-1.51591
TB E	5.90116	0.12578	-0.01525

Tooling Ball Locations (1-5) are 1 inch above Tooling Ball Adapter Plane
 Tooling Ball Locations (A-E) are 5/16 inch above Tooling Ball Adapter Plane
 Dimensions in Inch

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Pole Tip Gap Measurements



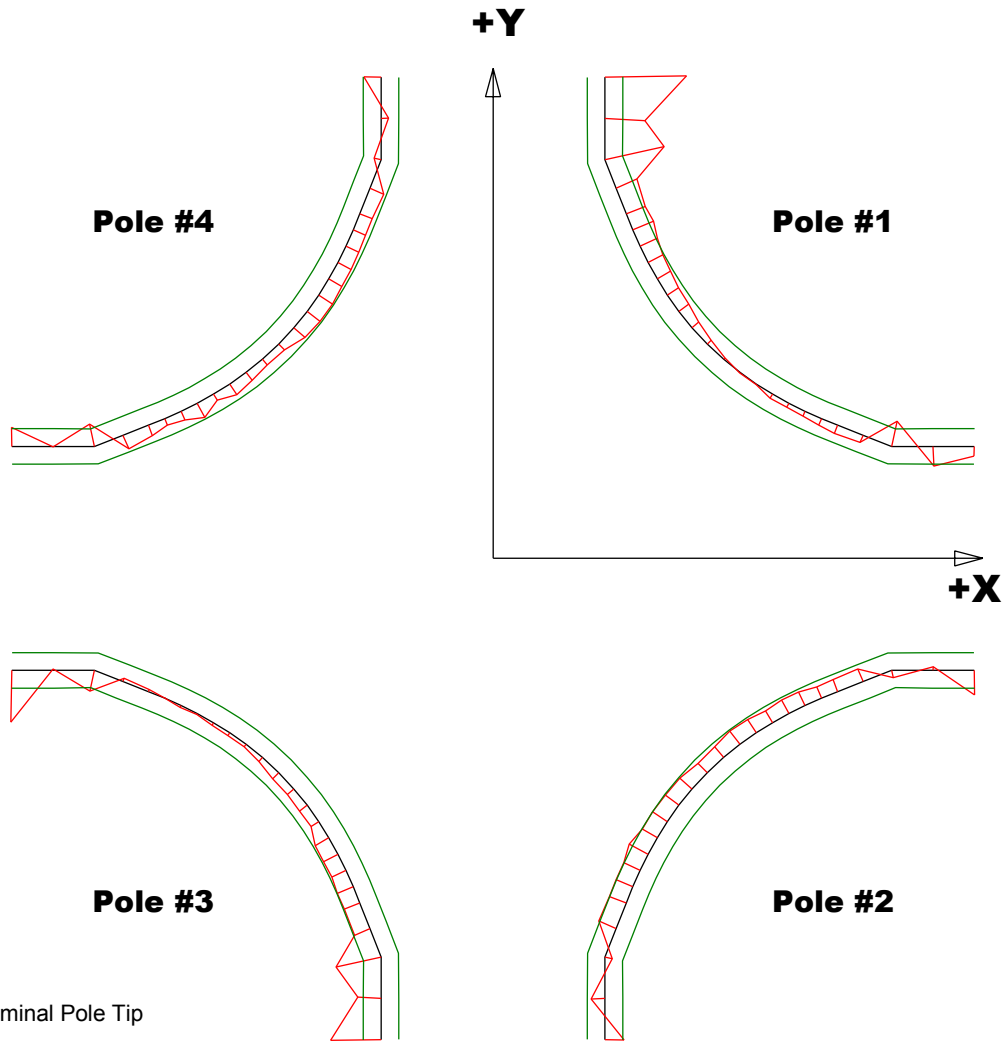
	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	0.433 ± .002	0.43371	0.43176
Pole Tip Distance 2-4	0.433 ± .002	0.43176	0.43466
Gap 1-2	0.159 ± .002	0.15851	0.16102
Gap 2-3	0.159 ± .002	0.16039	0.16139
Gap 3-4	0.159 ± .002	0.15942	0.15881
Gap 4-1	0.159 ± .002	0.1616	0.159

