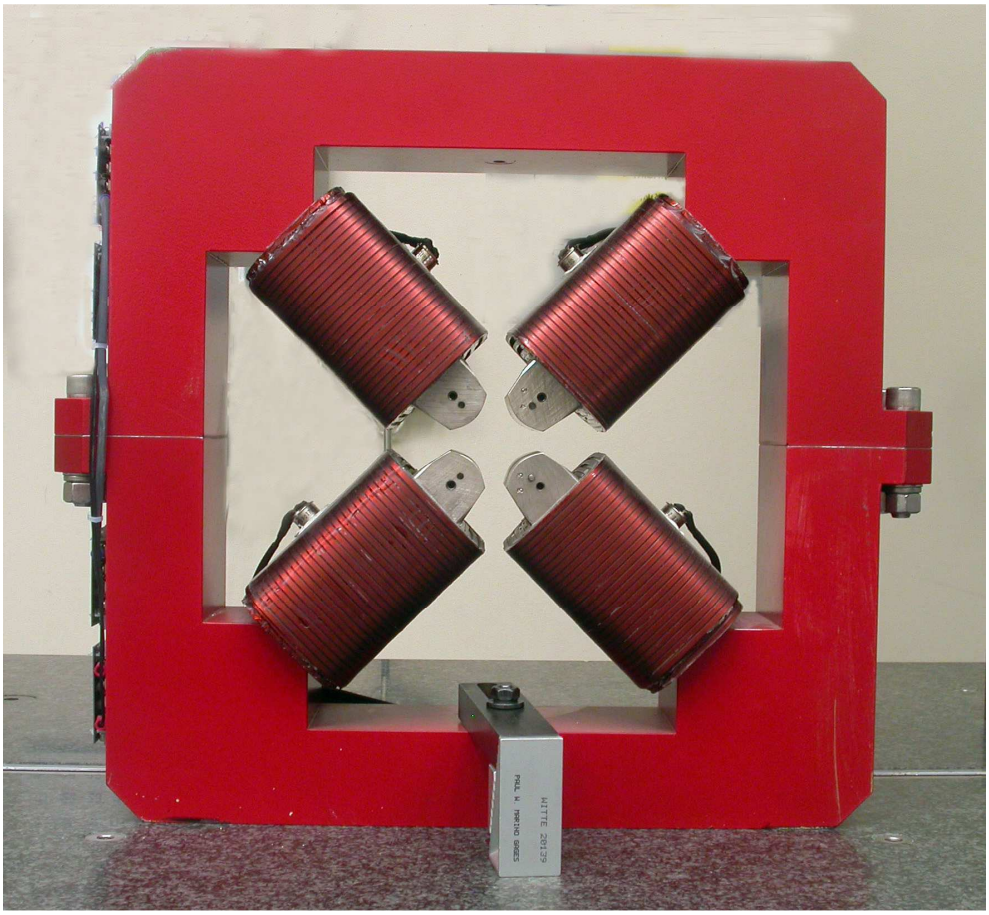
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4017

Mfg. S/N : 022

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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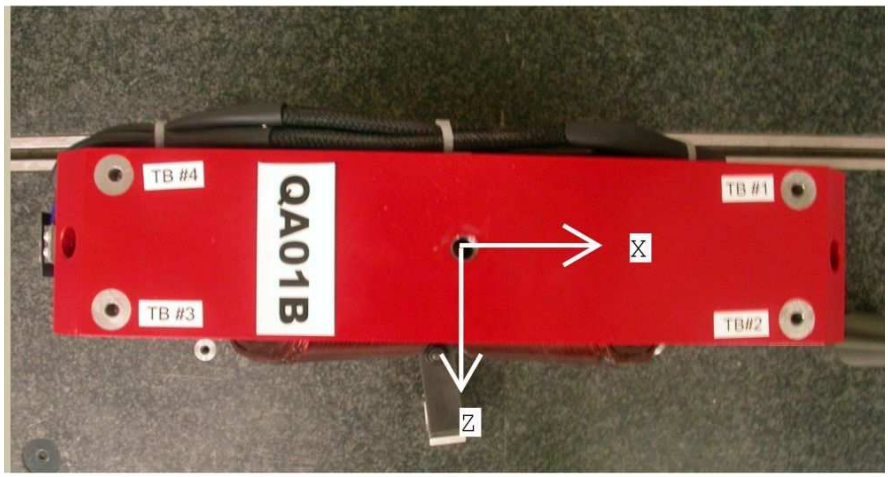
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.50722	8.86484	-1.24580
TB 2	6.50802	8.86481	1.25429
TB 3	-6.49155	8.88181	1.25634
TB 4	-6.49198	8.88217	-1.24409
TB A	6.50604	8.17725	-1.24581
TB B	6.50708	8.17702	1.25459
TB C	-6.49238	8.19466	1.25633
TB D	-6.49287	8.19468	-1.24308

