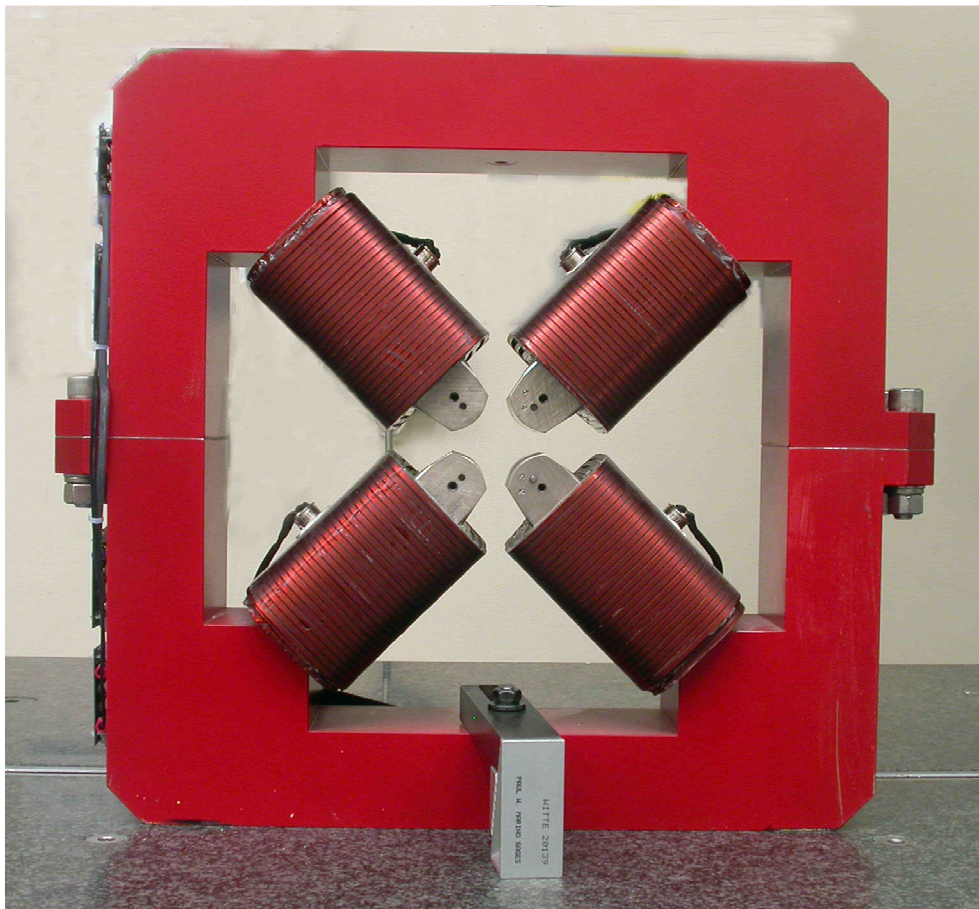


## LCLS II Injector Quadrupole Fiducialization Report



**Barcode # : 002744**  
**Beamline Name: QM04B**

## 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

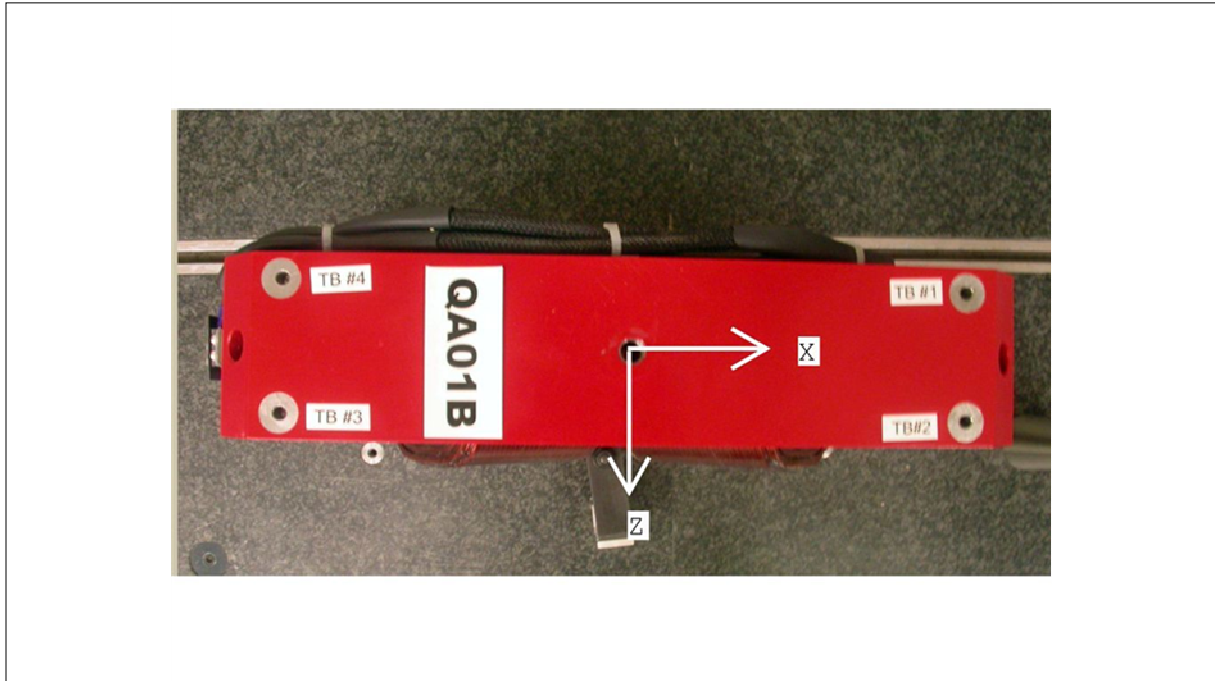
The Planar Alignment of the magnet is created by averaging the rotations of the composite best-fits of the upstream pole tips and downstream pole tips. This direction defines the Y and X directions of the magnet.

### 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 # : 002744**  
**Beamline Name: QM04B**

## Tooling Ball Locations



## Tooling Ball Locations

Tooling Ball	X Coord.	Y Coord.	Z Coord.
Ball #1	6.50657	8.87478	-1.25453
Ball #2	6.50672	8.87664	1.24559
Ball #3	-6.49307	8.88811	1.25002
Ball #4	-6.49251	8.88717	-1.25043

