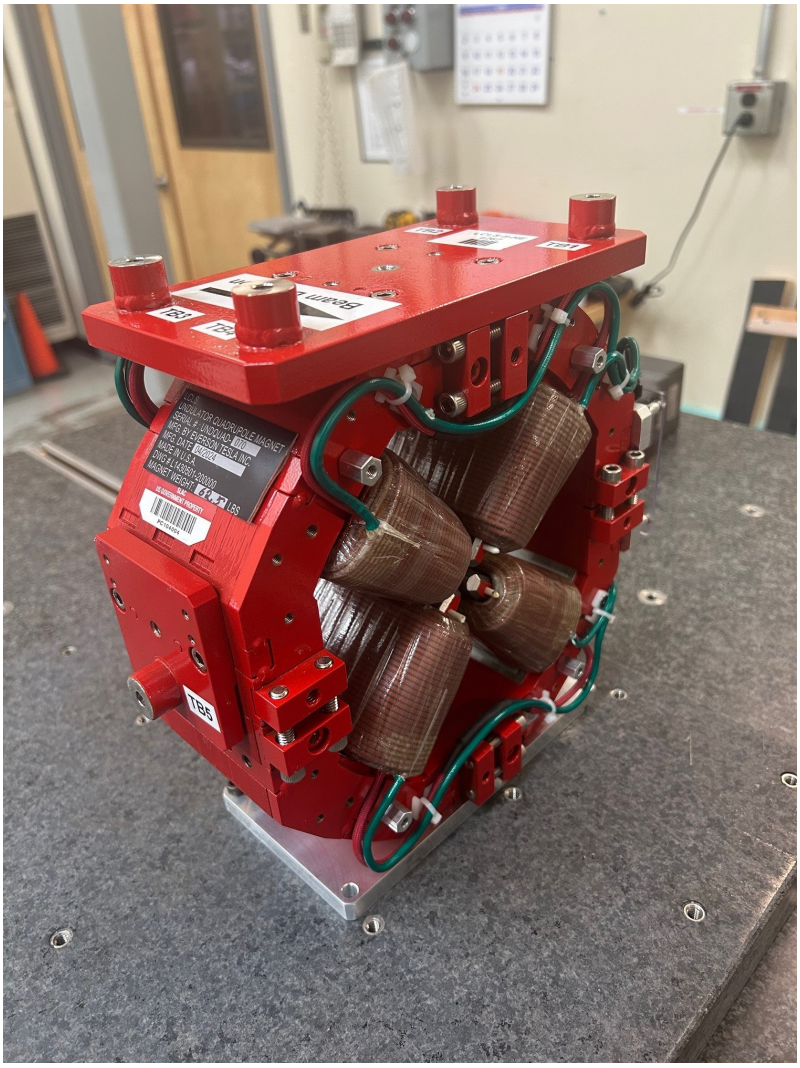
LCLS II Undulator Quadrupole Fiducialization Report



Inspector : K. Caban
Engineer : S. Anderson
Drawing No. : SA-381-012-00 R00
Barcode # : 4269
Mfg. S/N : 071
SLAC PC# : 104005

