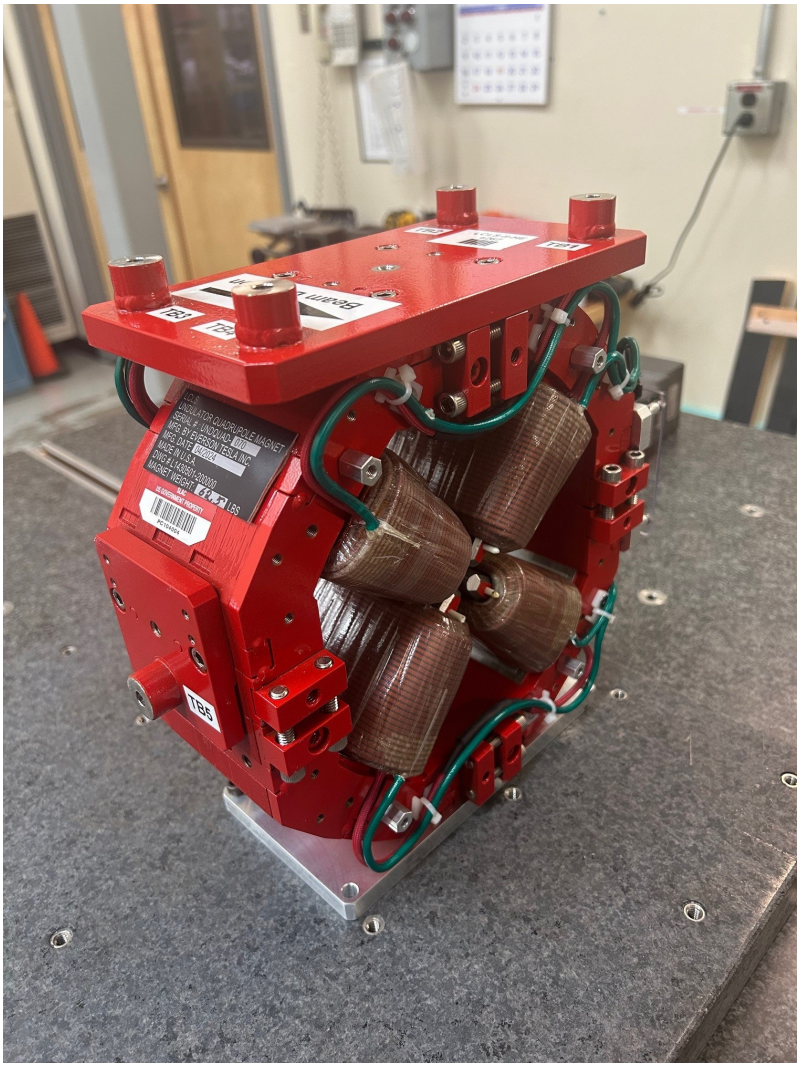
LCLS II Undulator Quadrupole Fiducialization Report



Inspector : K. Caban
Engineer : S. Anderson
Drawing No. : SA-381-012-00 R00
Barcode # : 4268
Mfg. S/N : 072
SLAC PC# : 104006

