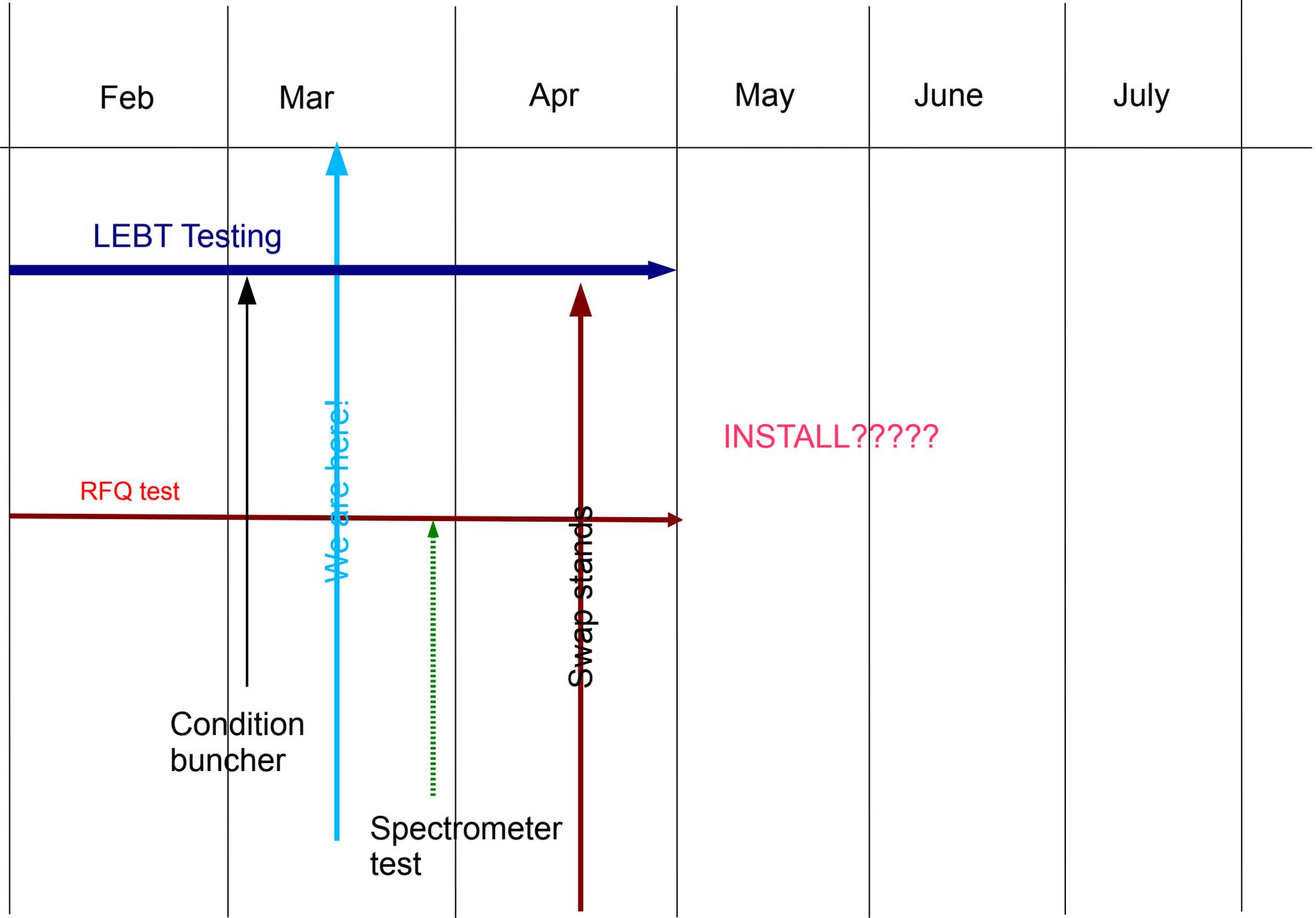


Pre-injector Upgrade Updates (29 Feb 2012 – 14 Mar 2012)

C.Y. Tan
14 Mar 2012



Feb

Mar

Apr

May

June

July

LEBT Testing

RFQ test

Condition buncher

We are here!

Spectrometer test

Swap stands

INSTALL?????

