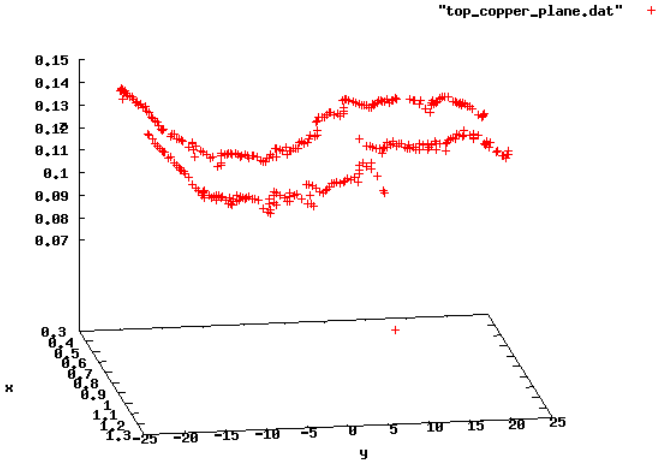
Results of RFQ “fixes”

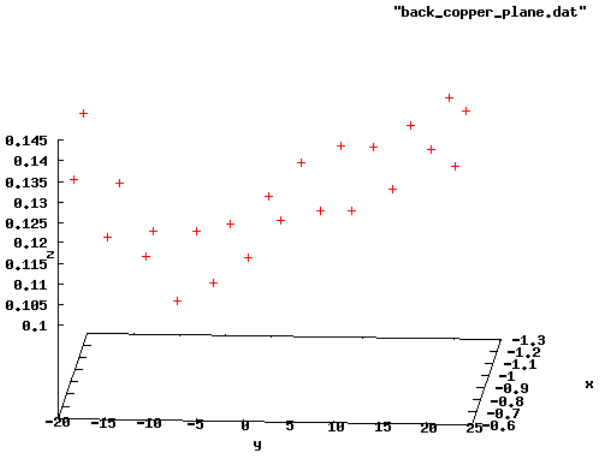
C.Y. Tan, J. Schmidt, B. Koubek,
D. Bollinger, P. Karns, R. Tomlin
16 May 2012

What we did

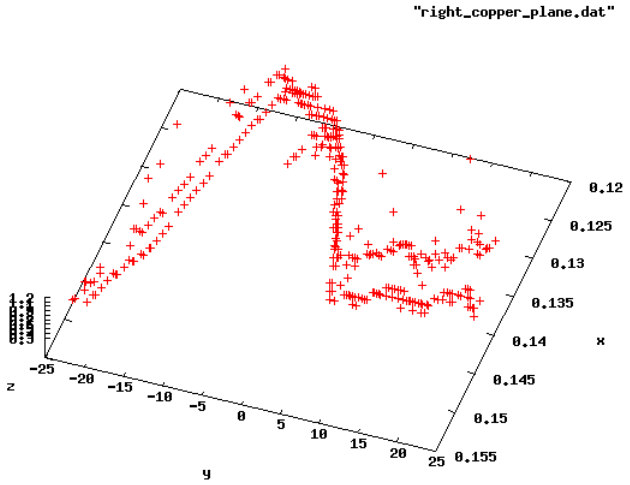
- Straighten the rods in situ to see if energy changed.
- Rod removed and measured with laser tracker and CMM (coordinate measuring machine)
- Rods re-mounted so that they are longitudinally aligned