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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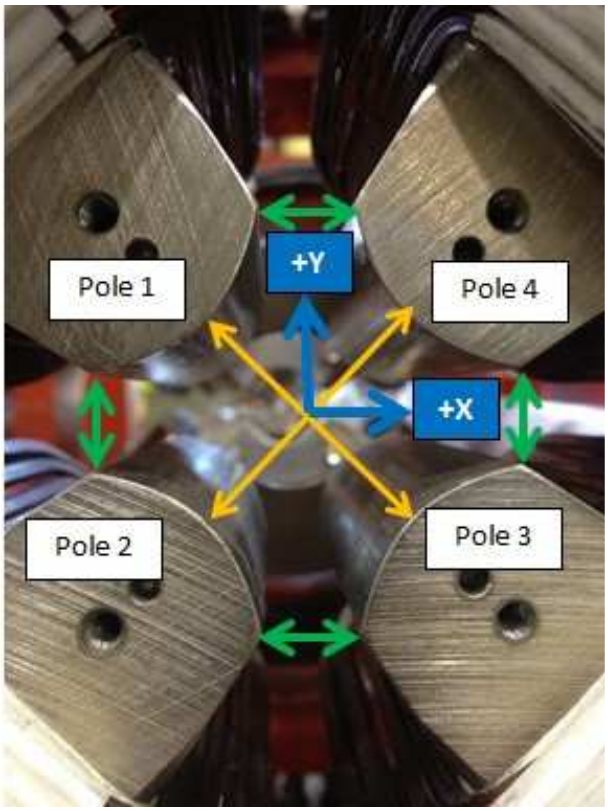
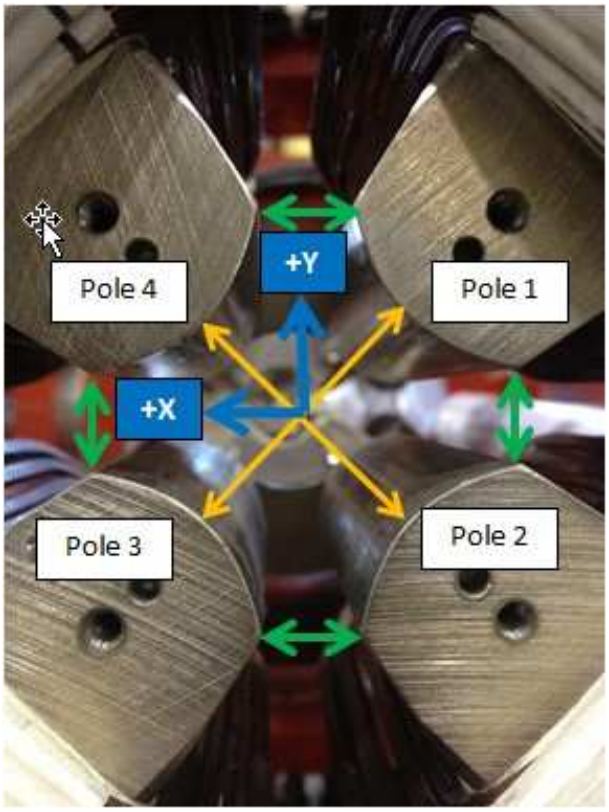
Pole Tip Gap Measurements

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	1.26179	1.26271
Pole Tip Distance 2-4	1.260	1.26009	1.26075
Gap 1-2	.422	0.42175	0.42447
Gap 2-3	.422	0.42505	0.42344
Gap 3-4	.422	0.42202	0.42412
Gap 4-1	.422	0.42737	0.42678