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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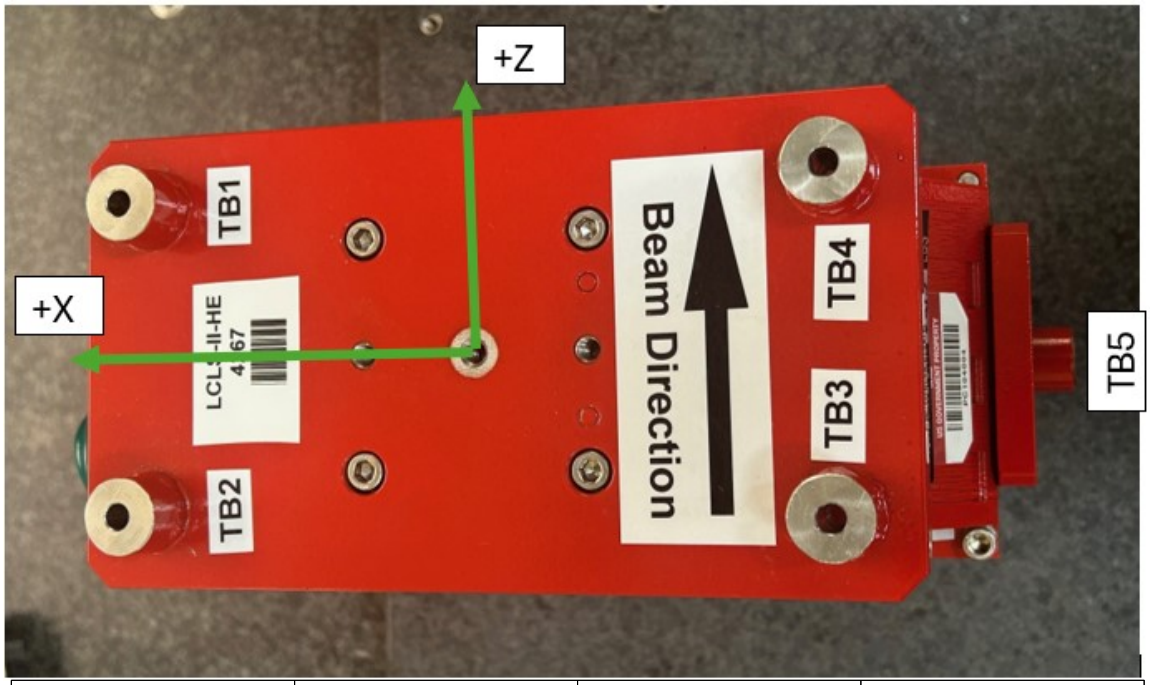
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	3.34971	6.81628	1.54308
TB 2	3.38777	6.81689	-1.45628
TB 3	-3.35846	6.81598	-1.54207
TB 4	-3.39681	6.81543	1.45768
TB 5	-6.58591	0.10903	0.01013
TB A	3.35034	6.12878	1.54356
TB B	3.38833	6.12939	-1.45618
TB C	-3.35884	6.12848	-1.54190
TB D	-3.39713	6.12793	1.45797
TB E	-5.89841	0.10949	0.01033

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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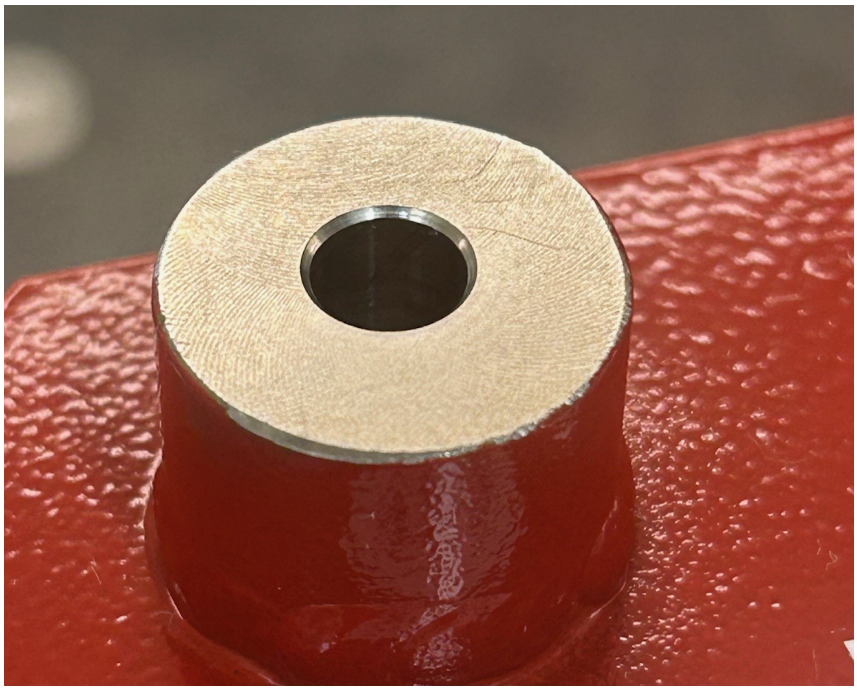
Tooling Ball Adapter Info



Tooling Ball	Form	Dia. 0.2501 - 0.2504	Perpendicularity
TB 1	0.00013	0.25031	0.00055
TB 2	0.00008	0.2503	0.00032
TB 3	0.00012	0.25032	0.00042
TB 4	0.00008	0.25035	0.00038
TB 5	0.00029	0.25026	0.00031

