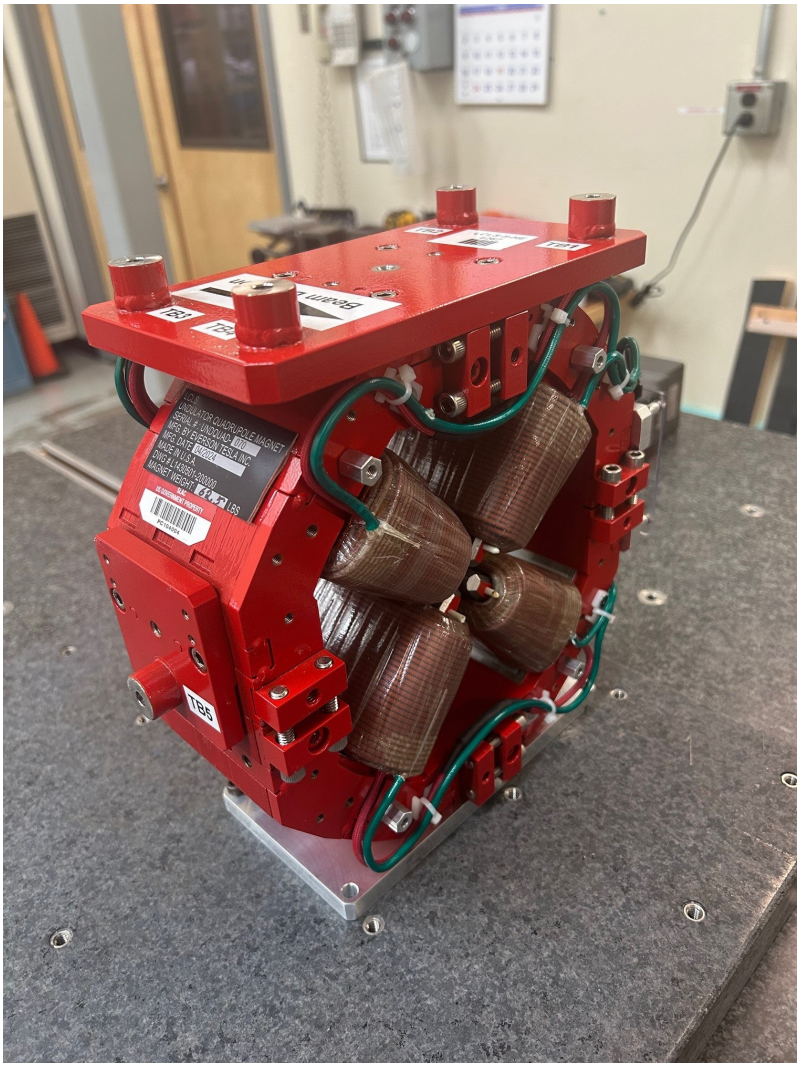
LCLS II Undulator Quadrupole Fiducialization Report



Inspector : K. Caban
Engineer : S. Anderson
Drawing No. : SA-381-012-00 R00
Barcode # : 4267
Mfg. S/N : 070
SLAC PC# : 104004