Dimensions in Inch

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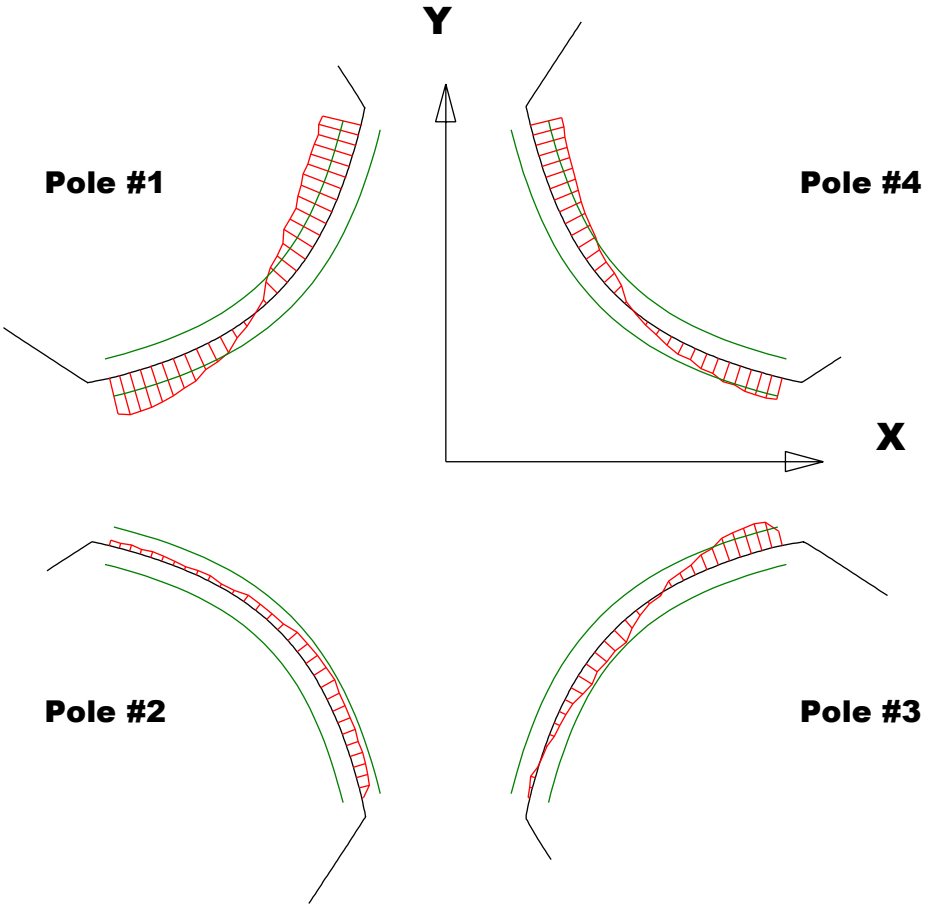
Composite Best-fit of Pole Tips, Downstream



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.	-0.00217	0.0001	-0.00092	-0.00171
Max. Dev.	0.00215	0.00085	0.00148	0.00125

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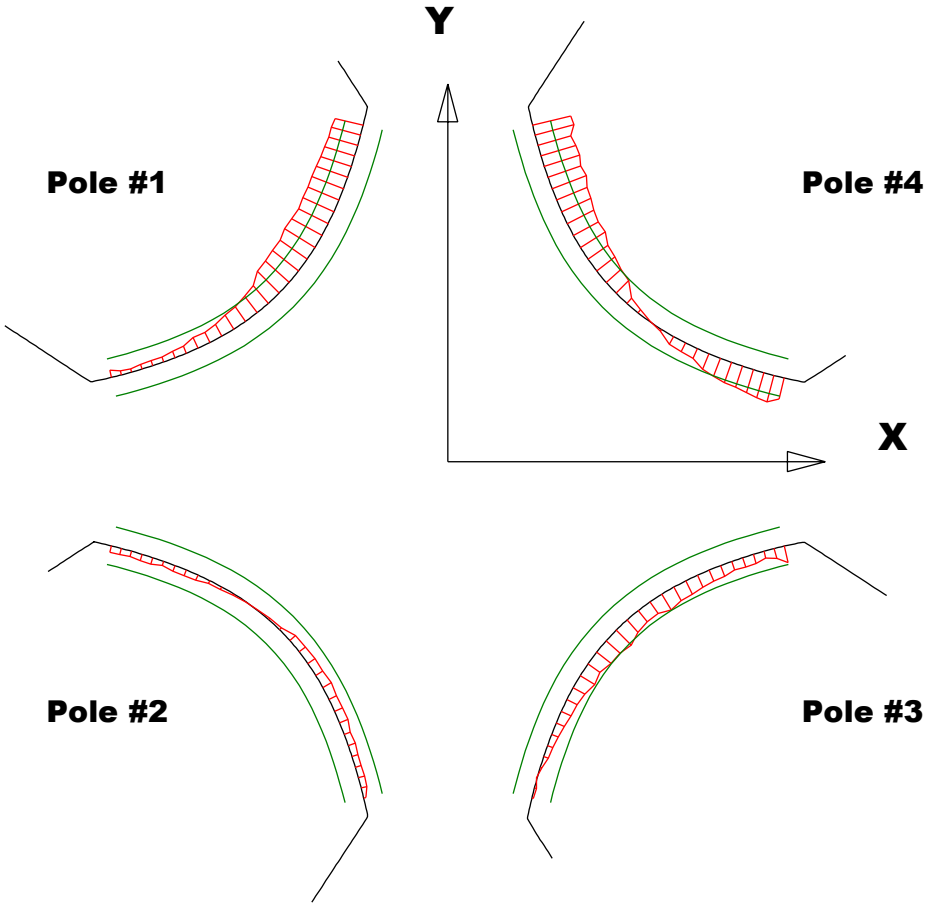
Composite Best-fit of Pole Tips, Upstream