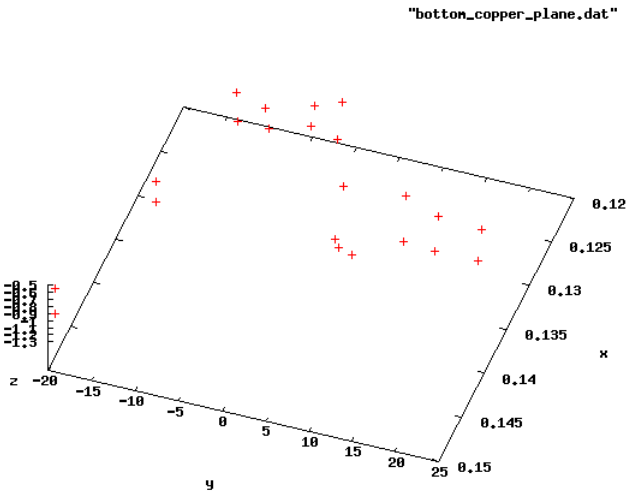
Survey of RFQ





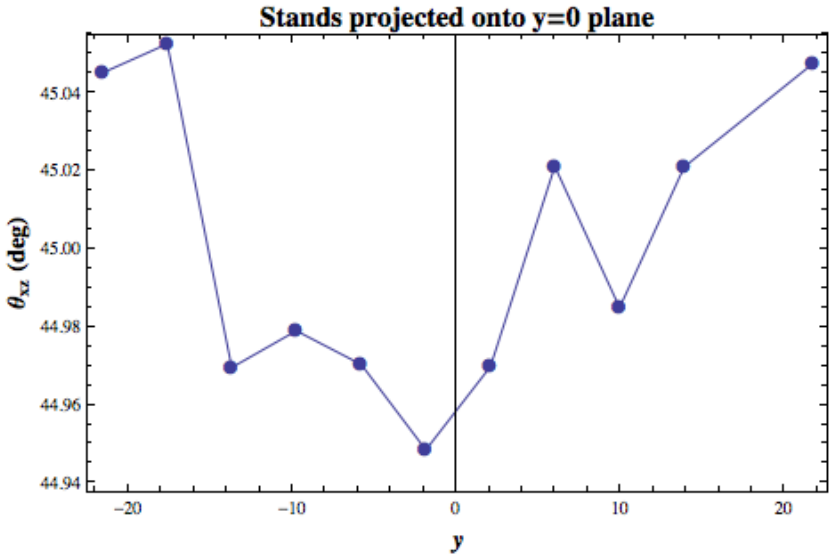
Horz rods

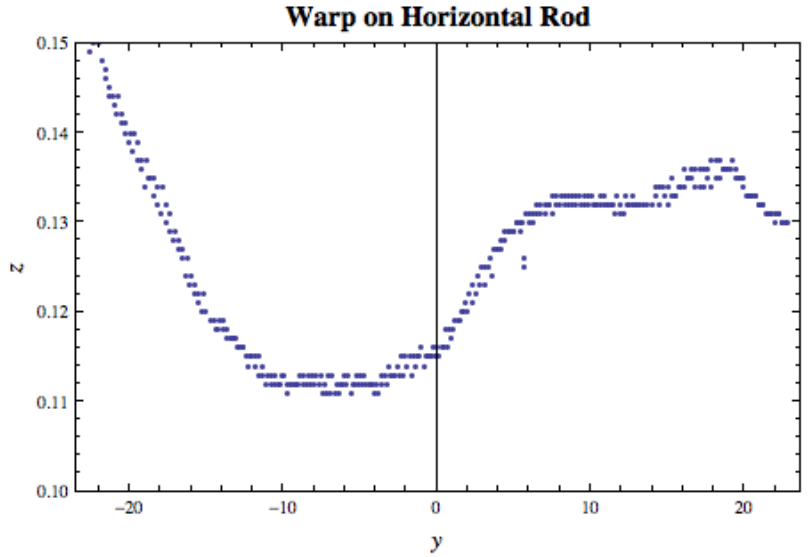




