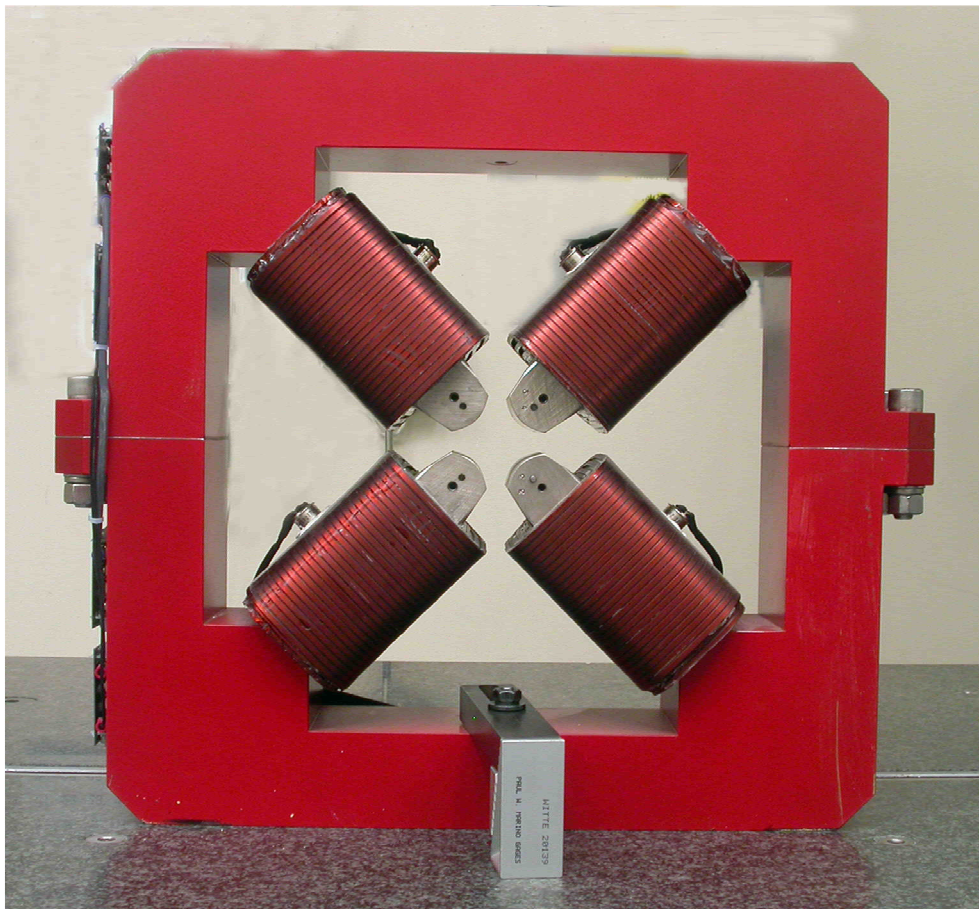


## **LCLS II Injector Quadrupole Fiducialization Report**



**Barcode # : 002740**  
**Beamline Name: QE04B**

## 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 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.

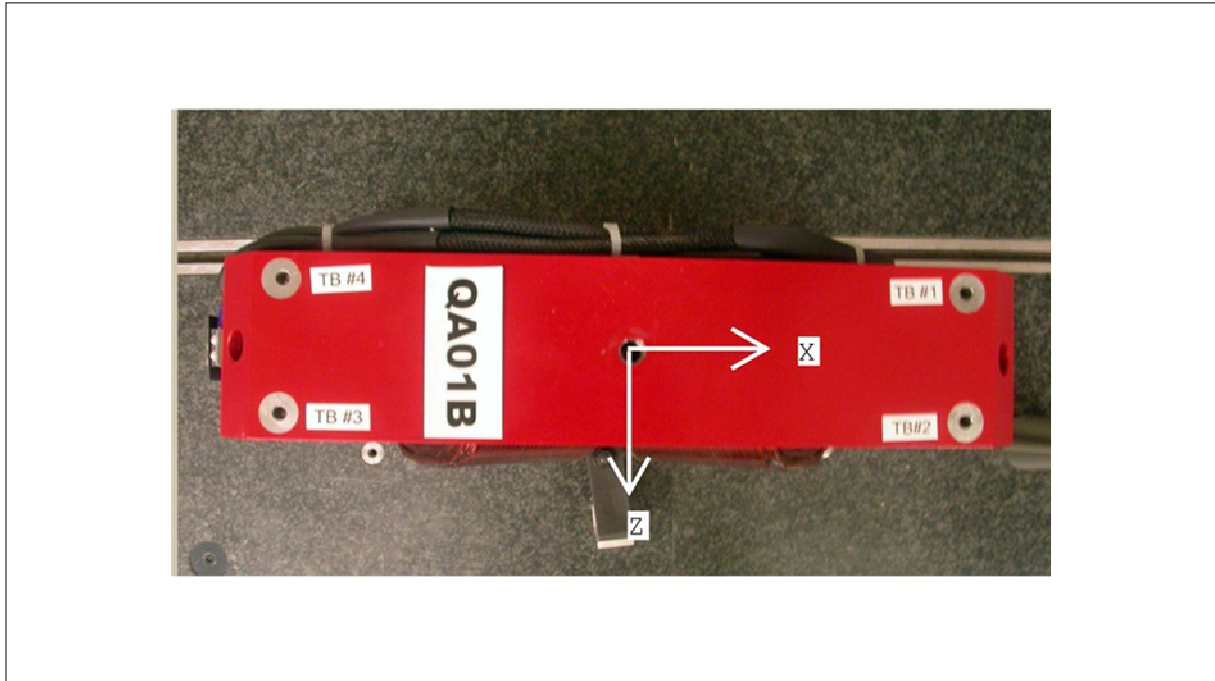
### Coordinate Origins

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.

**Barcode # : 002740**

**Beamline Name: QE04B**

## Tooling Ball Locations



## Tooling Ball Locations

Tooling Ball	X Coord.	Y Coord.	Z Coord.
Ball #1	6.49331	8.88409	-1.25161
Ball #2	6.49419	8.88632	1.24845
Ball #3	-6.50555	8.87672	1.24846
Ball #4	-6.50589	8.87577	-1.25122