Dimensions in Inch

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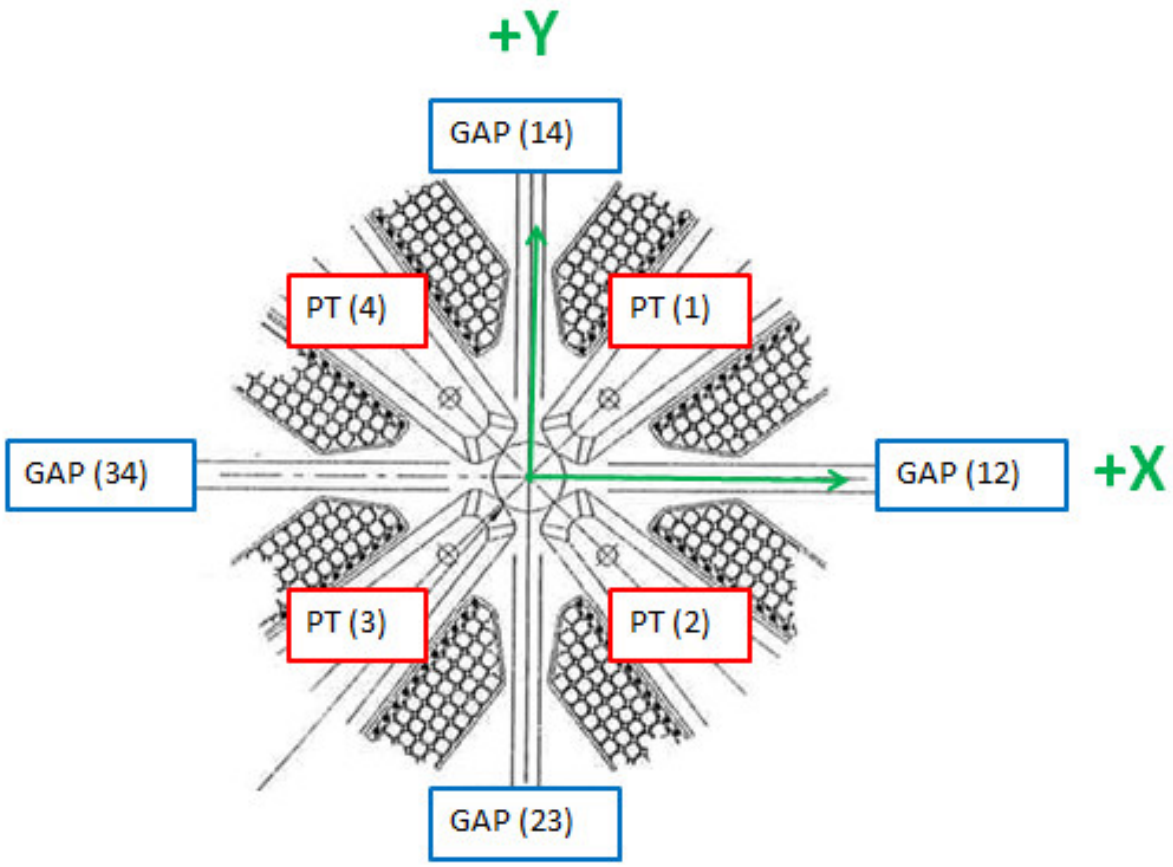
Pole Tip Gap Measurements



	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	0.433 ± .002	0.43188	0.43198
Pole Tip Distance 2-4	0.433 ± .002	0.43166	0.43128
Gap 1-2	0.159 ± .002	0.15635	0.16024
Gap 2-3	0.159 ± .002	0.16093	0.15857
Gap 3-4	0.159 ± .002	0.1579	0.15732
Gap 4-1	0.159 ± .002	0.1602	0.154