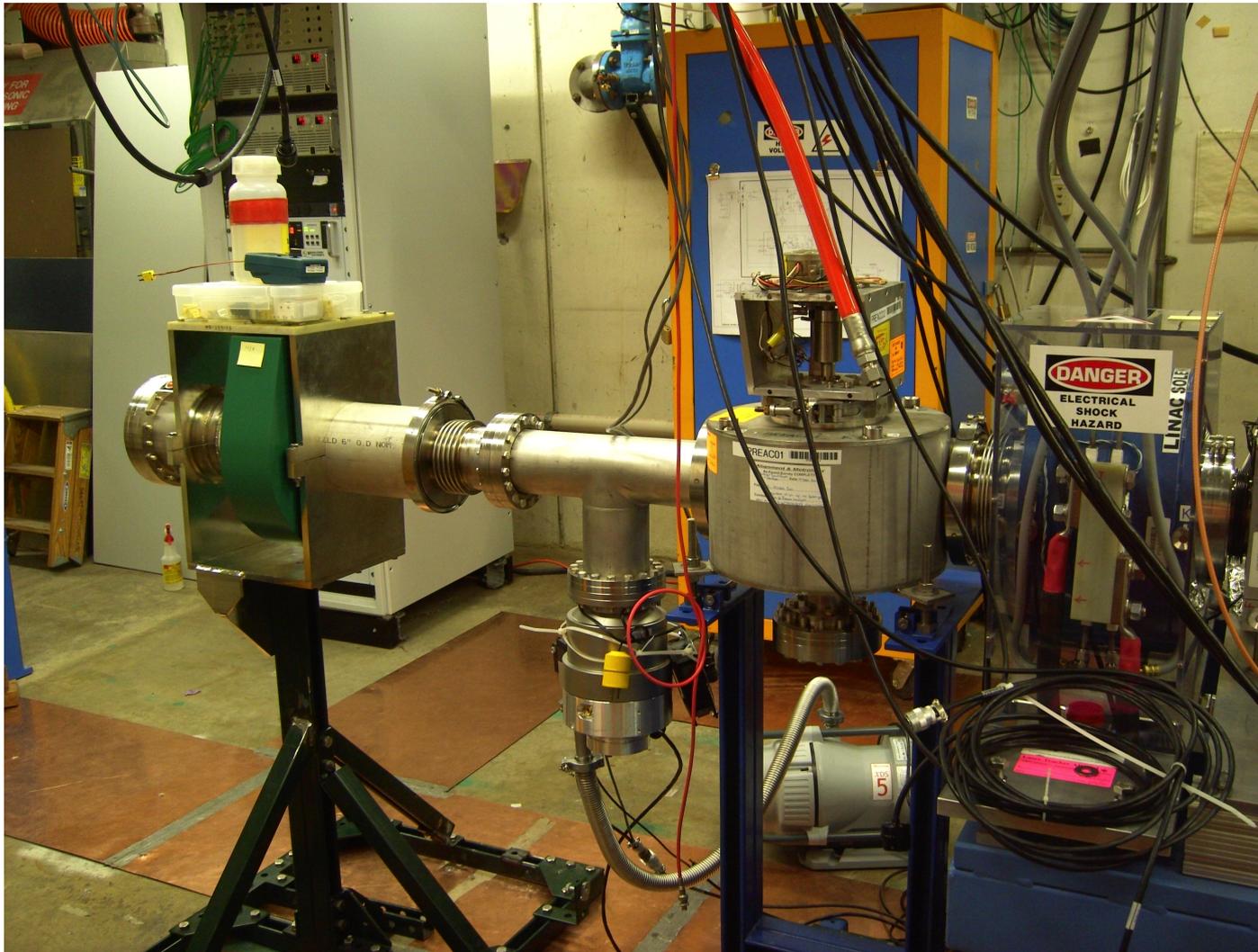
Latest

- Removed and replaced source.
- RFQ survey shows that the rods are **WARPED!**
- Emittance measurements are complete
 - Beam orthogonal to internal magnetic field is larger by 1.2 to 1.7.
-