Dimensions in Inch

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Mfg. S/N : 006

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

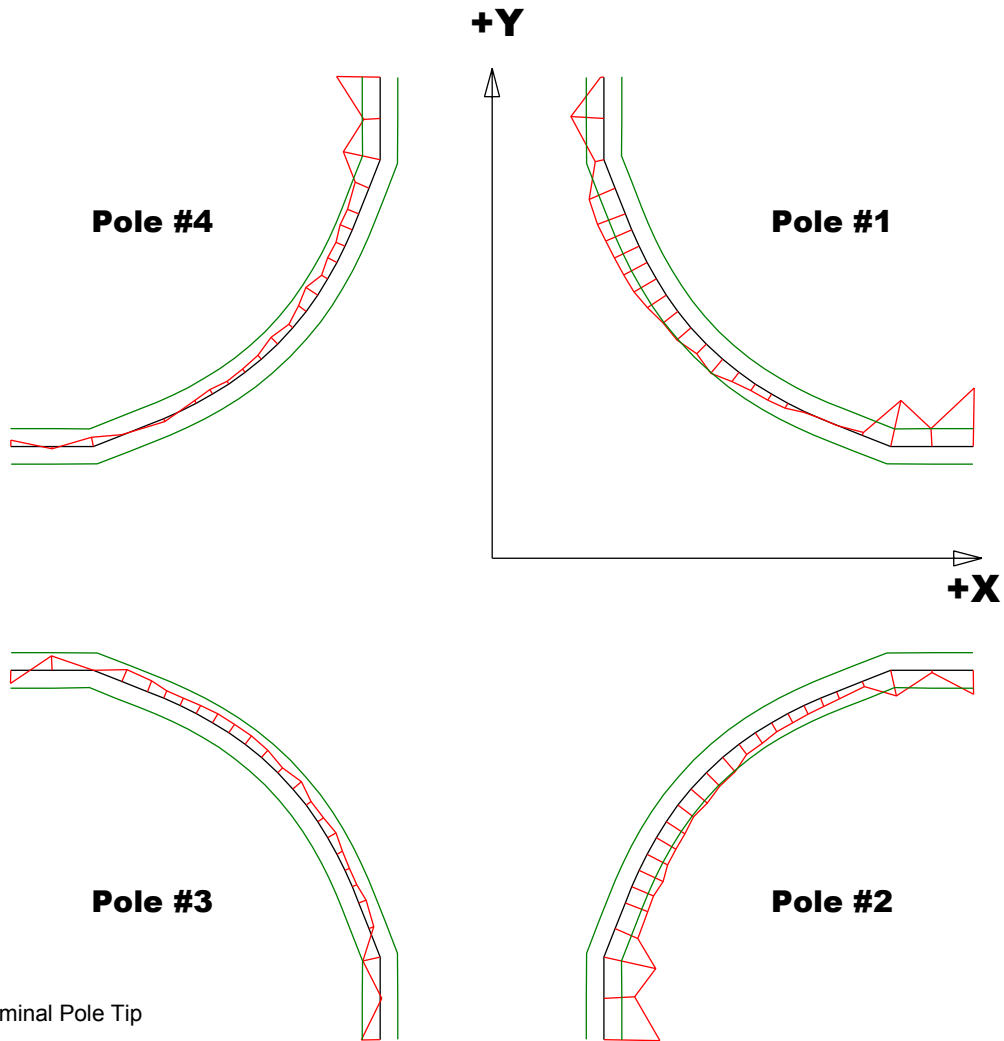
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00458	-0.00138	-0.00292	-0.00128
Max. Dev.	0.0011	0.00121	0.00021	0.00092

Barcode # : 4073

Mfg. S/N : 006

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

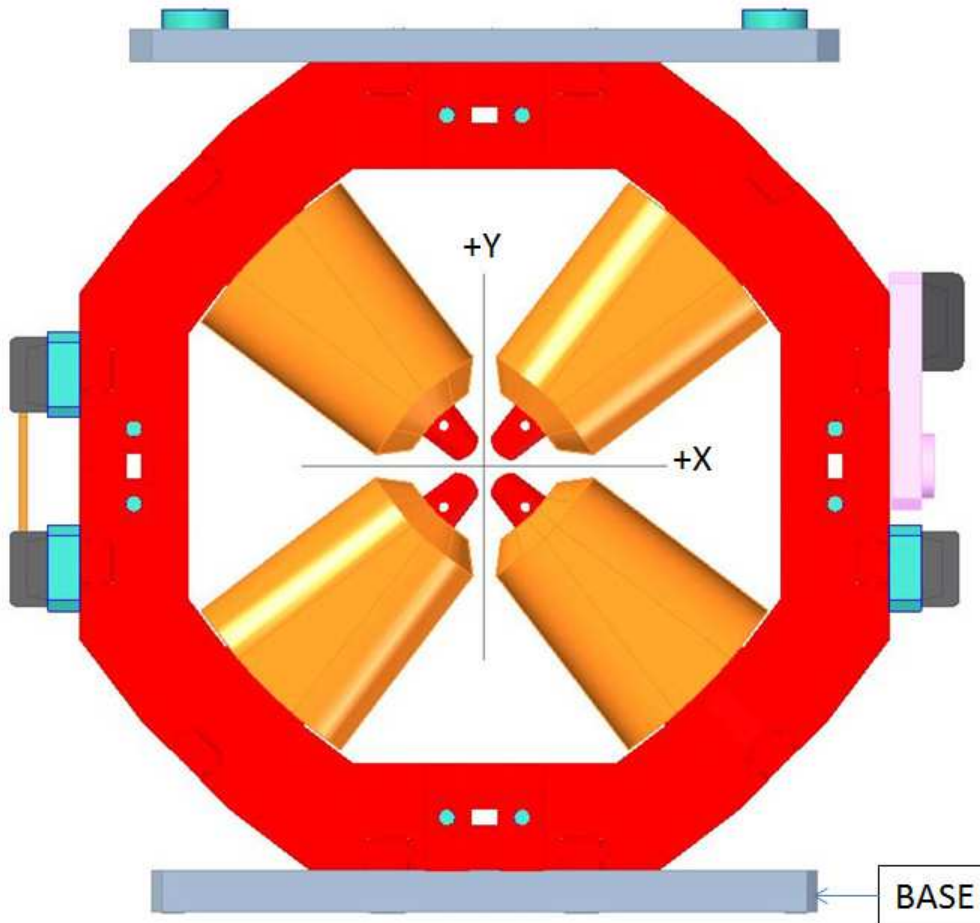
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00329	-0.00314	-0.00106	-0.00244
Max. Dev.	0.00186	-0.00012	0.00081	0.00018

Barcode # : 4073

Mfg. S/N : 006

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



Angle in Decimal Degrees ° :0.00495

Angle in Milliradians :0.08631

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