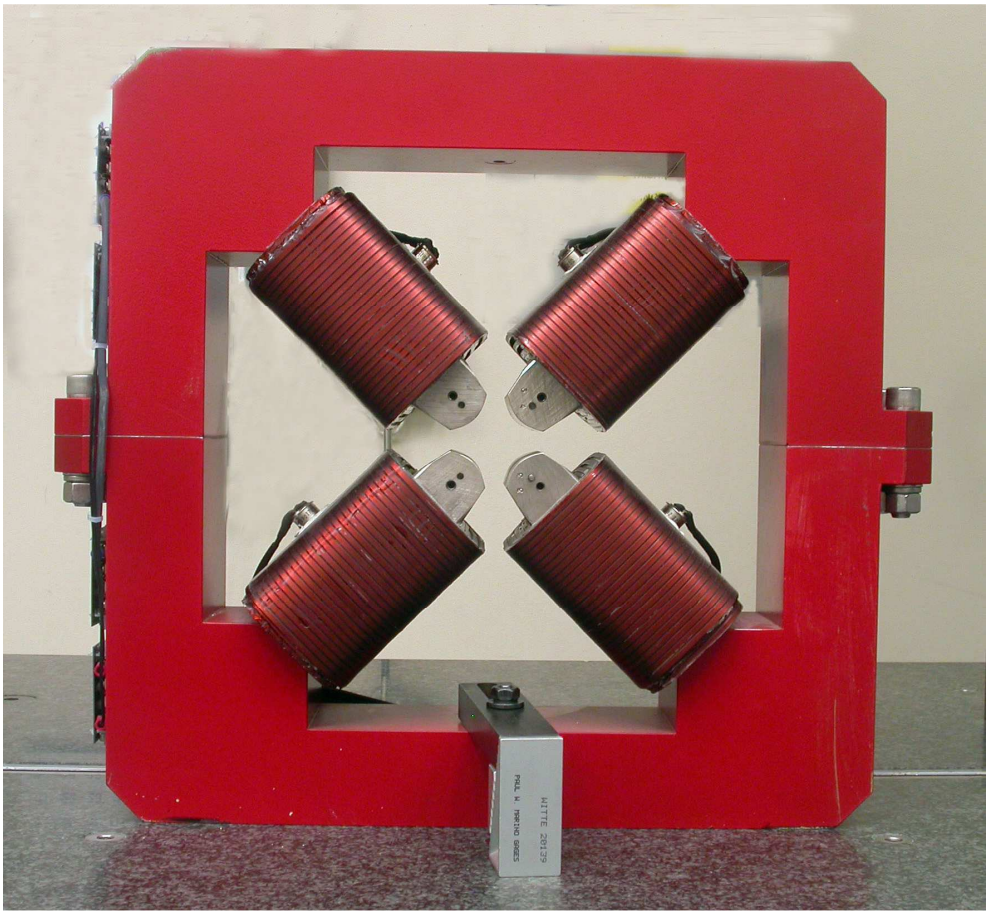
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

Drawing No. : SA-380-309-12 R1

Barcode No.: 4016

Mfg. S/N : 019

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 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.

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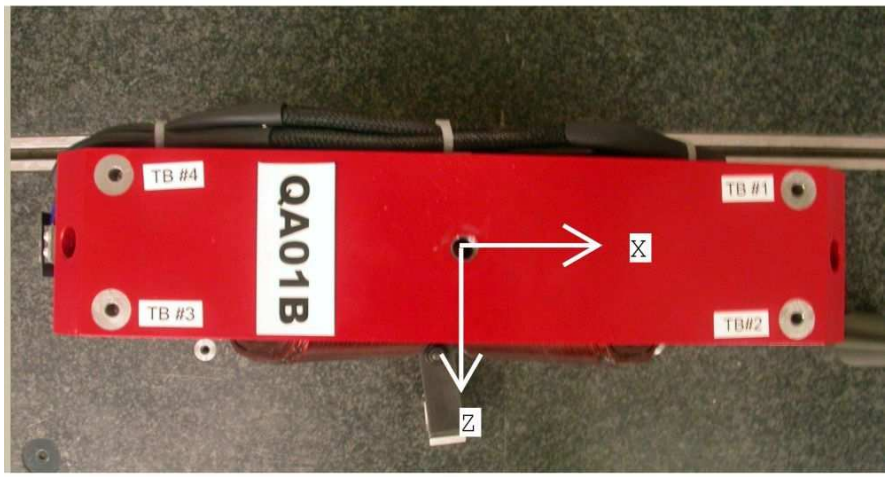
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.49311	8.87679	-1.24947
TB 2	6.49422	8.87743	1.25059
TB 3	-6.50510	8.86939	1.25396
TB 4	-6.50639	8.86887	-1.24645
TB A	6.49328	8.18945	-1.24892
TB B	6.49493	8.19000	1.25120
TB C	-6.50487	8.18216	1.25413
TB D	-6.50629	8.18145	-1.24580