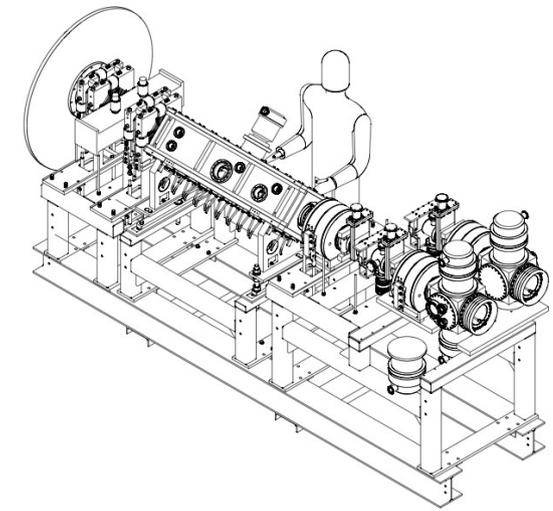
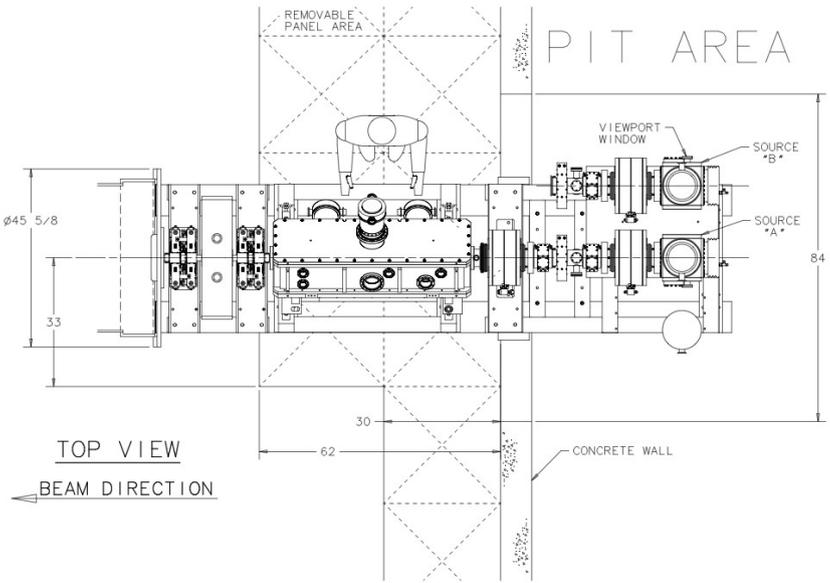
Plans

- Complete wire measurements of of new source.
- Complete buncher conditioning at 4 kW pulsed.
- Do Einzel lens test with DC beam.
- Redo field flatness measurement of RFQ.

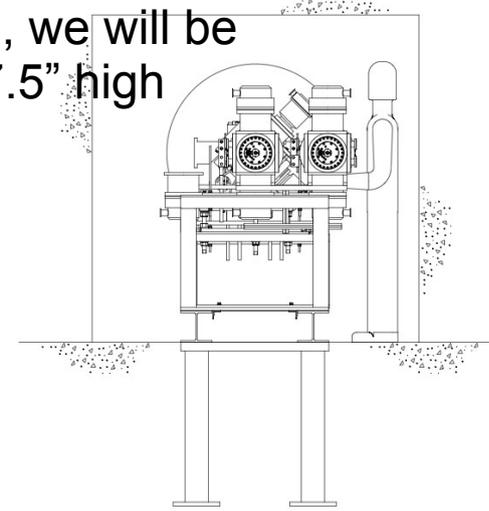
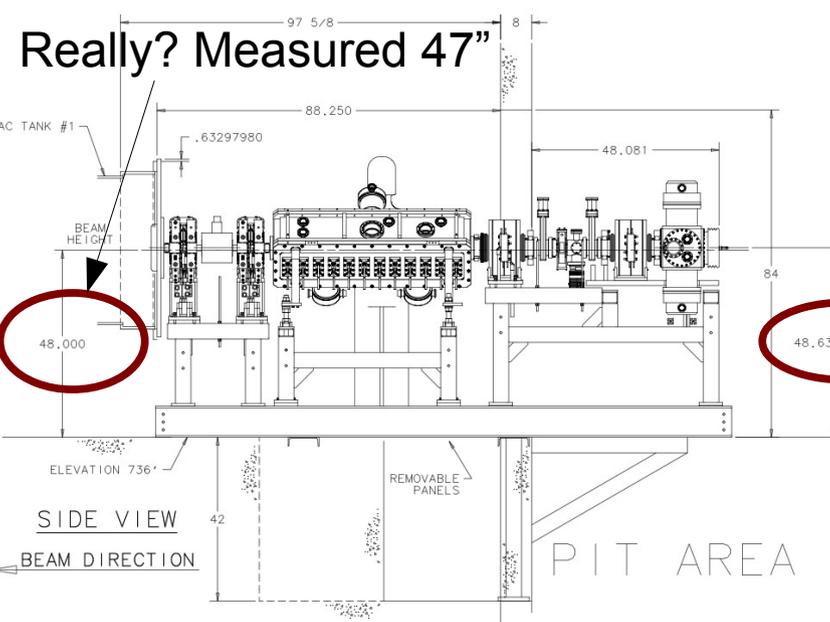
Multiwires at end of LEBT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