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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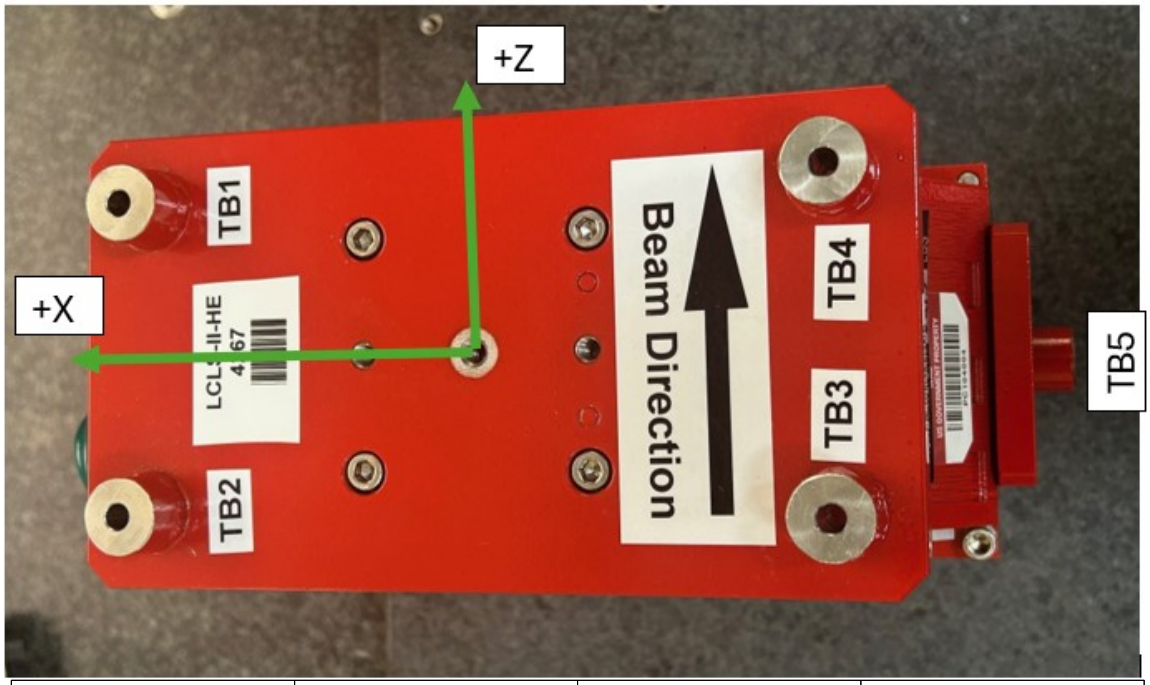
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	3.36838	6.81826	1.47908
TB 2	3.36495	6.81792	-1.52025
TB 3	-3.38367	6.81298	-1.51242
TB 4	-3.38019	6.81315	1.48736
TB 5	-6.58685	0.11722	-0.00399
TB A	3.36901	6.13076	1.47977
TB B	3.36542	6.13042	-1.51999
TB C	-3.38336	6.12548	-1.51225
TB D	-3.37984	6.12565	1.48786
TB E	-5.89935	0.11842	-0.00459

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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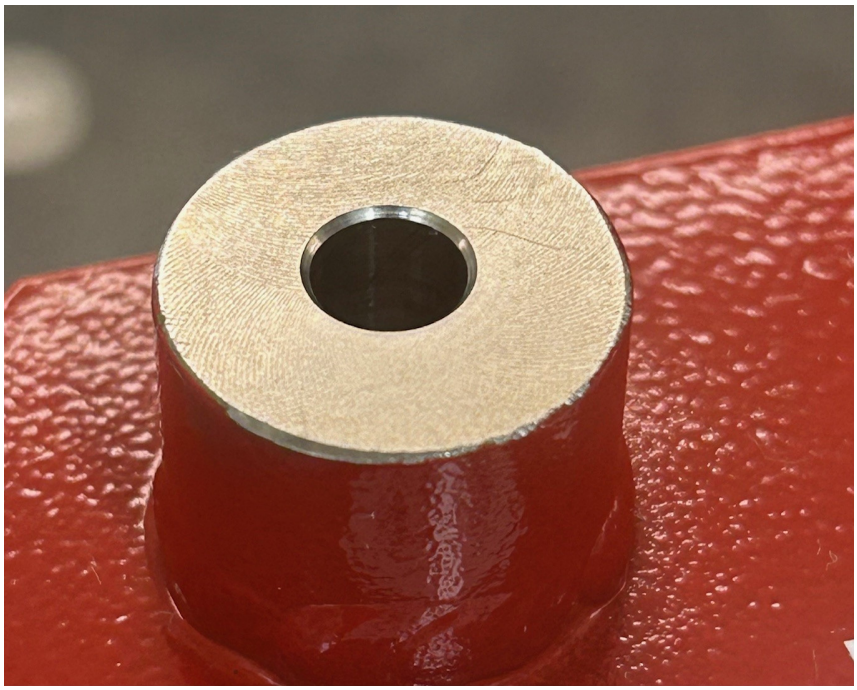
Tooling Ball Adapter Info



Tooling Ball	Form	Dia. 0.2501 - 0.2504	Perpendicularity
TB 1	0.00011	0.25037	0.0004
TB 2	0.00008	0.25042	0.0003
TB 3	0.00016	0.25009	0.00029
TB 4	0.00024	0.25015	0.0004
TB 5	0.00069	0.25018	0.00062