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.	-0.0019	-0.00036	-0.00113	-0.00213
Max. Dev.	-0.00018	0.00053	0.00005	0.00144

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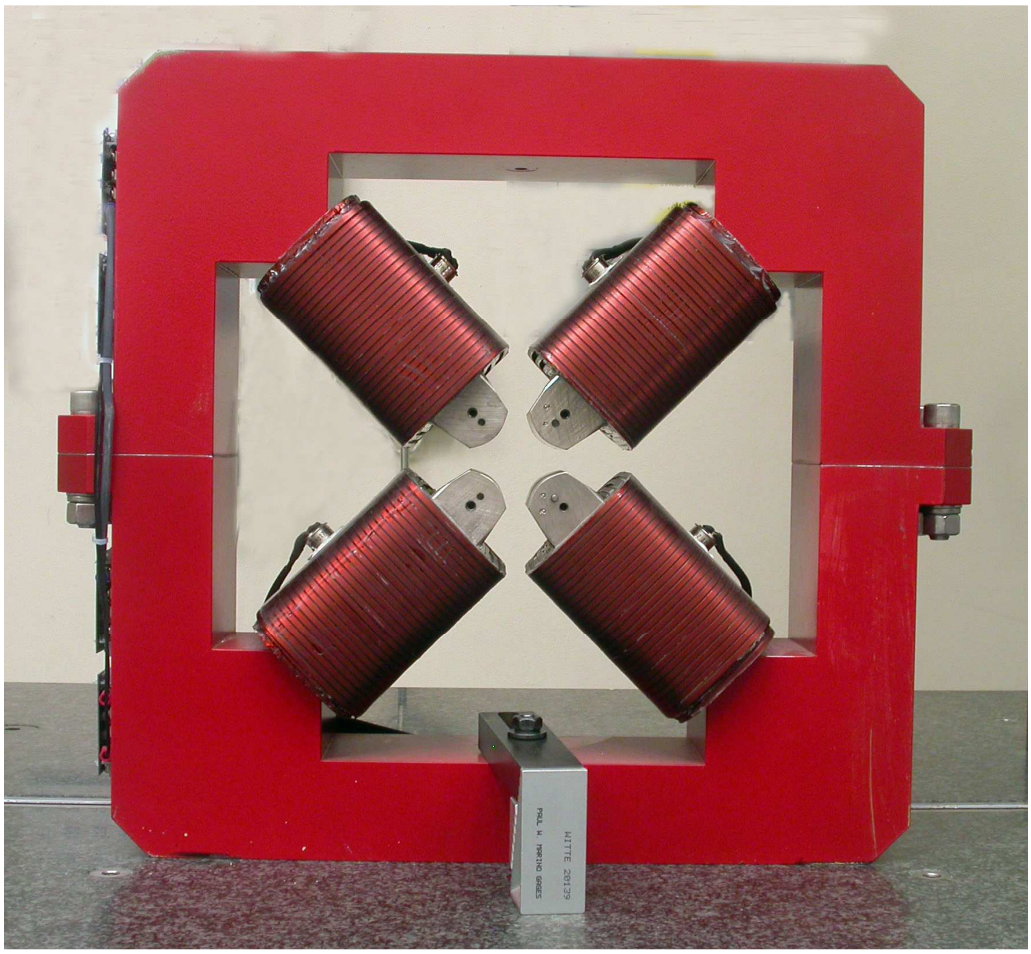
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = 0.07622

Angle in Milliradians = 1.33027

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