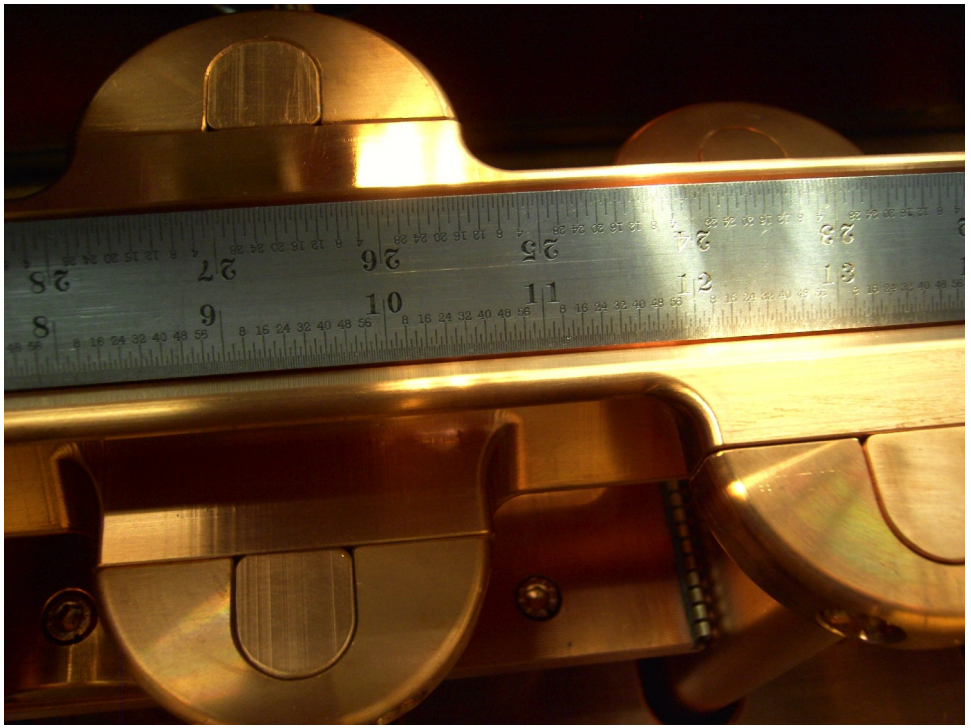
Vert rods

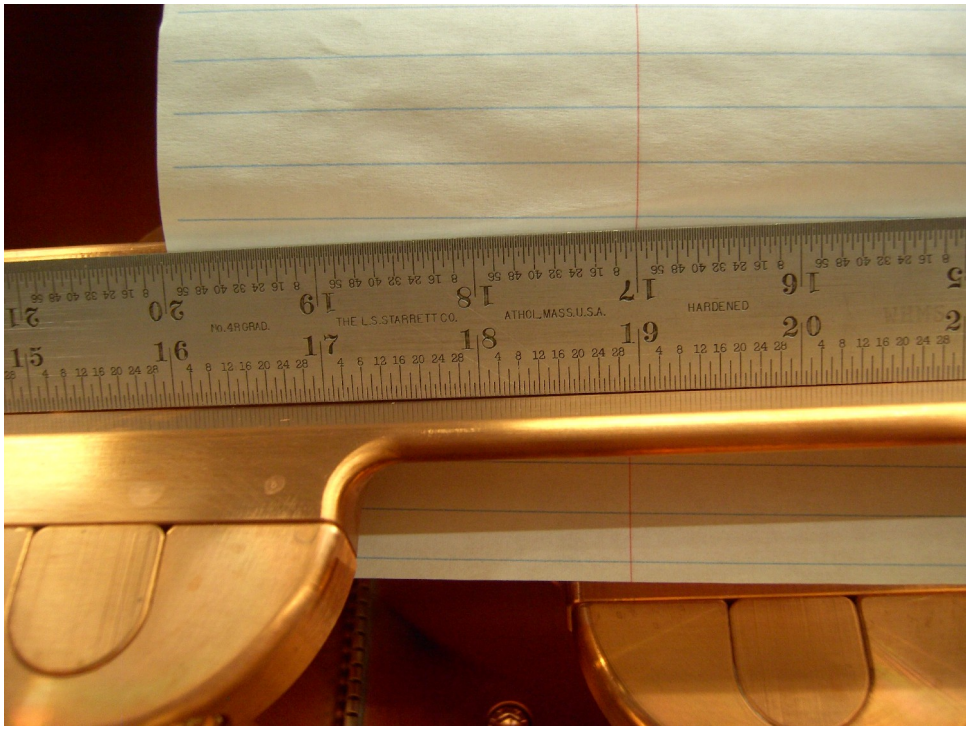
Correlation between warpage and stand angle