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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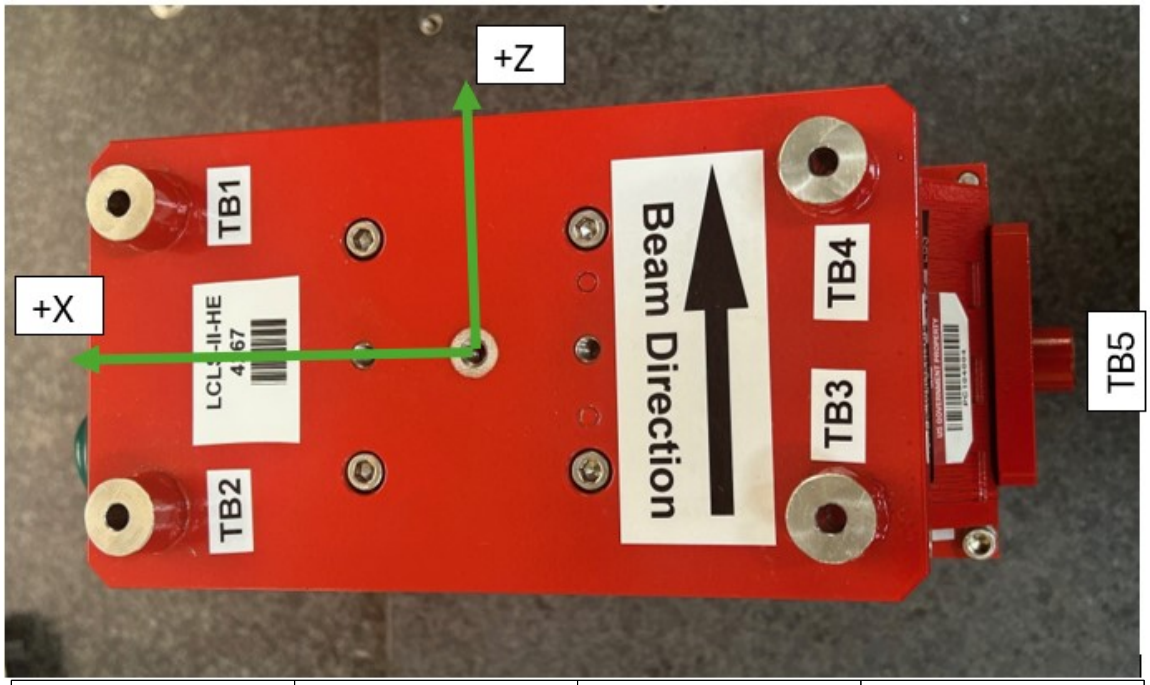
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	3.37660	6.81524	1.50648
TB 2	3.37878	6.81538	-1.49218
TB 3	-3.36858	6.81739	-1.49768
TB 4	-3.37150	6.81684	1.50157
TB 5	-6.58558	0.10789	-0.00755
TB A	3.37661	6.12774	1.50723
TB B	3.37907	6.12788	-1.49230
TB C	-3.36916	6.12989	-1.49763
TB D	-3.37175	6.12934	1.50197
TB E	-5.89808	0.10813	-0.00768

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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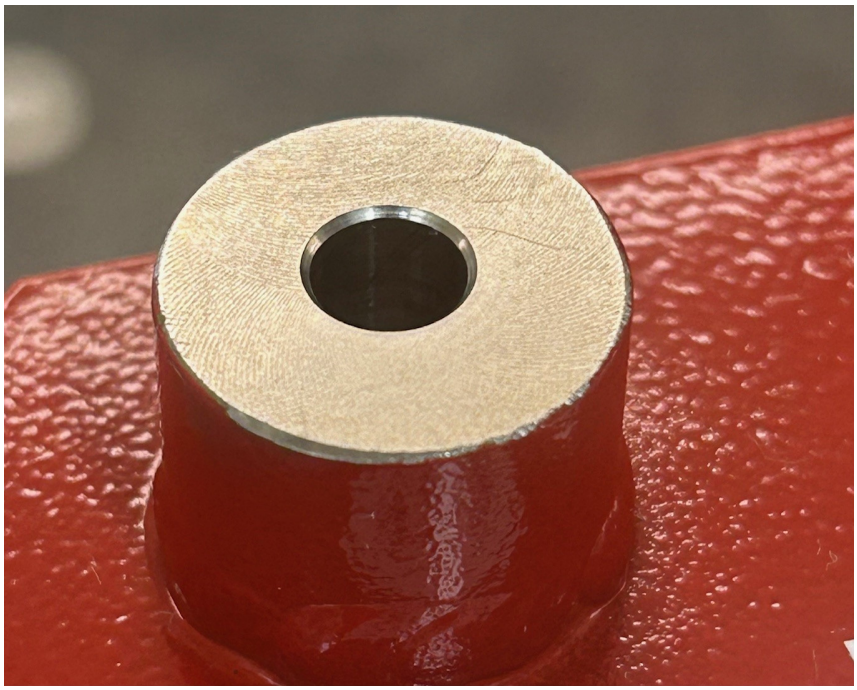
Tooling Ball Adapter Info



Tooling Ball	Form	Dia. 0.2501 - 0.2504	Perpendicularity
TB 1	0.00014	0.25037	0.00054
TB 2	0.0001	0.25036	0.00034
TB 3	0.00037	0.25015	0.00072
TB 4	0.00007	0.25041	0.00036
TB 5	0.00018	0.25032	0.00072