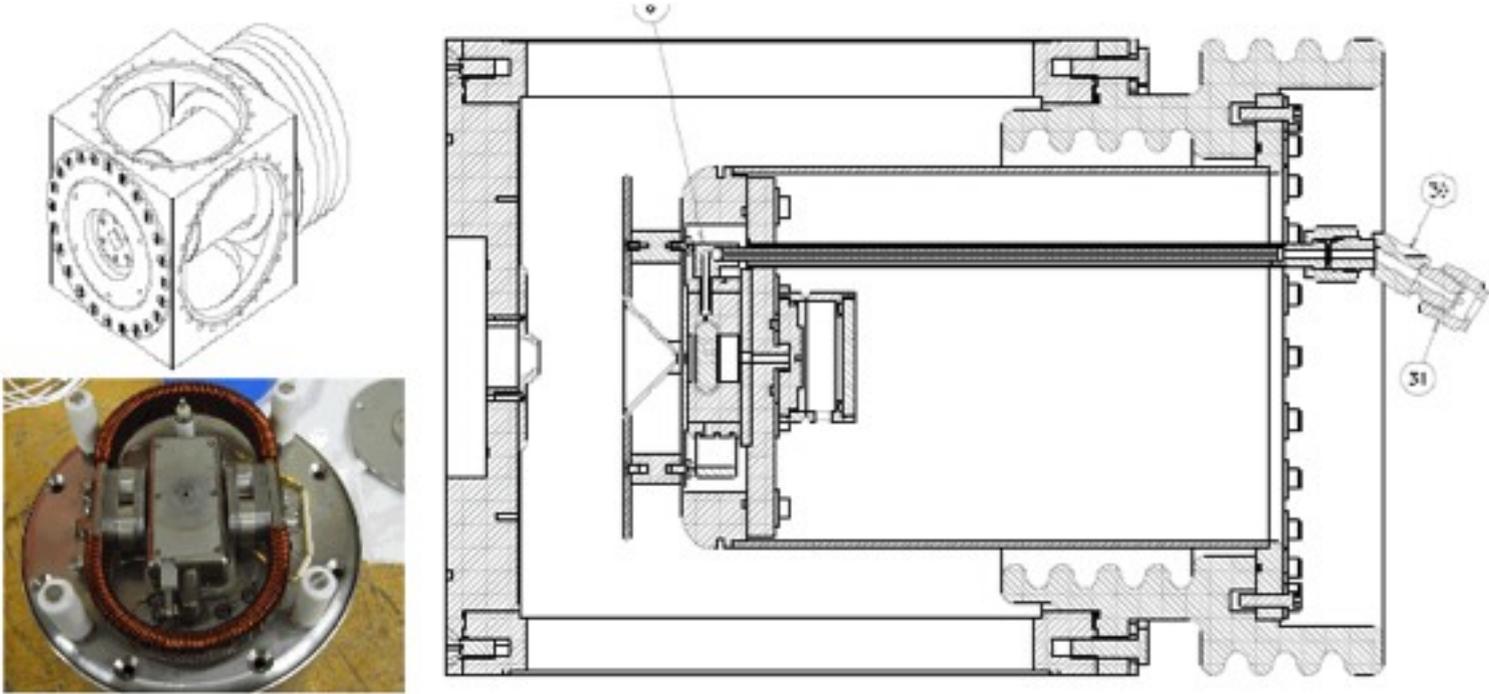


PREACCELERATOR
PRELIMINARY
LAYOUT
APRIL 27, 2011



UNLESS OTHERWISE SPECIFIED			ORIGINATOR
+	+	+	DRAWN
+	+	+	CHECKED
+	+	+	APPROVED
1. BREAK ALL SHARP EDGES MAX.			USED ON
2. DO NOT SCALE DRAWING.			
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			
4. MKV, ALL MKV SURFACES			MATERIAL
5. DRAWING UNITS: U.S. INCH			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
SCALE	DRAWING NUMBER	SHEET	REV
		1 OF 1	
CREATED WITH :	GROUP :		