Tooling Ball Locations are 1 inch above unpainted surface pads

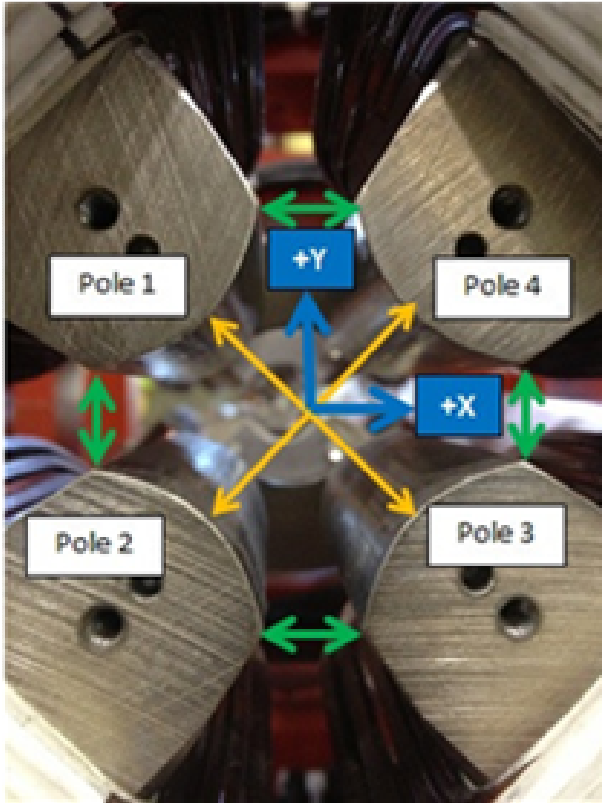
Dimensions in Inch

**Barcode # : 002744**

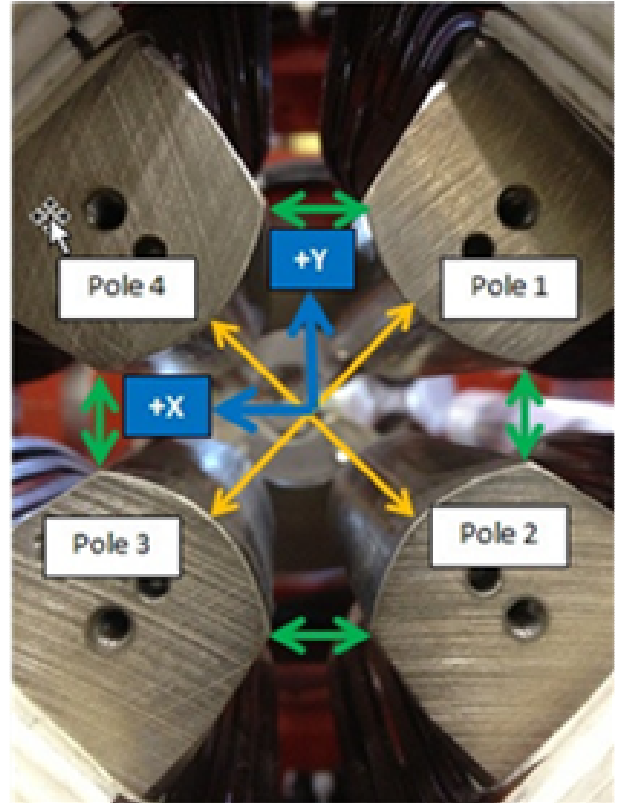
**Beamline Name: QM04B**

# Pole Tip Gap Measurements

**Pole Tips looking Downstream**



**Pole Tips looking Upstream**

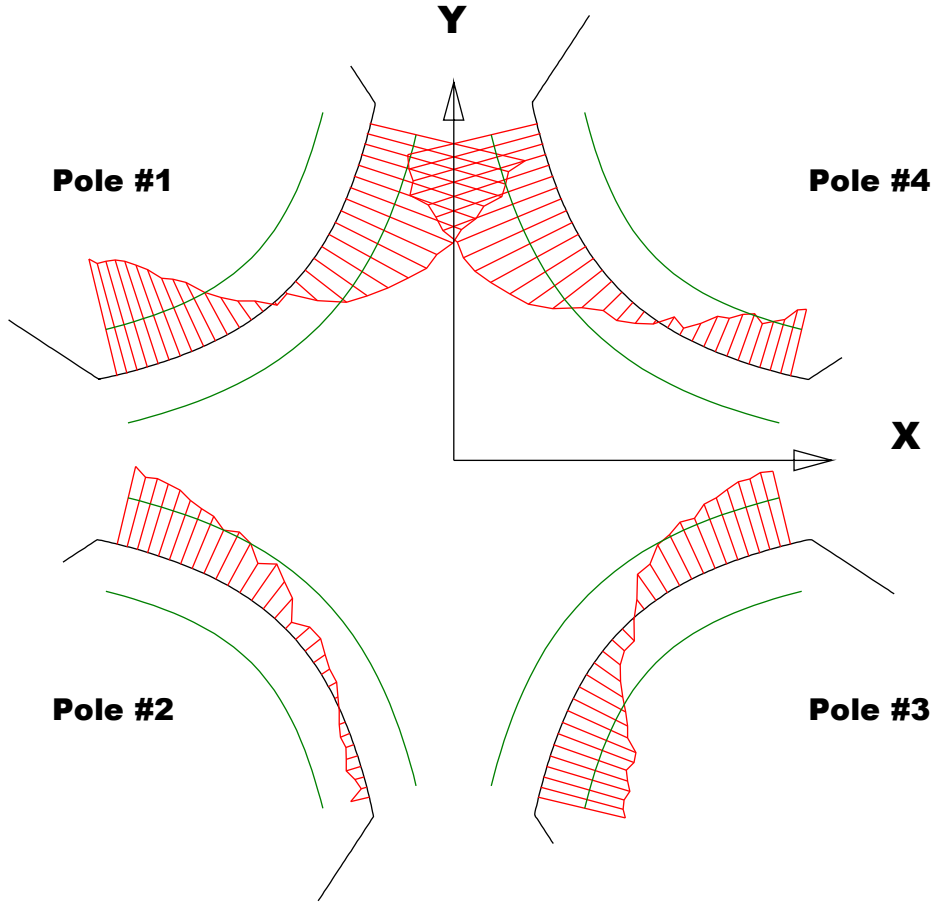


	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26028	1.26094
Pole Tip Distance 2-4	1.260	1.25926	1.25959
Gap 1-2	.422	0.42494	0.42501
Gap 2-3	.422	0.42668	0.4273
Gap 3-4	.422	0.42375	0.42322