Dimensions in Inch

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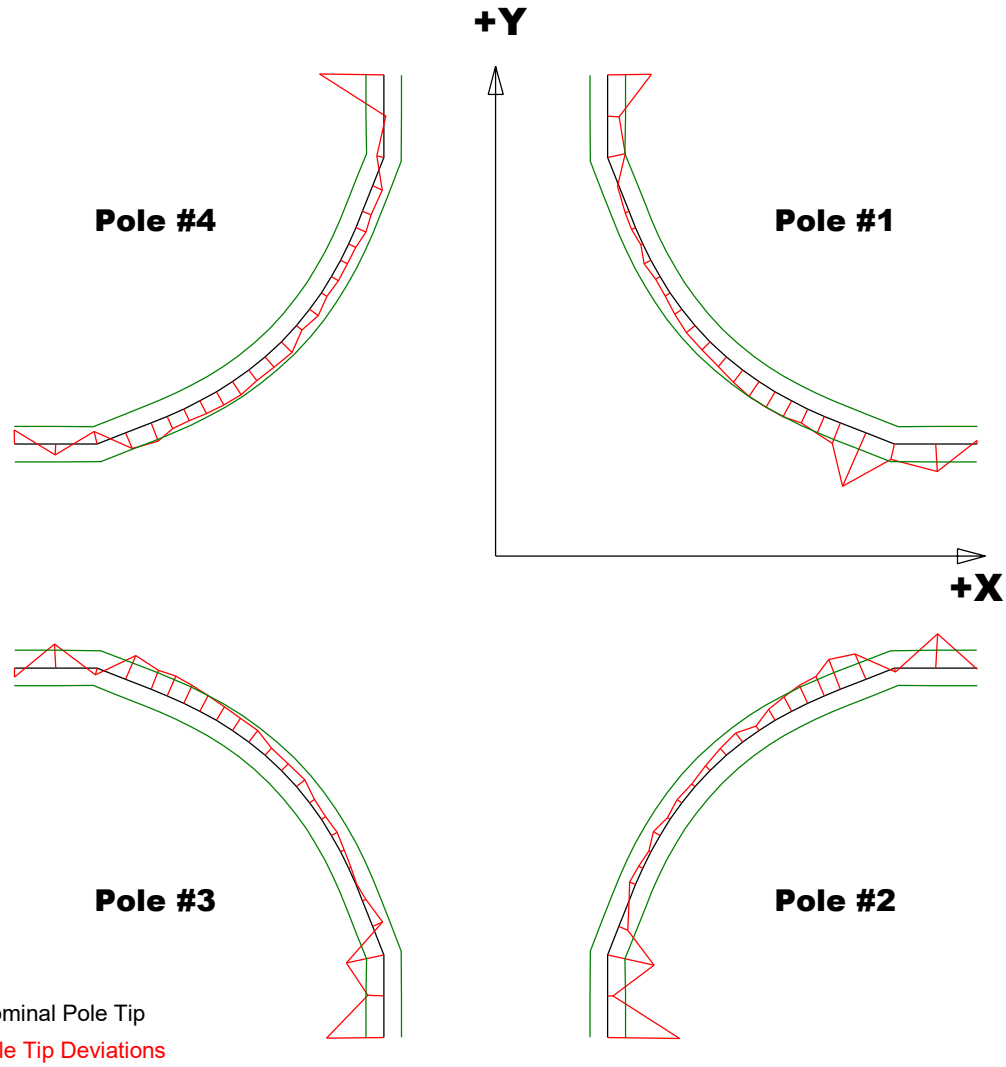
Composite Best-fit of Pole Tips, Downstream



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.	-0.00247	-0.00405	-0.00322	-0.00362
Max. Dev.	0.00327	0.00193	0.00145	0.0011

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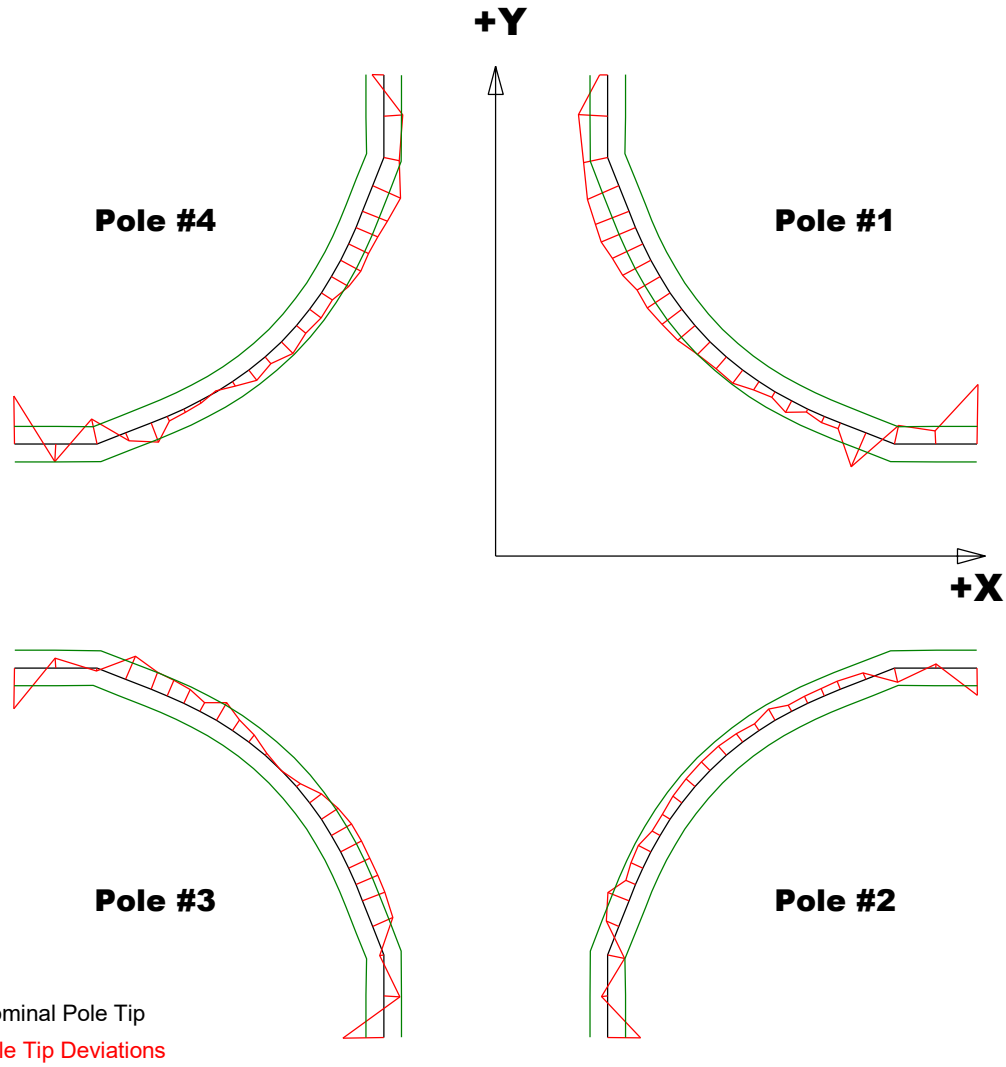
Composite Best-fit of Pole Tips, Upstream