Tooling Ball Locations are 1 inch above unpainted surface pads

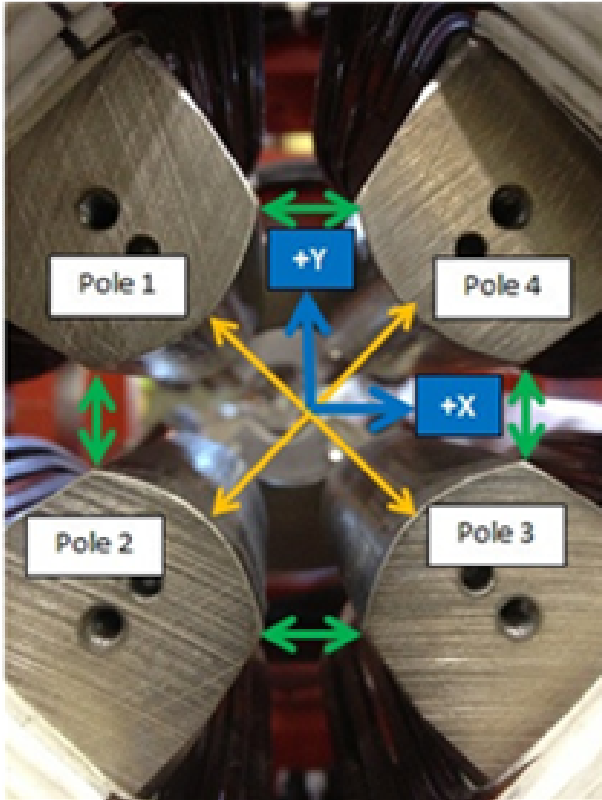
Dimensions in Inch

**Barcode # : 002740**

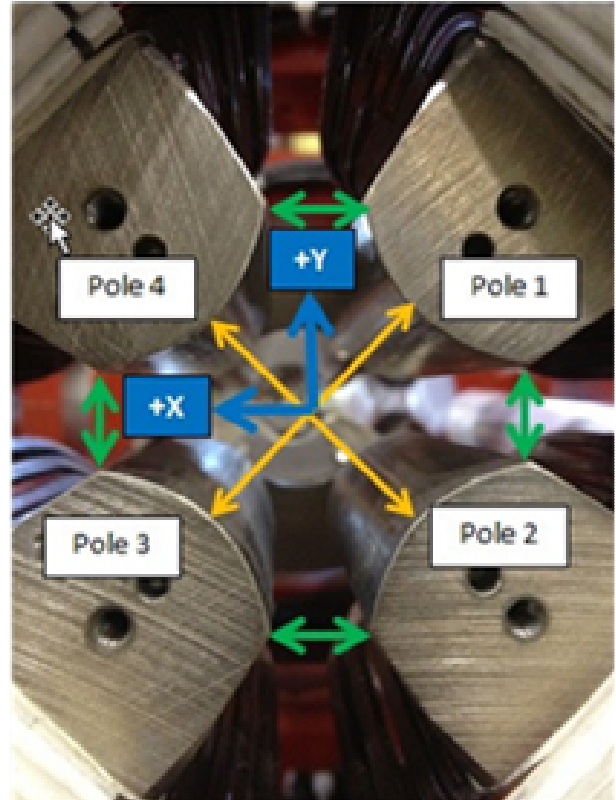
**Beamline Name: QE04B**

# Pole Tip Gap Measurements

**Pole Tips looking Downstream**



**Pole Tips