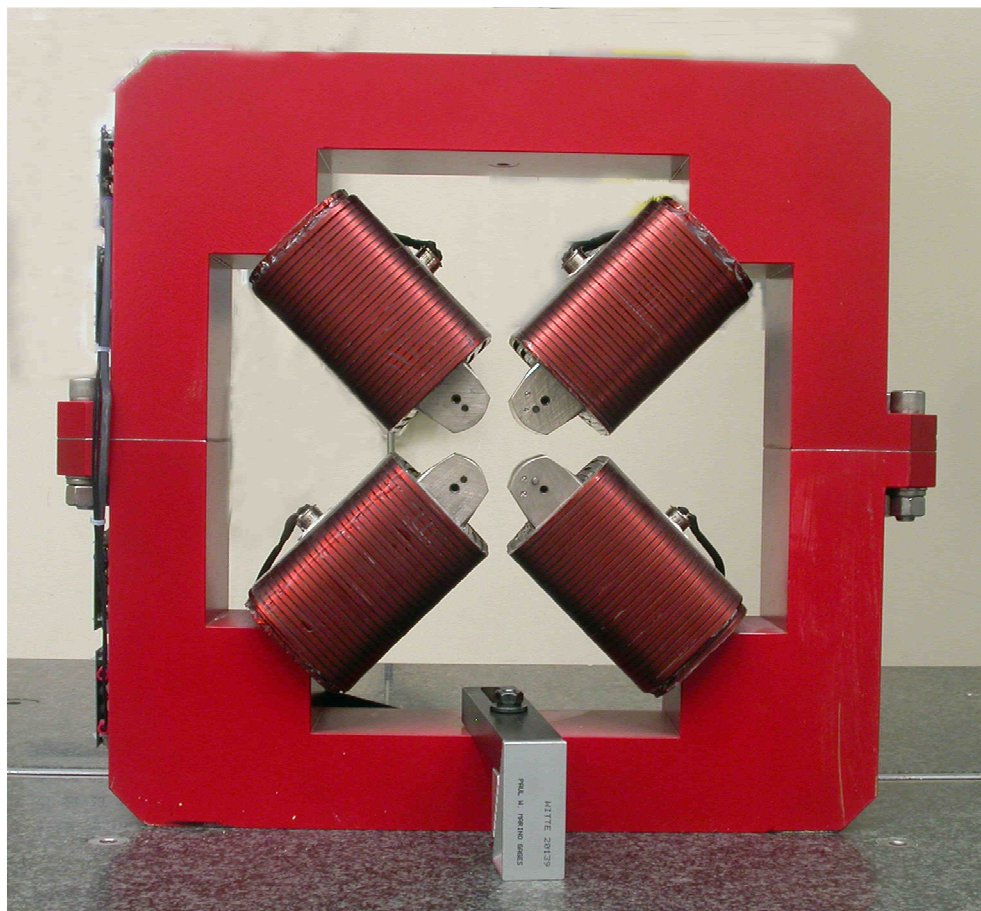


## **LCLS II Injector Quadrupole Fiducialization Report**



**Barcode # : 002743**  
**Beamline Name: QM03B**

## 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

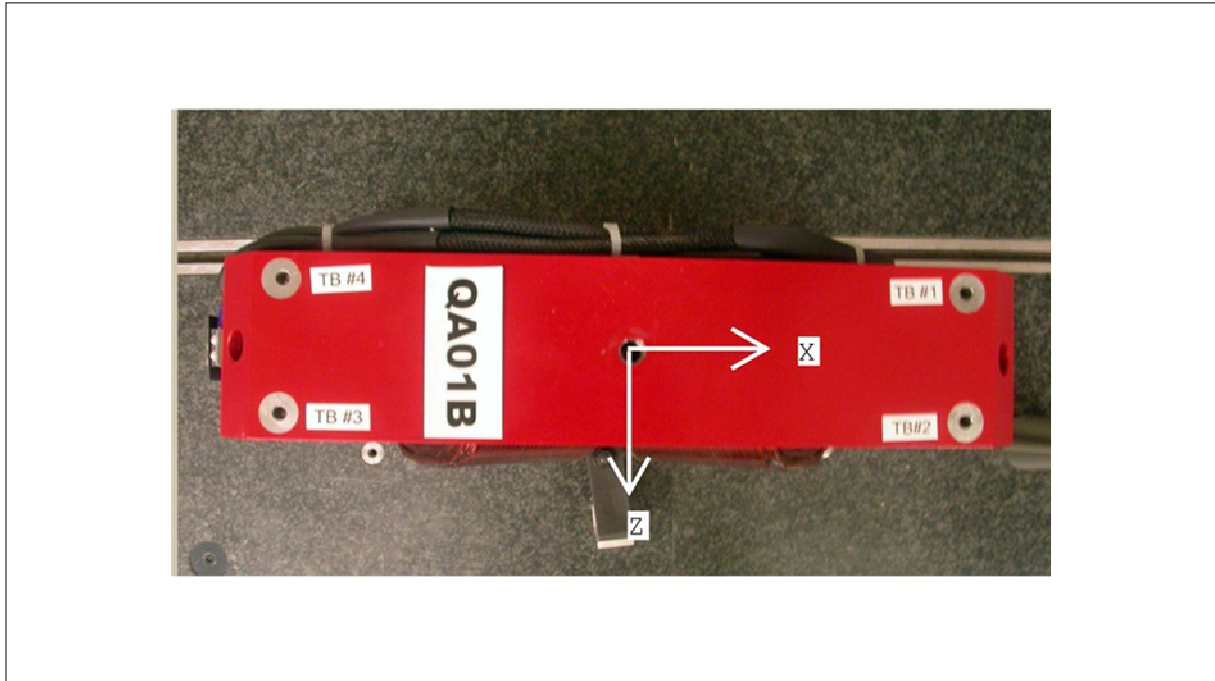
The Planar Alignment of the magnet is created by averaging the rotations of the composite best-fits of the upstream pole tips and downstream pole tips. This direction defines the Y and X directions of the magnet.

### 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.

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## Tooling Ball Locations



## Tooling Ball Locations

Tooling Ball	X Coord.	Y Coord.	Z Coord.
Ball #1	6.49443	8.88794	-1.25363
Ball #2	6.49416	8.88867	1.24556
Ball #3	-6.50452	8.88042	1.24686
Ball #4	-6.50633	8.87942	-1.25504