Dimensions in Inch

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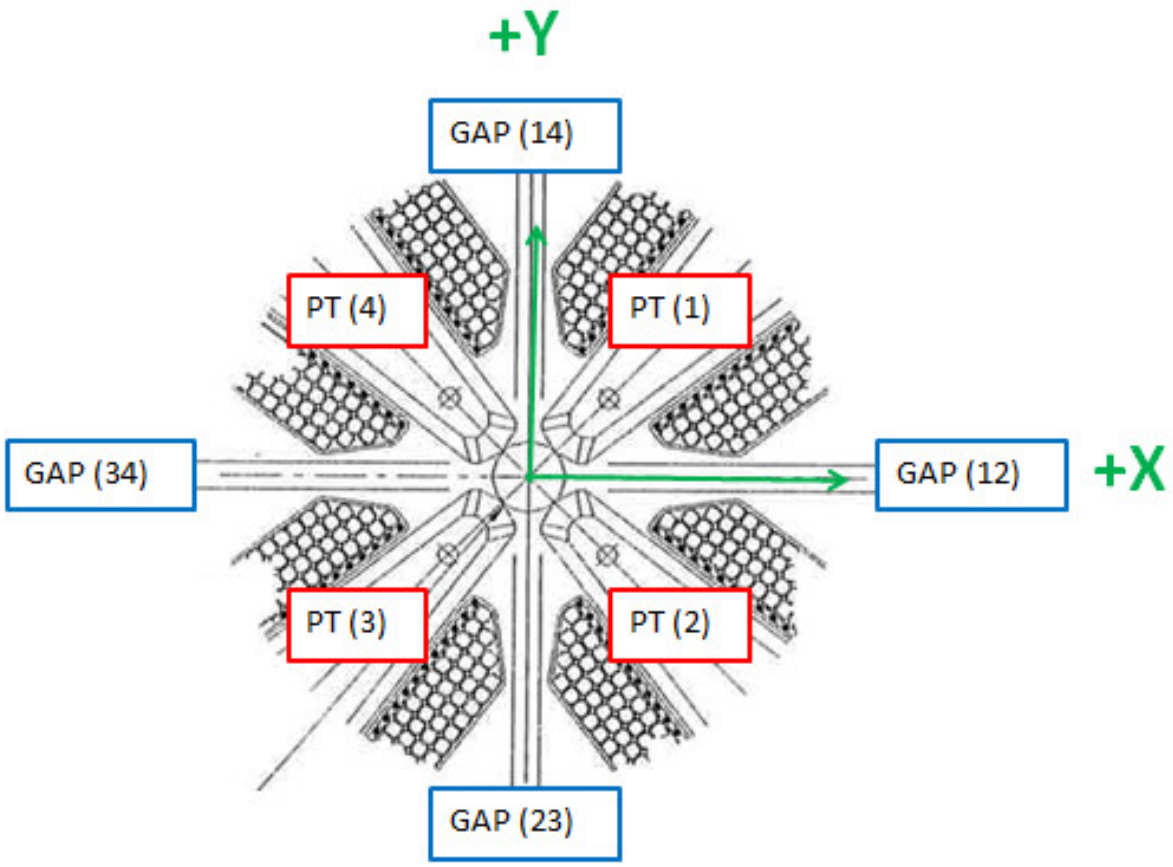
Pole Tip Gap Measurements



	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	0.433 ± .002	0.43191	0.43218
Pole Tip Distance 2-4	0.433 ± .002	0.43177	0.43355
Gap 1-2	0.159 ± .002	0.15988	0.16
Gap 2-3	0.159 ± .002	0.15838	0.15903
Gap 3-4	0.159 ± .002	0.16062	0.16155
Gap 4-1	0.159 ± .002	0.15718	0.15765