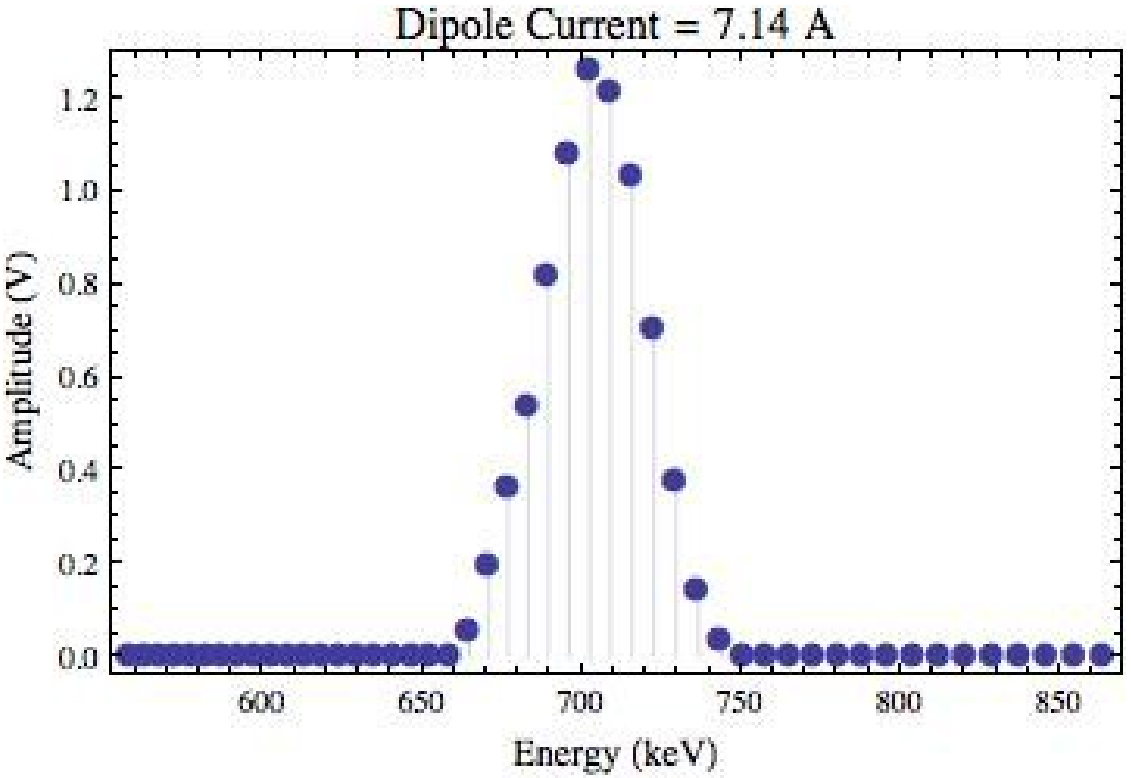
Reduced gap size





Reduced gap size by ~ 50% for both horz and vert rods that are visible by changing how much we screwed in the bolts of the stands.