Tooling Ball Locations are 1 inch above unpainted surface pads

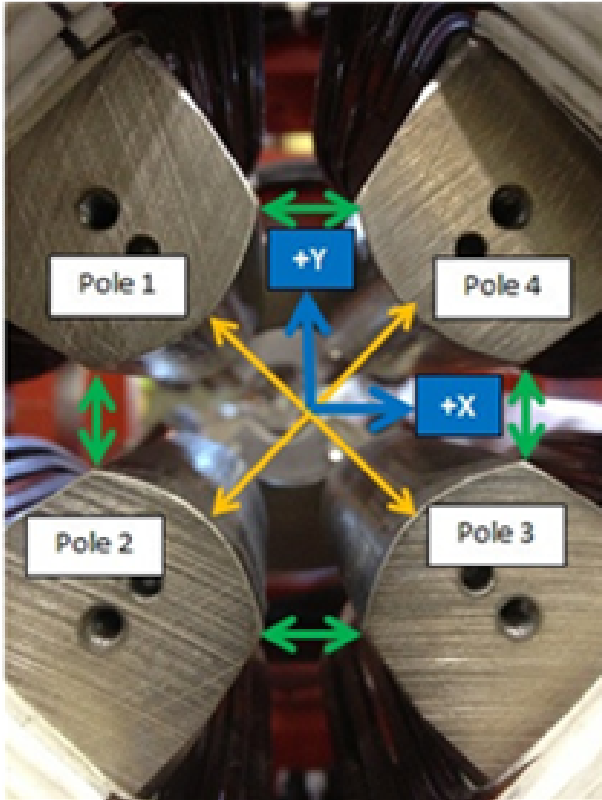
Dimensions in Inch

**Barcode # : 002743**

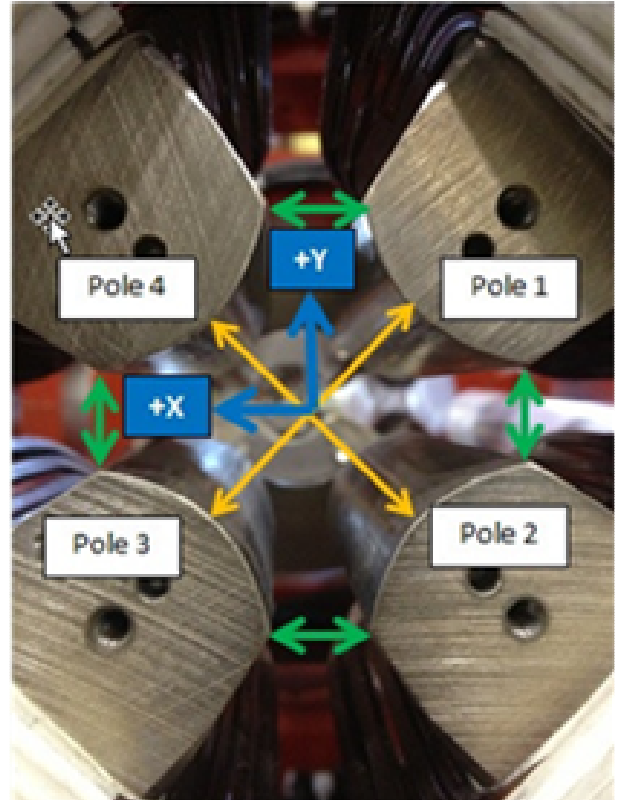
**Beamline Name: QM03B**

# Pole Tip Gap Measurements

**Pole Tips looking Downstream**



**Pole Tips looking Upstream**

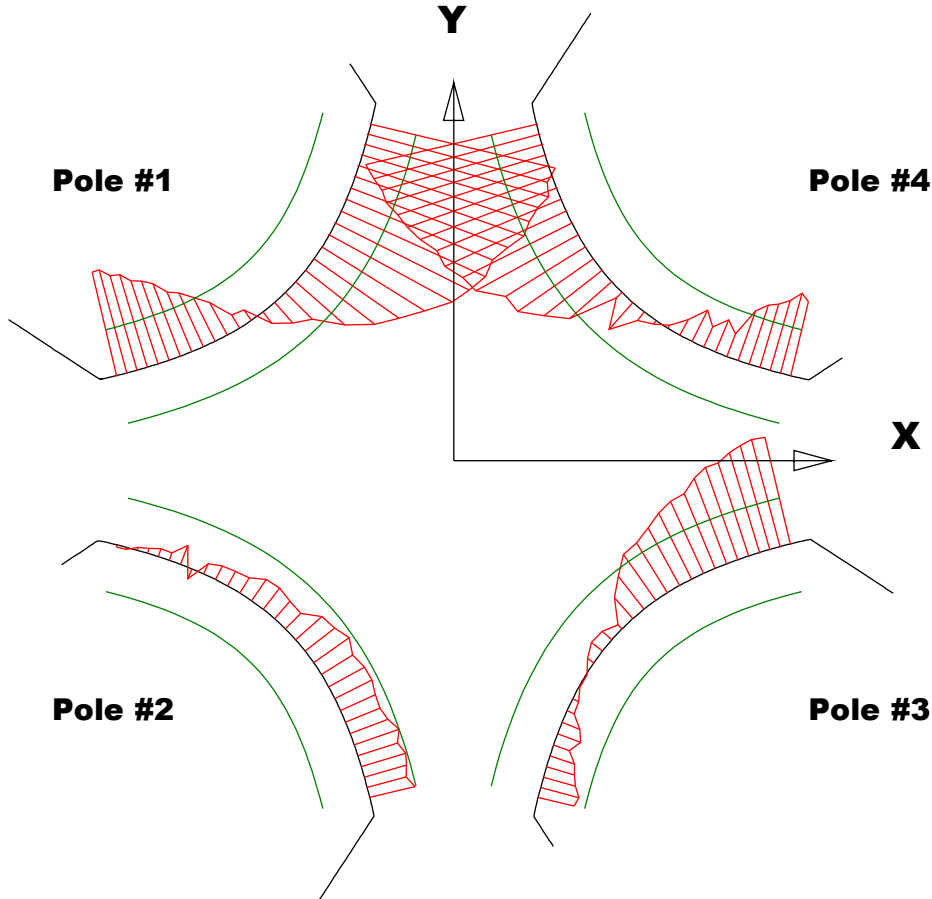


	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.25904	1.25859
Pole Tip Distance 2-4	1.260	1.25935	1.25746
Gap 1-2	.422	0.42801	0.42826
Gap 2-3	.422	0.42436	0.42214
Gap 3-4	.422	0.42185	0.41831