Dimensions in Inch

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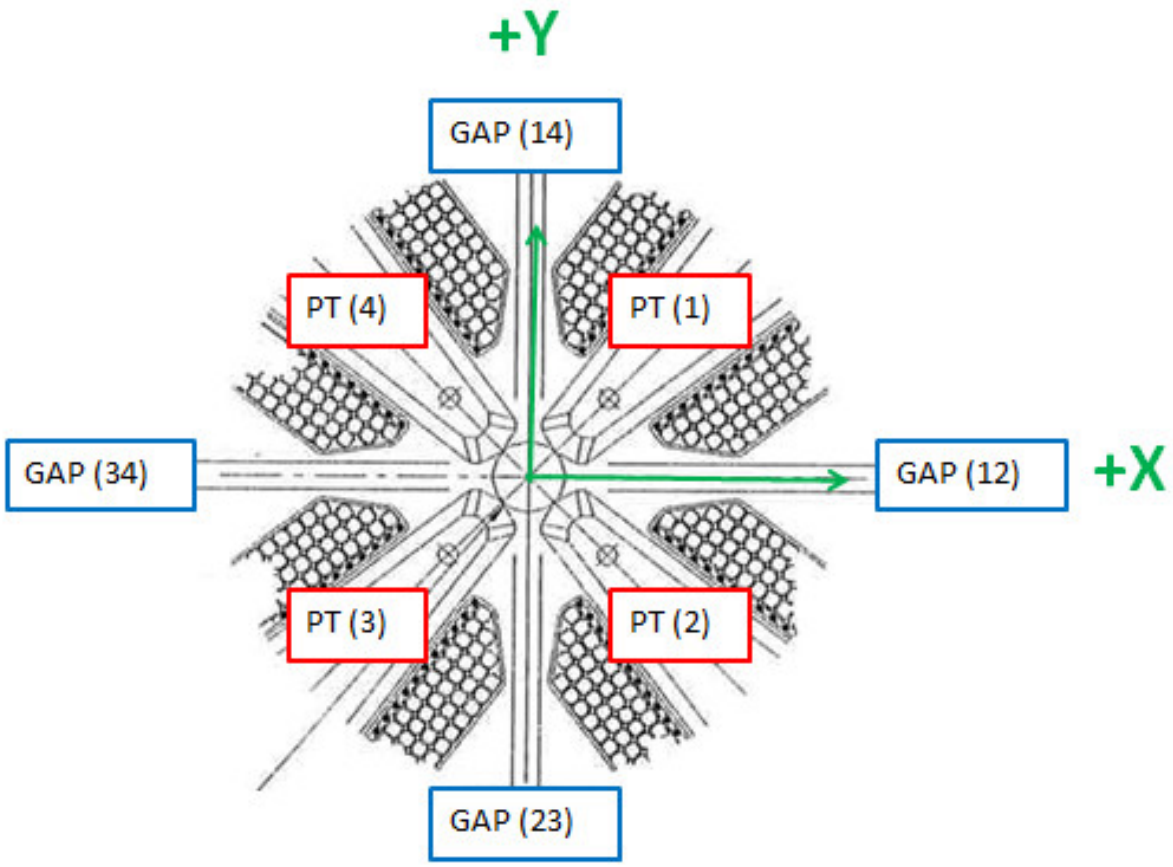
Pole Tip Gap Measurements



	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	0.433 ± .002	0.43229	0.43151
Pole Tip Distance 2-4	0.433 ± .002	0.4315	0.43256
Gap 1-2	0.159 ± .002	0.15546	0.15828
Gap 2-3	0.159 ± .002	0.15838	0.15866
Gap 3-4	0.159 ± .002	0.15819	0.15789
Gap 4-1	0.159 ± .002	0.15991	0.16092