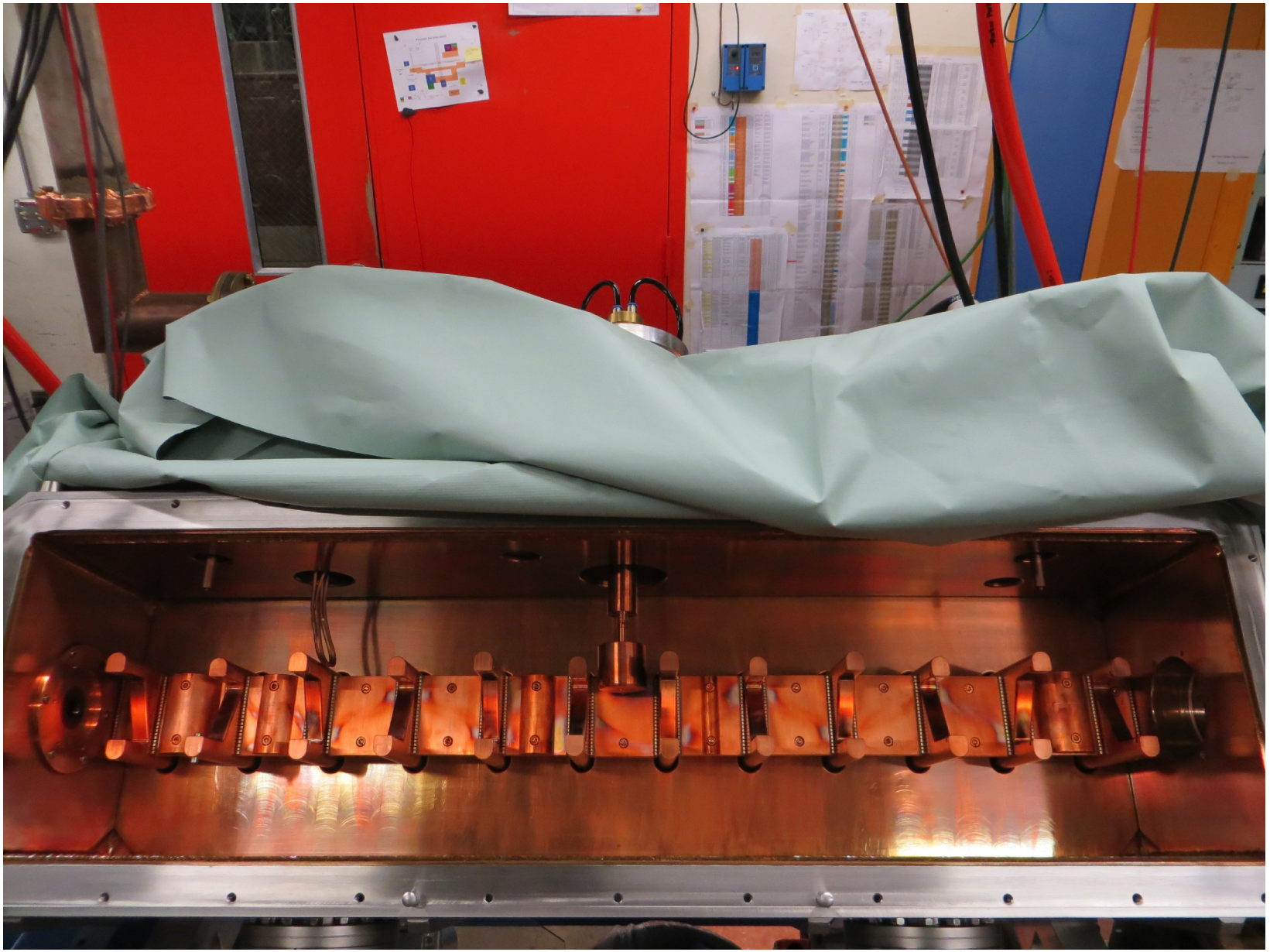
No Change in Energy!



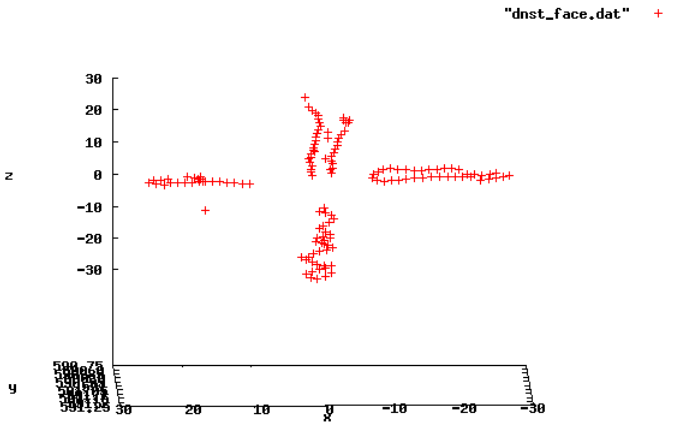
702 keV @ 165 kW

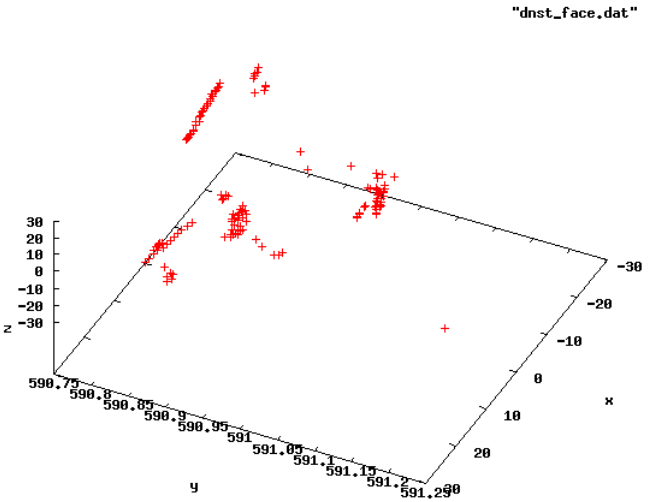
Why????? I would have expected an energy change from my back of the envelope calculation. However, the calculation is for pencil beam and perhaps the effect is smaller because the beam fills the entire aperture? Needs further investigation.