Tooling Ball Locations (1-4) are 1 inch above unpainted surface pads
Tooling Ball Locations (A-D) are 5/16 inch above unpainted surface pads

Dimensions in Inch

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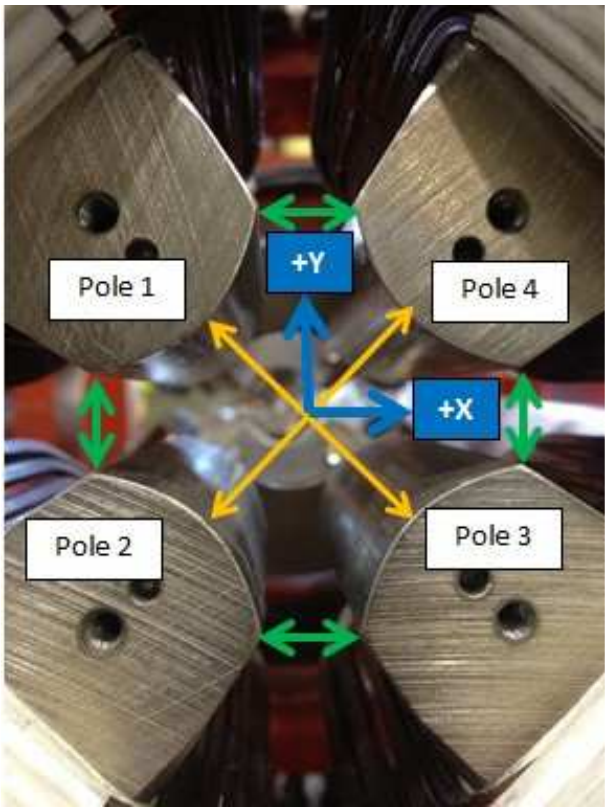
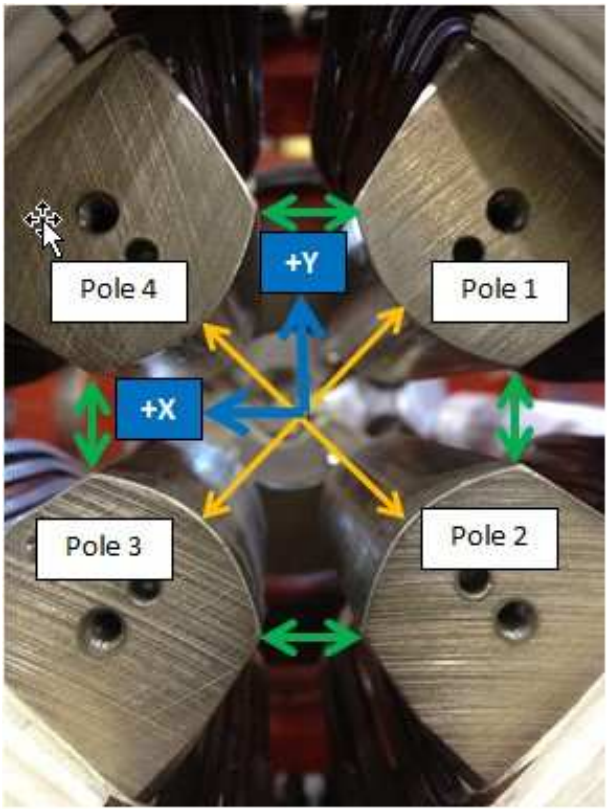
Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26046	1.26174
Pole Tip Distance 2-4	1.260	1.26124	1.26095
Gap 1-2	.422	0.42621	0.42699
Gap 2-3	.422	0.42265	0.42584
Gap 3-4	.422	0.42055	0.41809
Gap 4-1	.422	0.42195	0.42072