Dimensions in Inch

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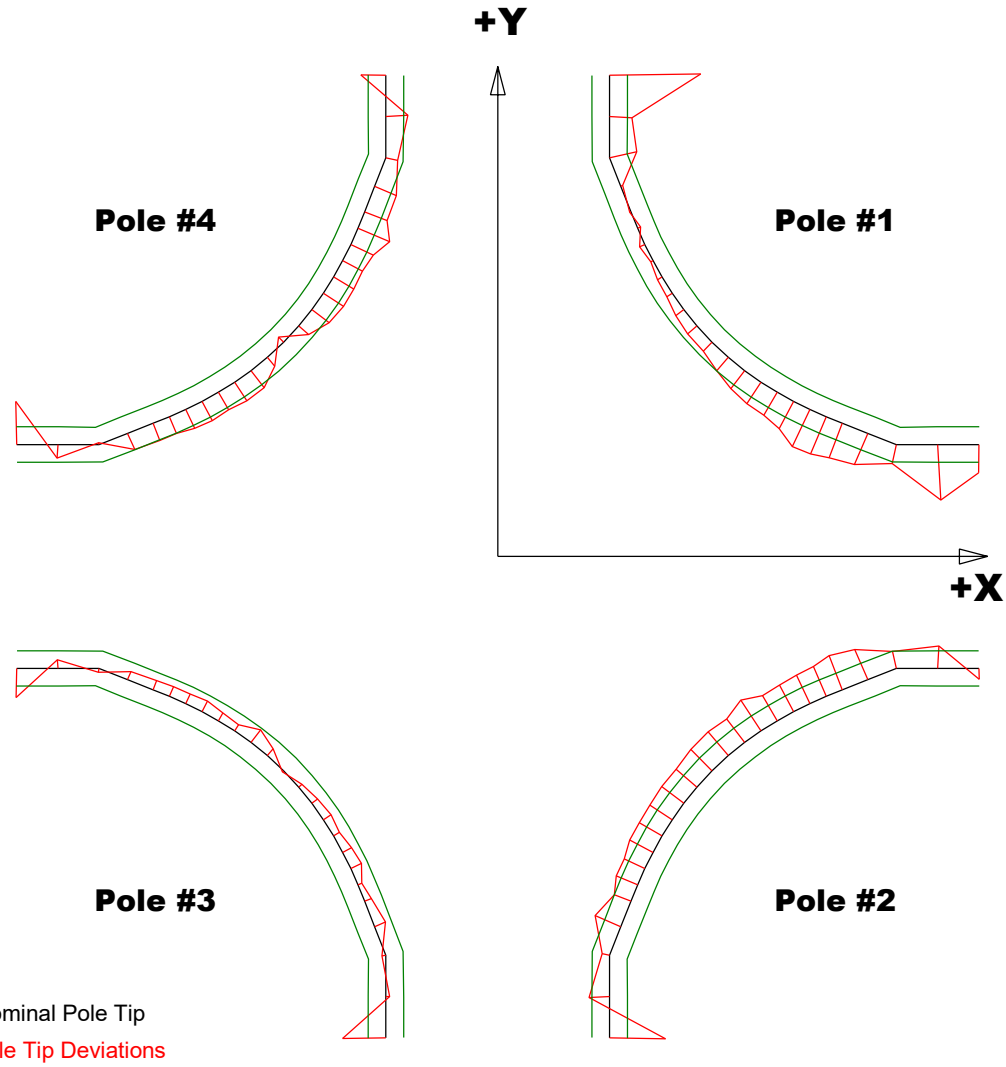
Composite Best-fit of Pole Tips, Downstream



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.	-0.00512	-0.00315	-0.00243	-0.00242
Max. Dev.	0.00312	0.00207	0.00089	0.00194

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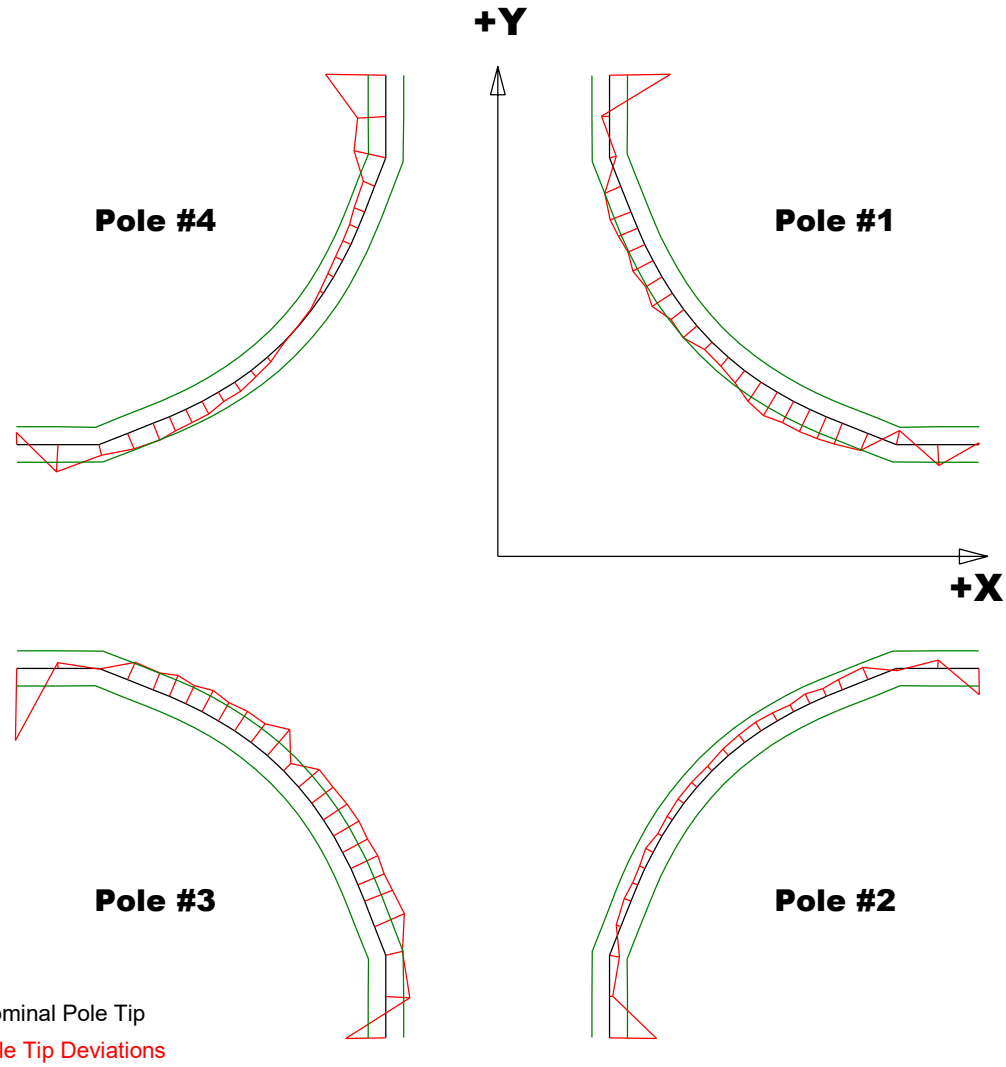
Composite Best-fit of Pole Tips, Upstream