Source Status

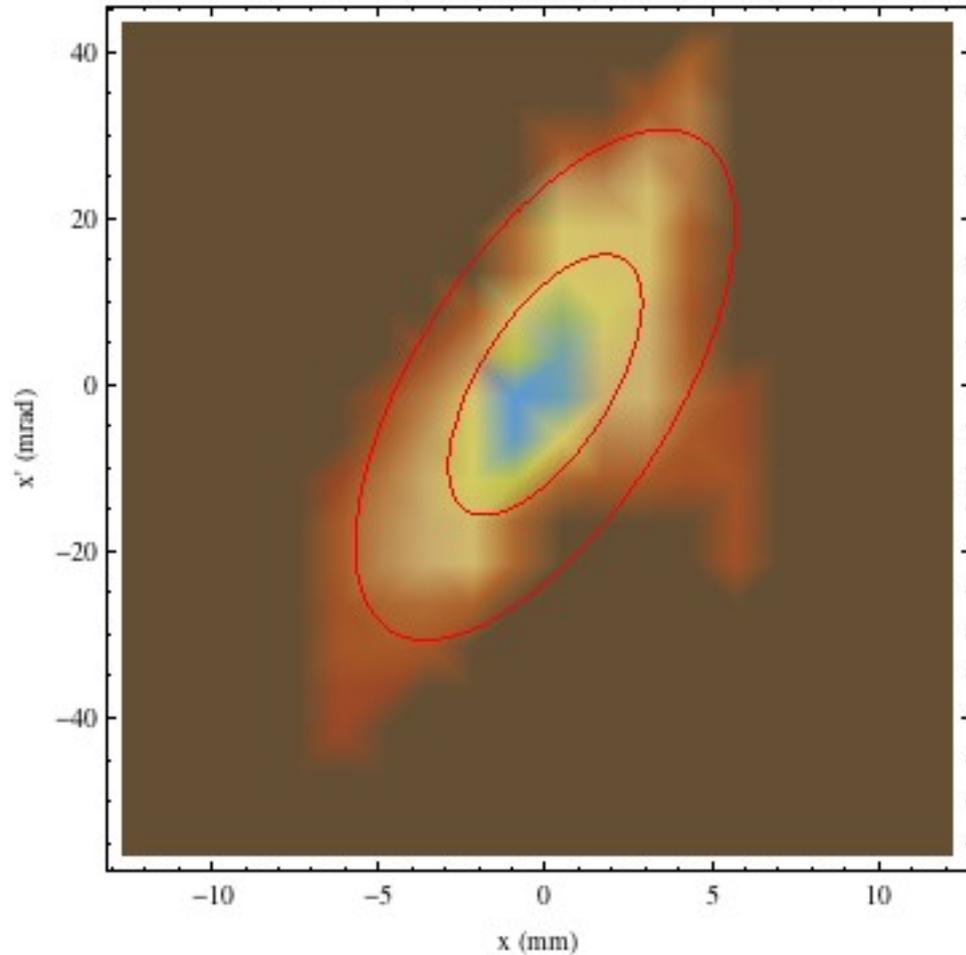


Device	Status	Comments
Source	new source installed 02 Mar 2012	Rotated 90 deg.