looking Upstream**

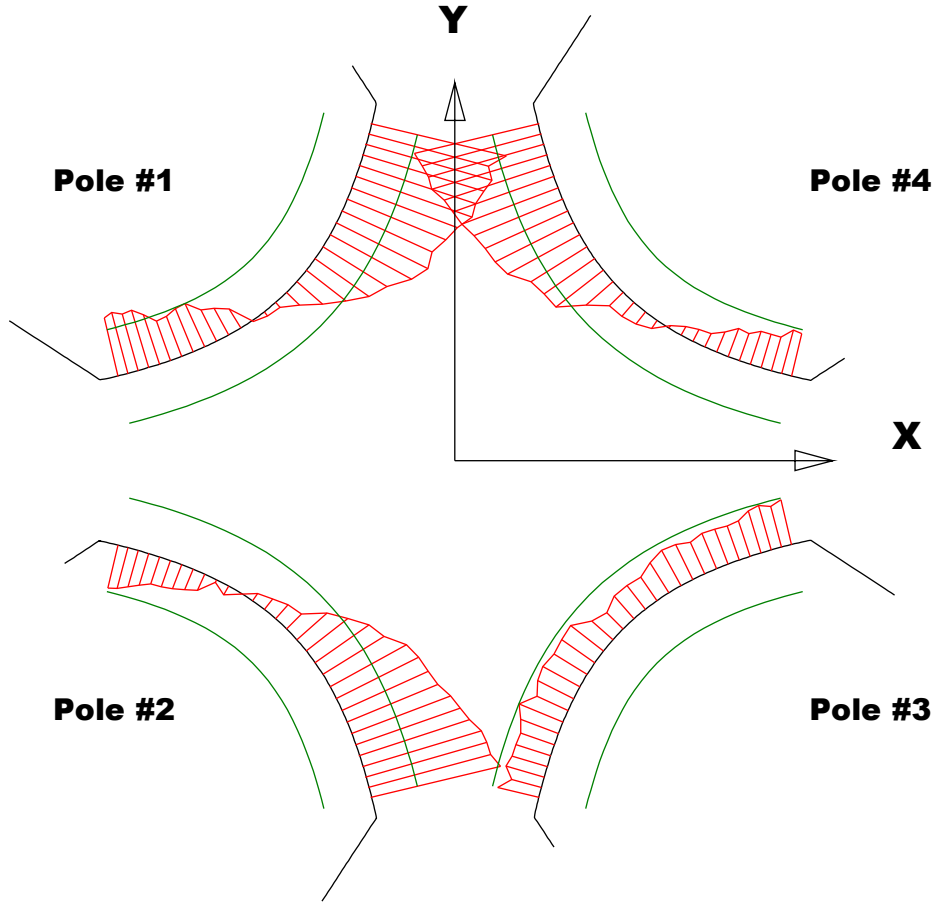


	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.2591	1.25891
Pole Tip Distance 2-4	1.260	1.25913	1.25895
Gap 1-2	.422	0.42739	0.4267
Gap 2-3	.422	0.41771	0.41627
Gap 3-4	.422	0.42316	0.42285
Gap 4-1	.422	0.41648	0.41704