Gap 4-1	.422	0.41374	0.41648

Dimensions in Inch

**Barcode # : 002743**  
**Beamline Name: QM03B**

# Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

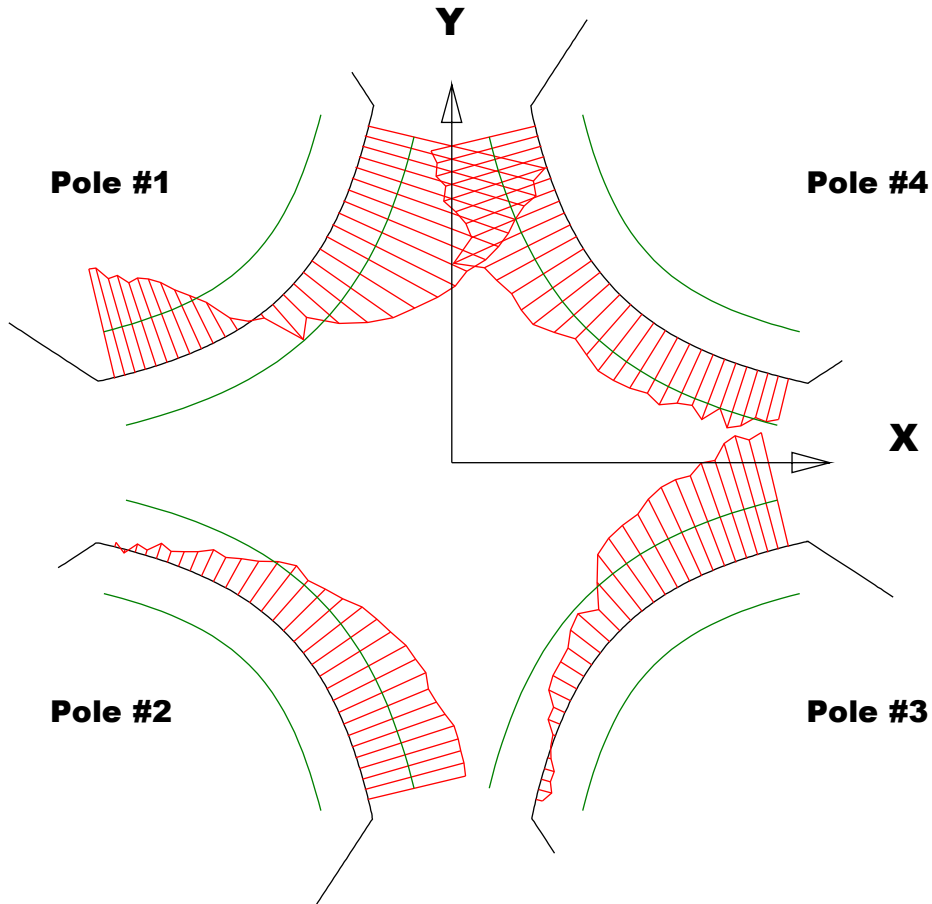
## Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00224	-0.00022	-0.00083	-0.00173
Max. Dev.	0.004	0.001	0.00233	0.00368

**Barcode # : 002743**

**Beamline Name: QM03B**

## 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.	-0.00234	-0.00008	-0.00029	0.00088
Max. Dev.	0.0038	0.00216	0.00252	0.00255

**Barcode # : 002743**

**Beamline Name: QM03B**