Dimensions in Inch

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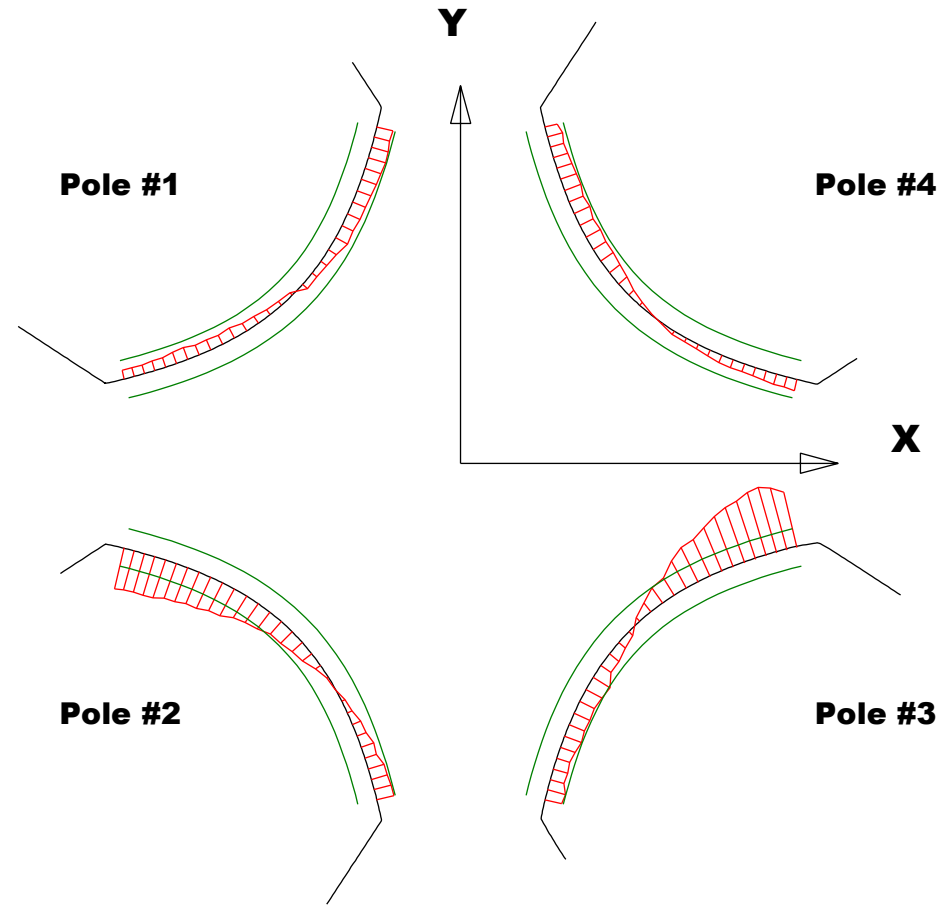
Composite Best-fit of Pole Tips, Downstream



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.	-0.00068	-0.00223	-0.00105	-0.00092
Max. Dev.	0.00095	0.00093	0.00355	0.00062

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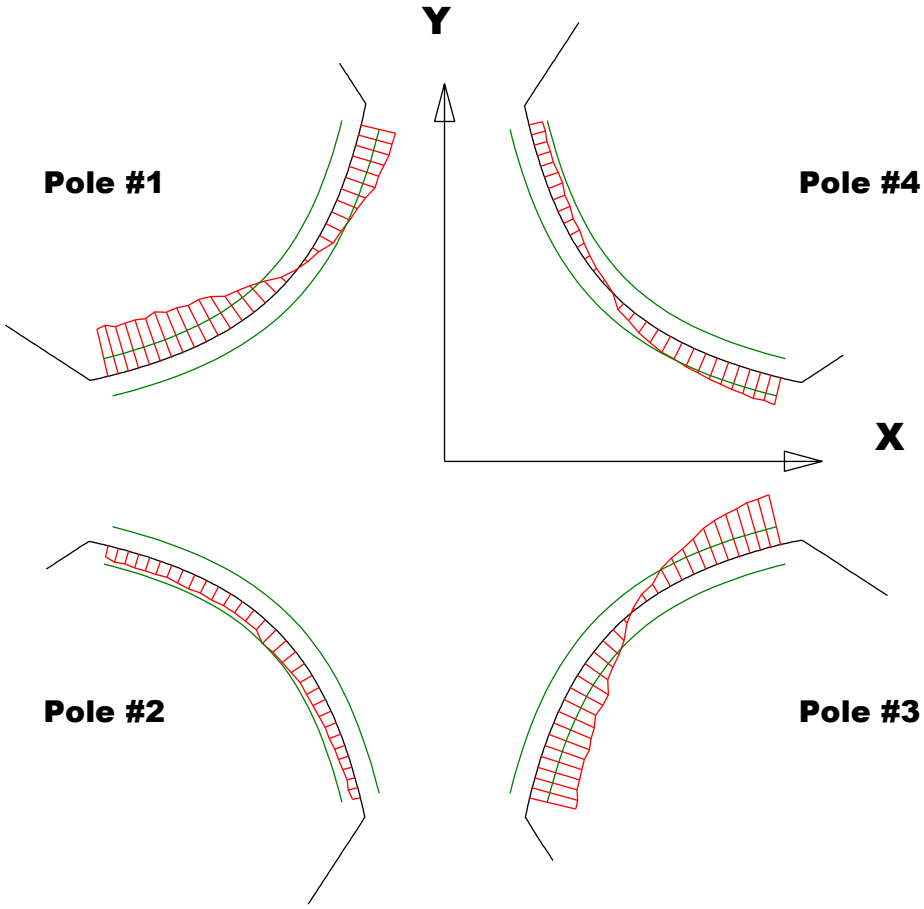
Composite Best-fit of Pole Tips, Upstream