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.	-0.00341	-0.00265	-0.00405	-0.00339
Max. Dev.	0.00151	0.00075	0.00193	0.00153

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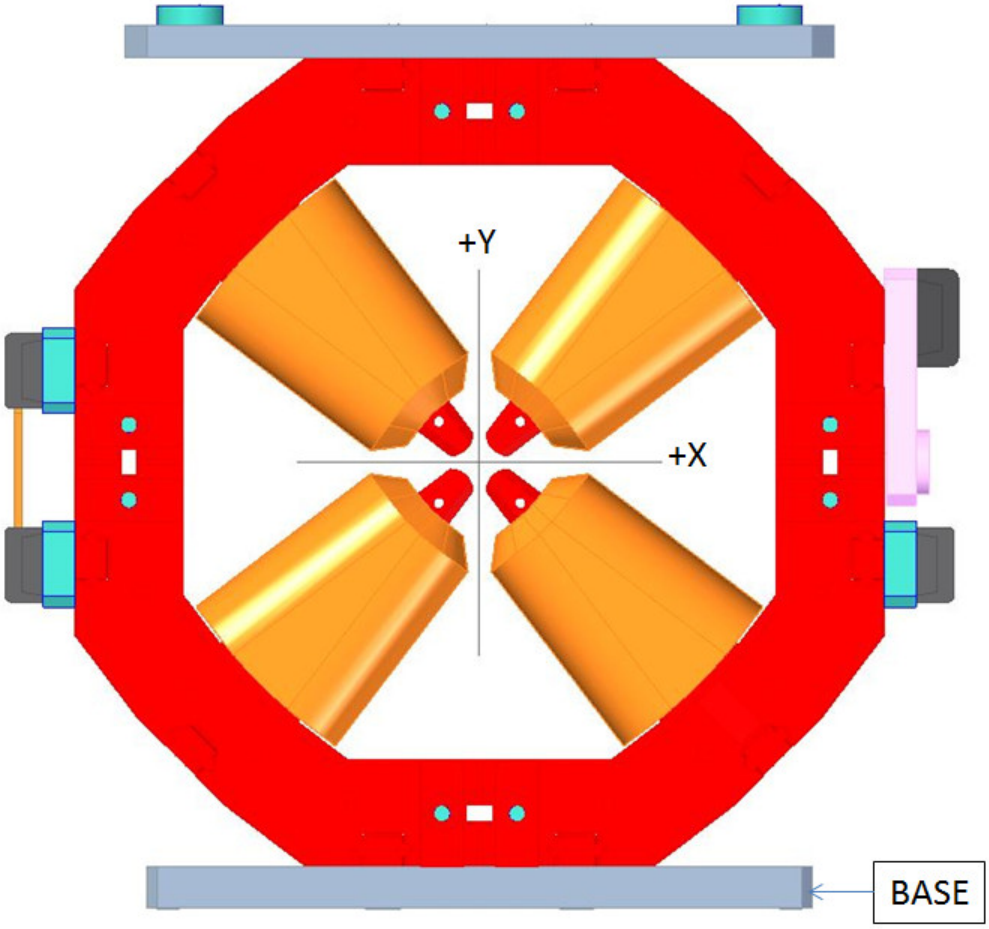
Angle of the Composite Pole Tip Best-Fit In Relation to Base



Angle in Decimal Degrees ° :-0.03264

Angle in Milliradians :-0.56963

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