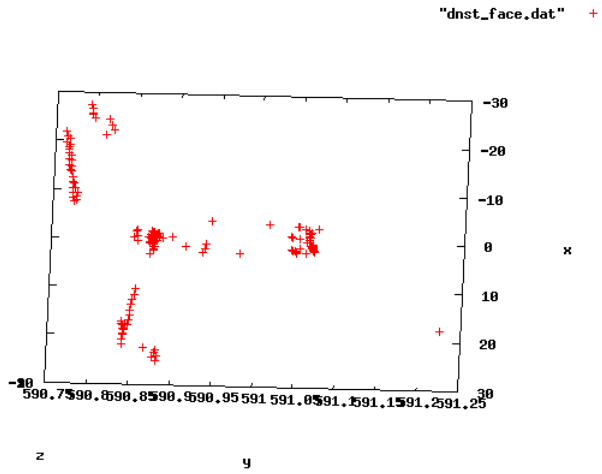
Stripping the RFQ



Longitudinally misaligned rods





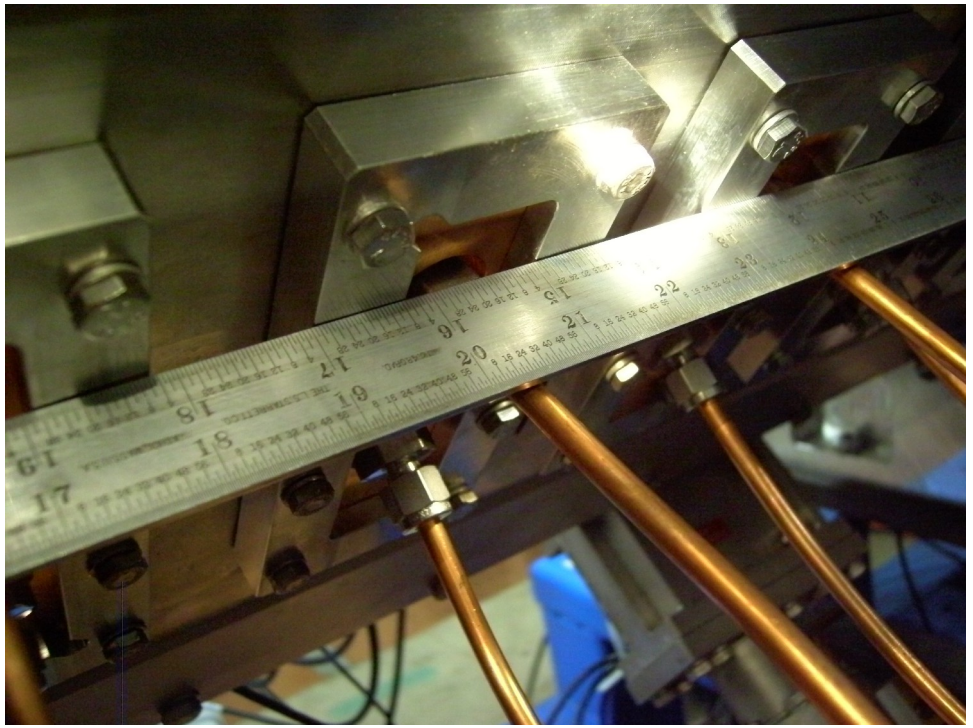


~0.25 mm misalignment

Geometry corrections

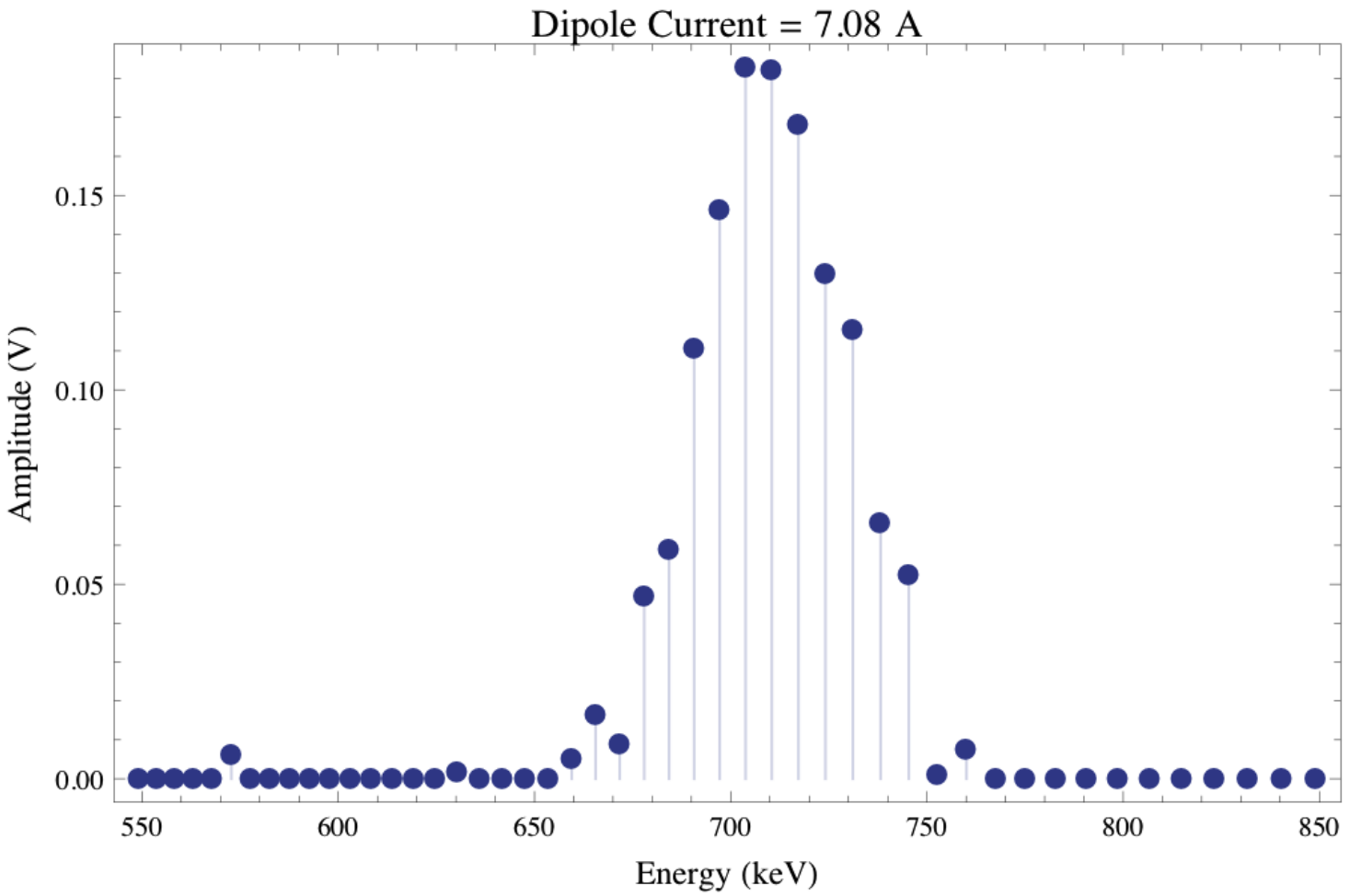
- Straightened the stands by evenly tightening the bolts of the stands.
- Rods are straight and longitudinally aligned.
- Only one of the rods have dowel pins used to hold to the stands. Other 3 rods do not have dowel pins.

Evened out the Compression of the O-Rings



Janet and Ben compressed the collars evenly by carefully bolting the collars to the back plate. This made the stands straight.

Energy increased by ~10 keV



712 keV @ 169 kW

Conclusion

- One more experiment will be done where we flatten the field in the RFQ and to fix the plunger position.
- All roads lead to new rods
  - If the rods are incorrectly manufactured → NEW RODS
  - If the rods are wrong → NEW RODS