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.	-0.00266	-0.00103	-0.00253	-0.00081
Max. Dev.	0.00188	-0.00042	0.00272	0.00148

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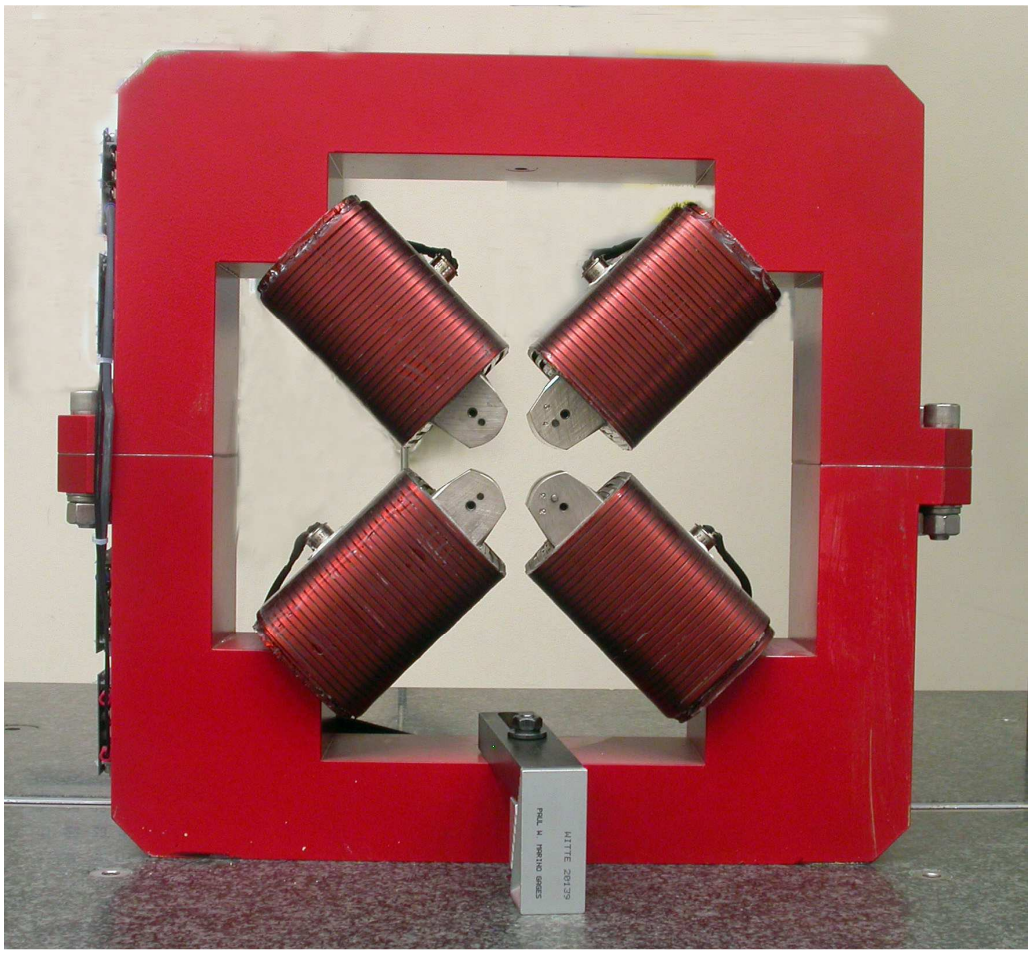
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = -0.03505

Angle in Milliradians = -0.61172

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