Emittances

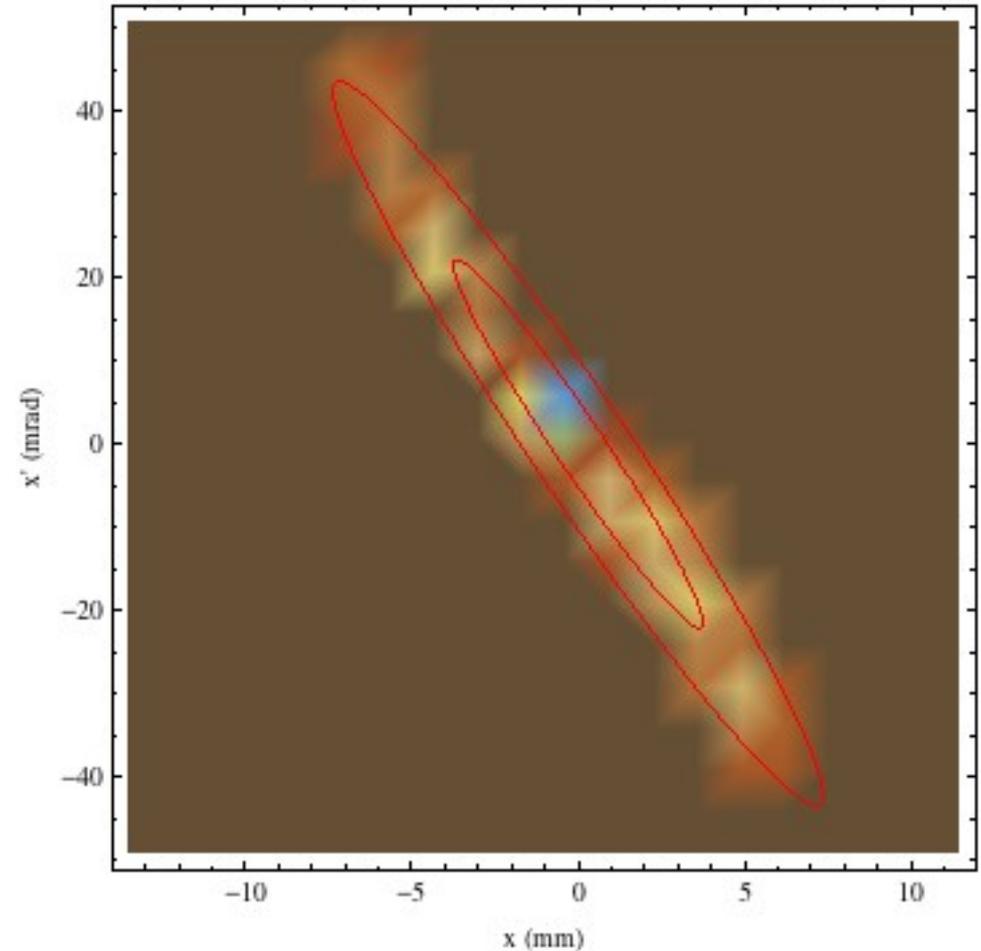
Horz

Emittance



Vert

Emittance



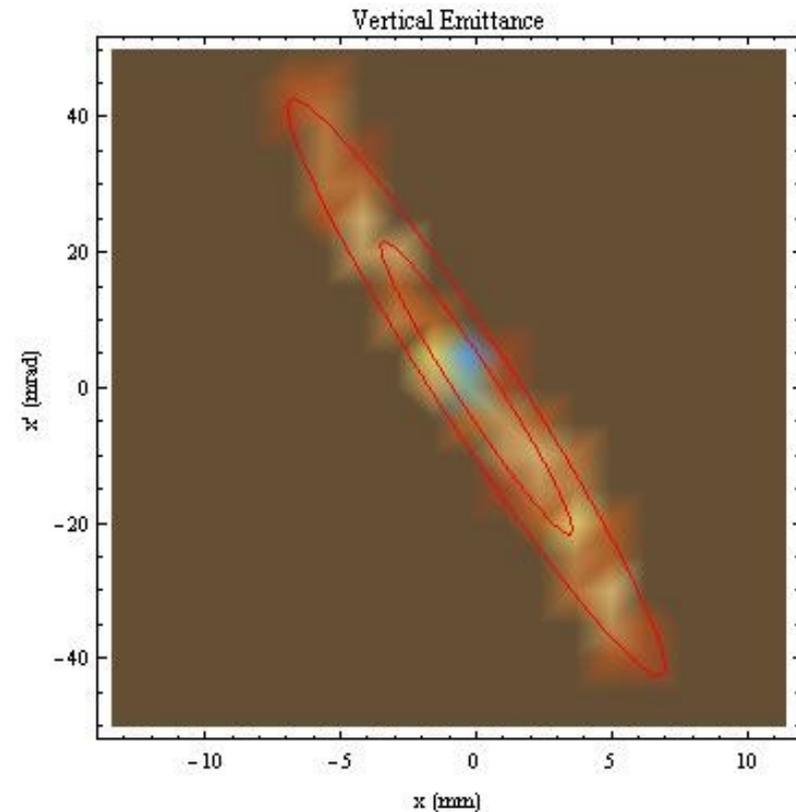
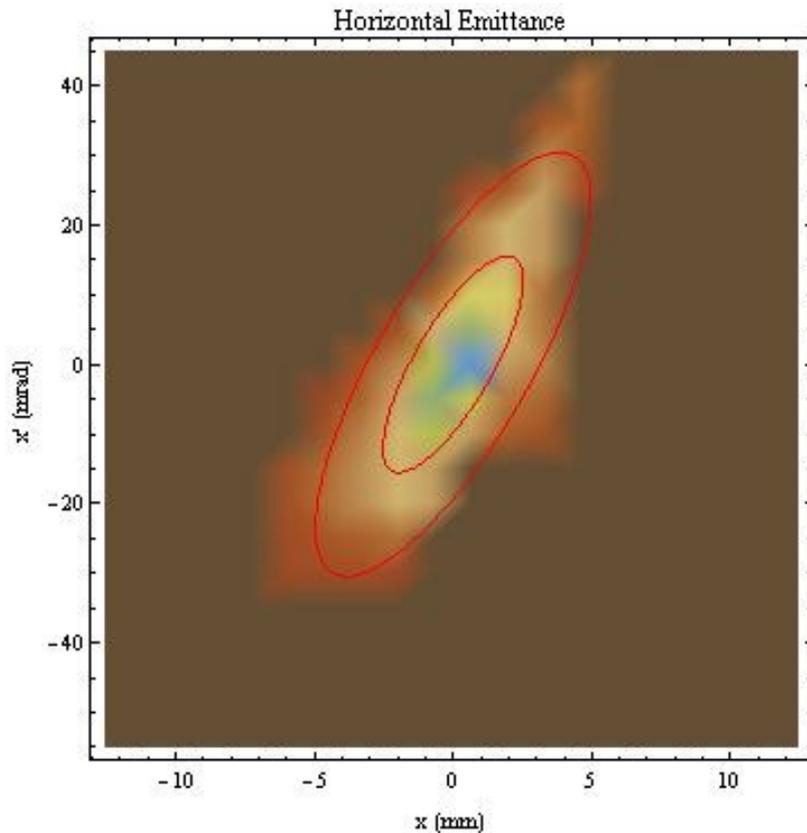
Nominal settings of ASOL for operations. LSOL focusing changed to get entire beam on probes. Beam current is 65 mA, 35 keV.