Dimensions in Inch

**Barcode # : 002740**  
**Beamline Name: QE04B**

## Composite Best-fit of Pole Tips, Downstream



Black = Nominal Pole Tip  
 Red = Pole Tip Deviations  
 Green = +/- .001 Tolerance

Dimensions in Inch

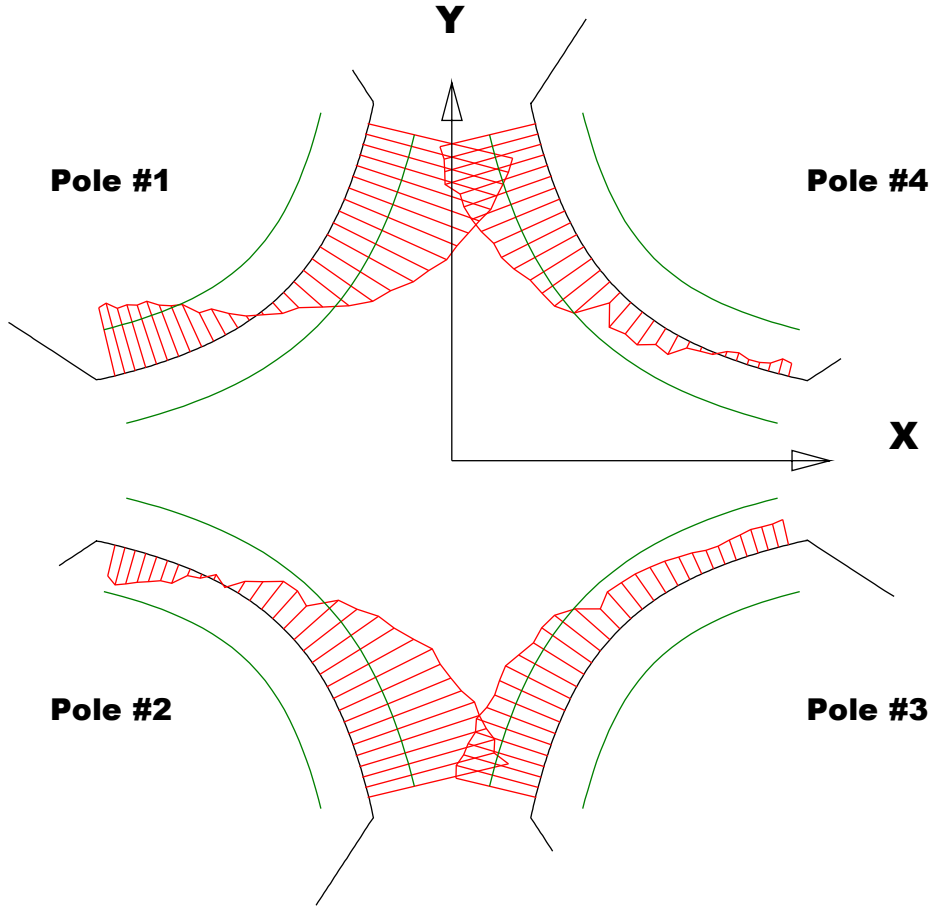
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00132	-0.00093	0.00048	-0.00094
Max. Dev.	0.00291	0.00278	0.001	0.00267

**Barcode # : 002740**

**Beamline Name: QE04B**

# 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.	-0.00152	-0.00081	0.00041	-0.00032
Max. Dev.	0.0031	0.00301	0.00177	0.00217

**Barcode # : 002740**

**Beamline Name: QE04B**