Dimensions in Inch

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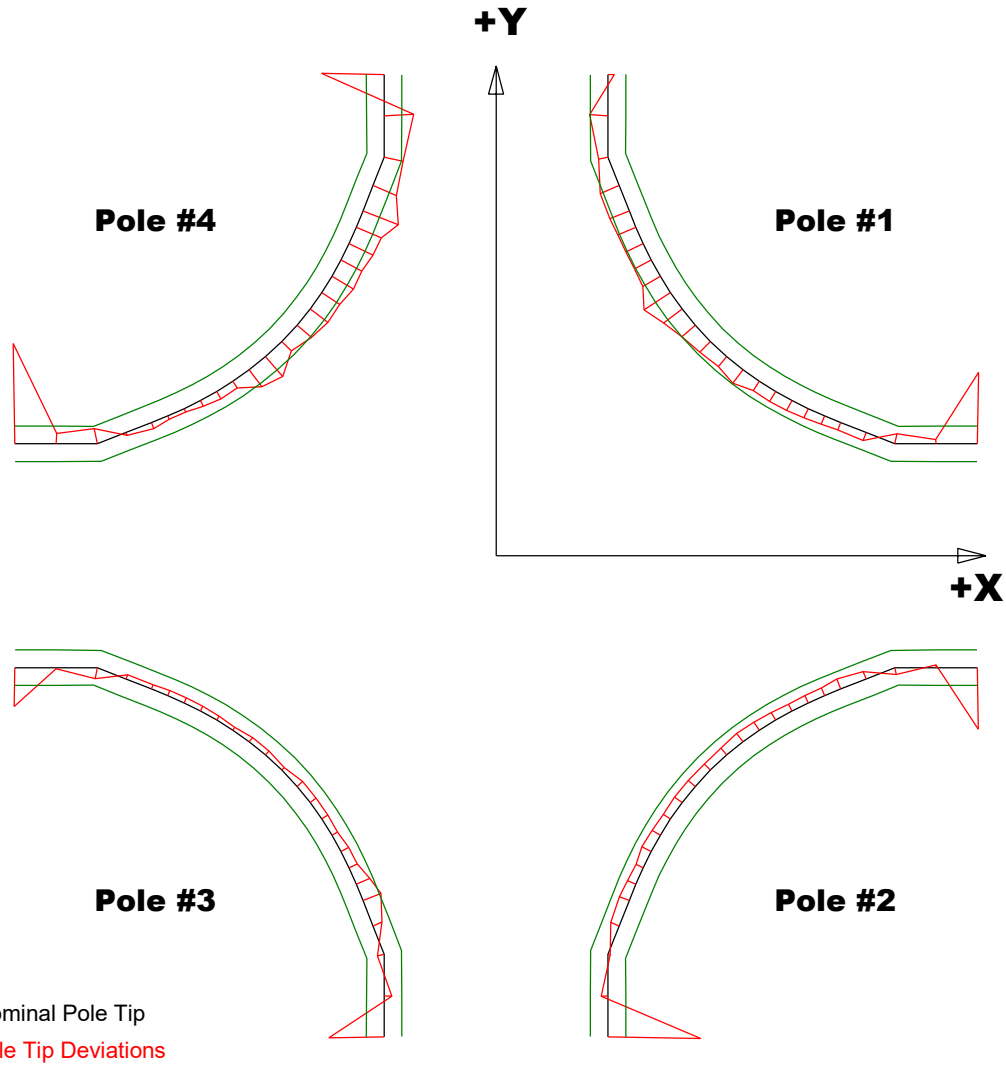
Composite Best-fit of Pole Tips, Downstream



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.	-0.00403	-0.00521	-0.00312	-0.00564
Max. Dev.	0.00177	0.0006	0.00108	0.00214

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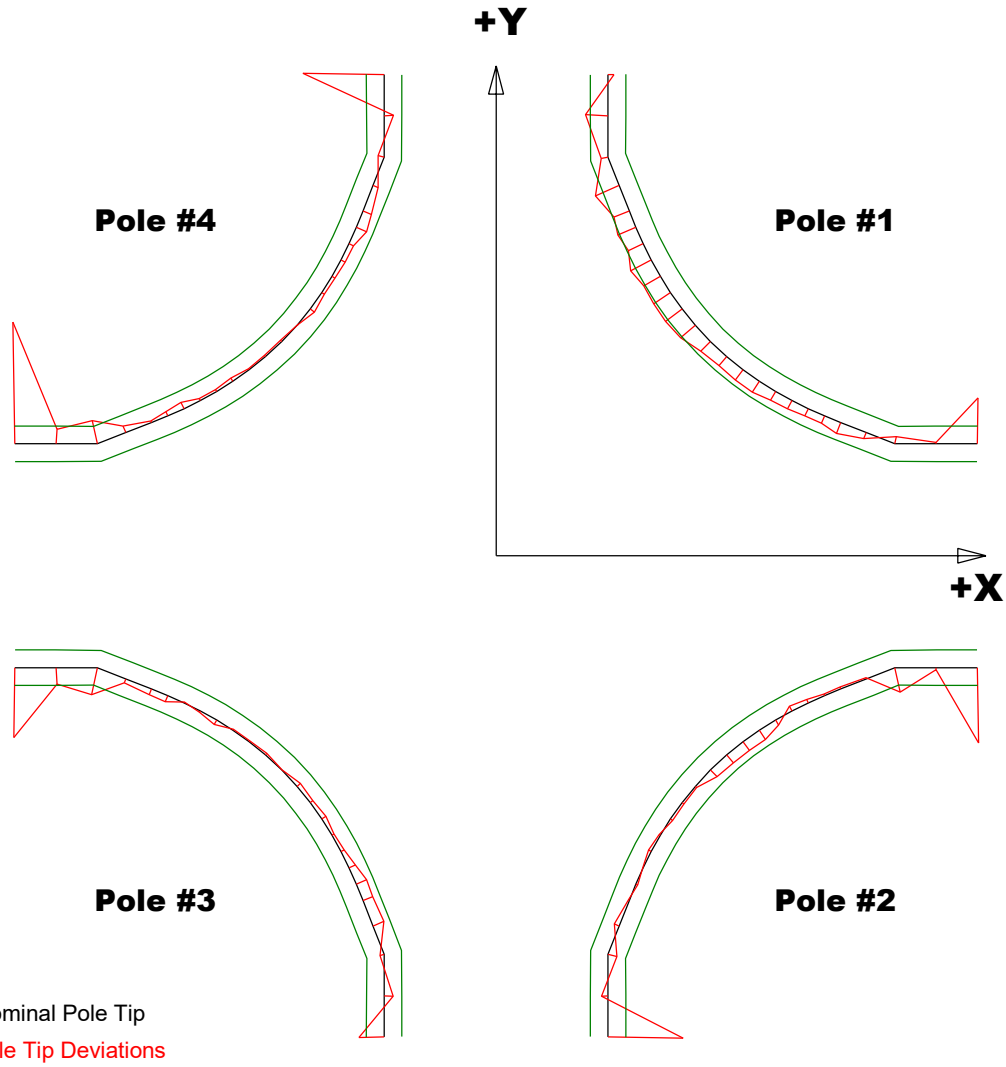
Composite Best-fit of Pole Tips, Upstream