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.	-0.00335	-0.00184	-0.0023	-0.00271
Max. Dev.	0.0021	0.00128	0.00141	0.00171

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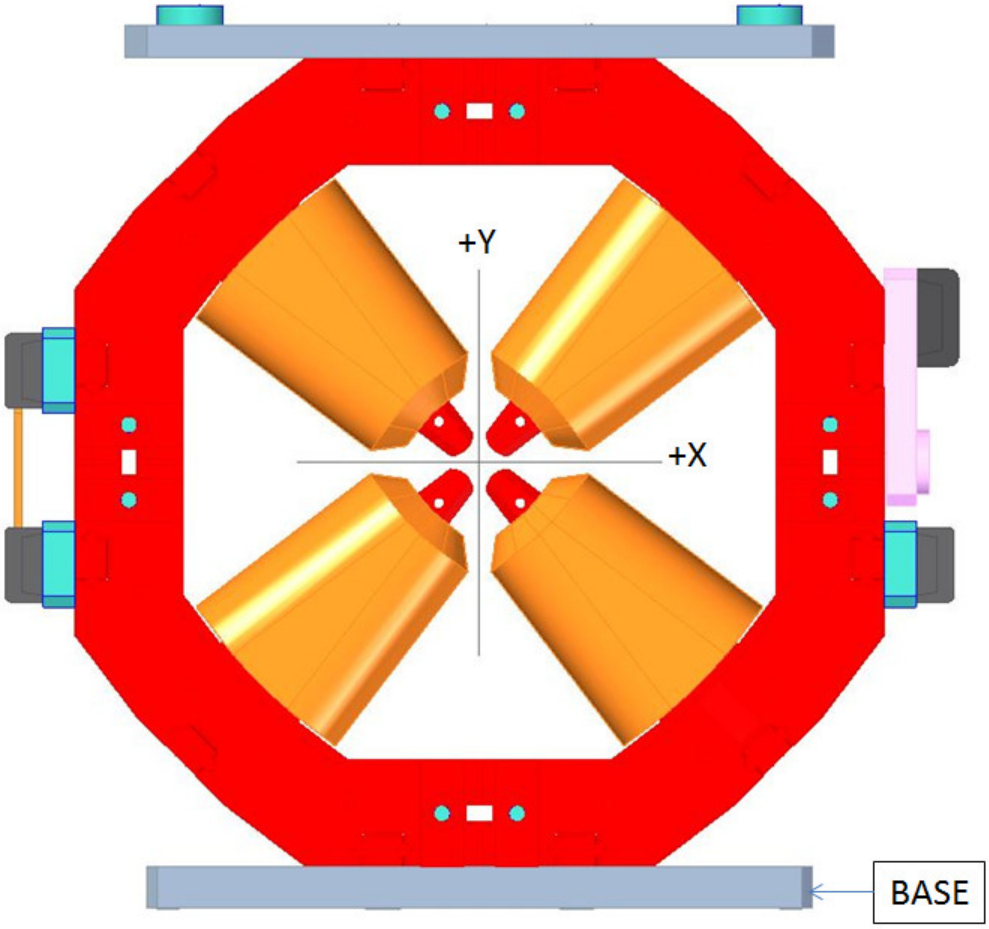
Angle of the Composite Pole Tip Best-Fit In Relation to Base



Angle in Decimal Degrees ° :-0.01292

Angle in Milliradians :-0.22545

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