Gap 4-1	.422	0.41593	0.41655

Dimensions in Inch

**Barcode # : 002744**  
**Beamline Name: QM04B**

## Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

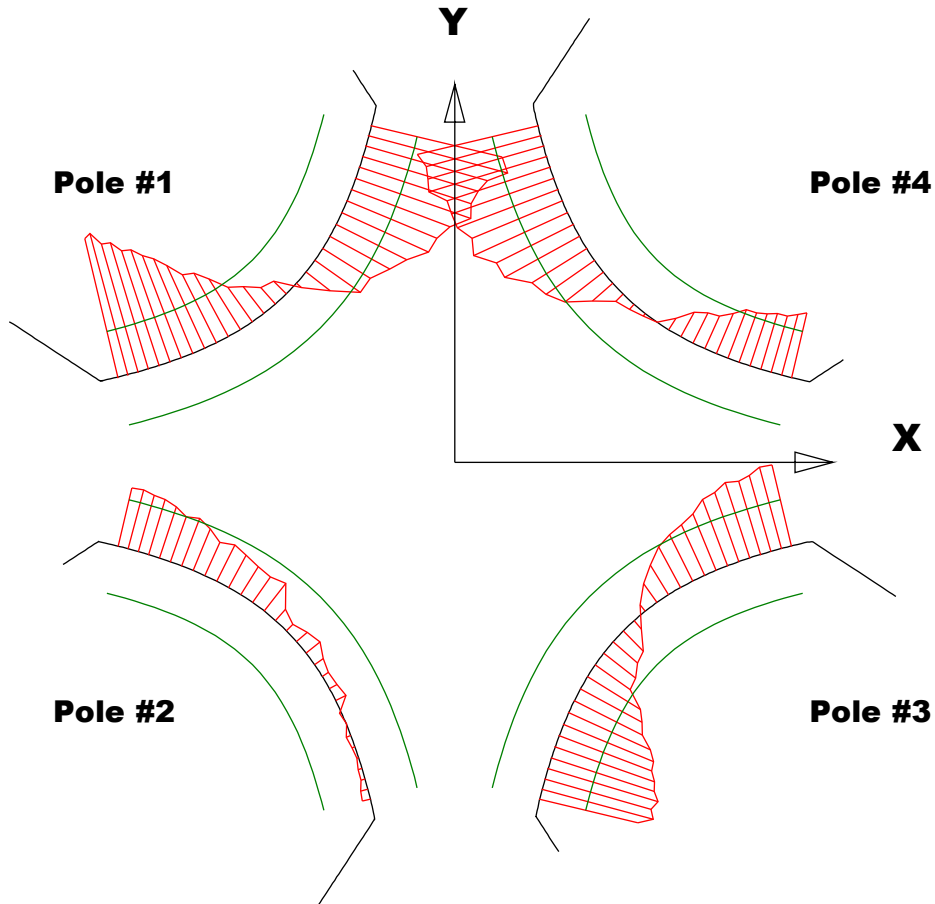
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00251	-0.0004	-0.00187	-0.00143
Max. Dev.	0.00333	0.00168	0.00161	0.00297

**Barcode # : 002744**

**Beamline Name: QM04B**

## 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.	-0.00306	-0.00017	-0.00241	-0.0014
Max. Dev.	0.00302	0.00128	0.00177	0.0026

**Barcode # : 002744**

**Beamline Name: QM04B**