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.	-0.00259	-0.00423	-0.00392	-0.00685
Max. Dev.	0.00145	0.00037	0.00066	0.00063

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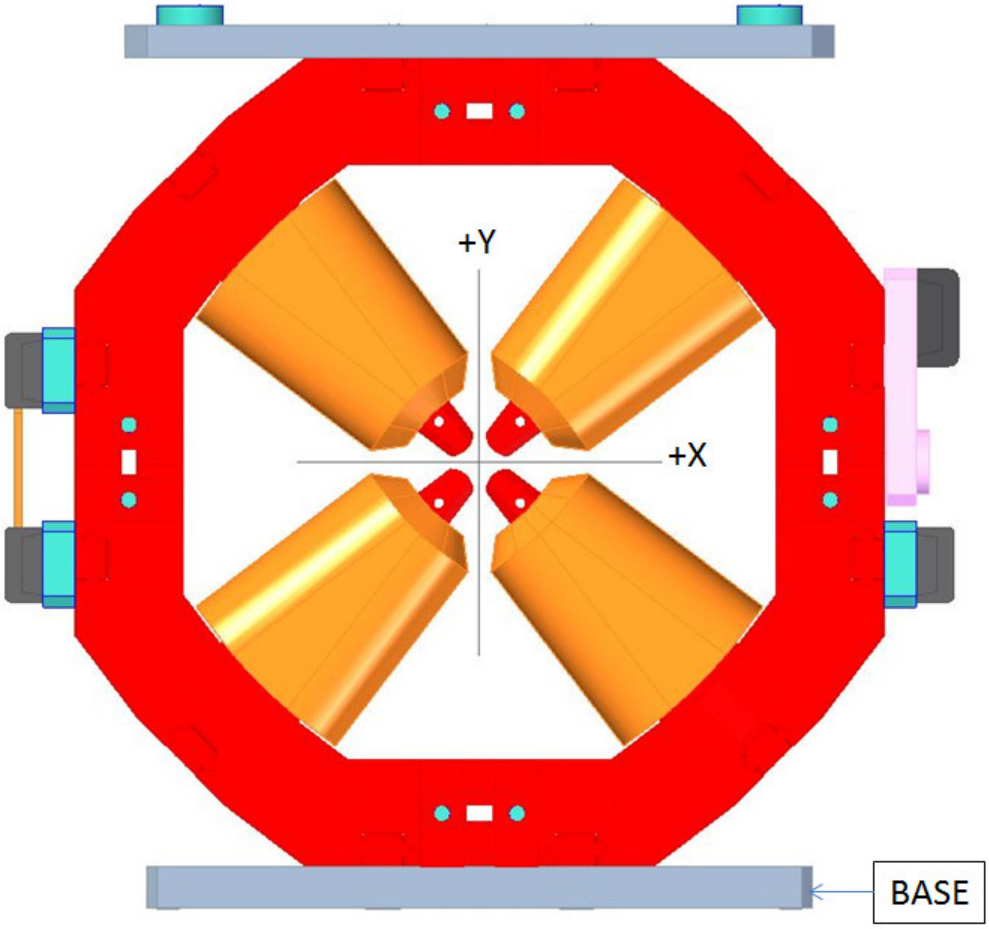
Angle of the Composite Pole Tip Best-Fit In Relation to Base



Angle in Decimal Degrees ° :-0.01680

Angle in Milliradians :-0.29321

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