$\epsilon_h = 0.30 \pi \text{ mm mrad}$ 1sigma normalized

$\epsilon_v = 0.17 \pi \text{ mm mrad}$ 1 sigma normalized

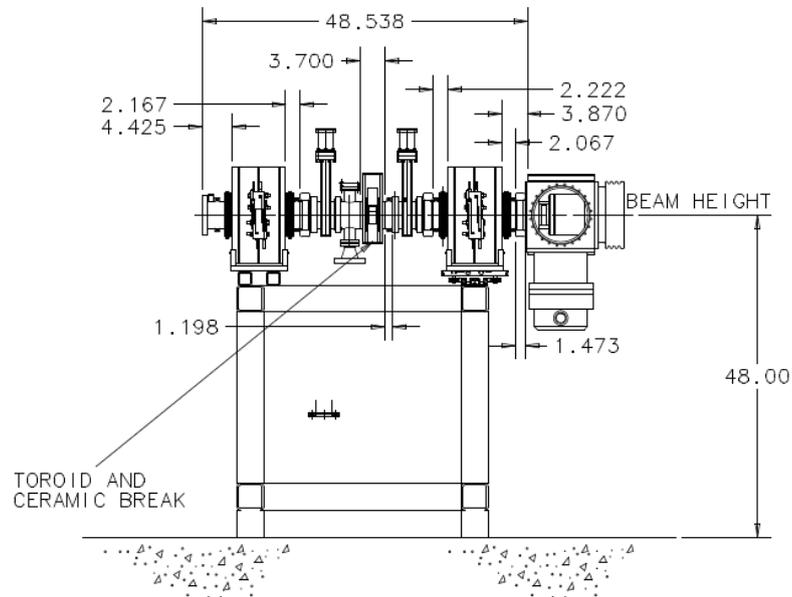
Ratio is 1.76. **With source rotated by 90 deg. ϵ_h is now larger!**

After tuning arc current



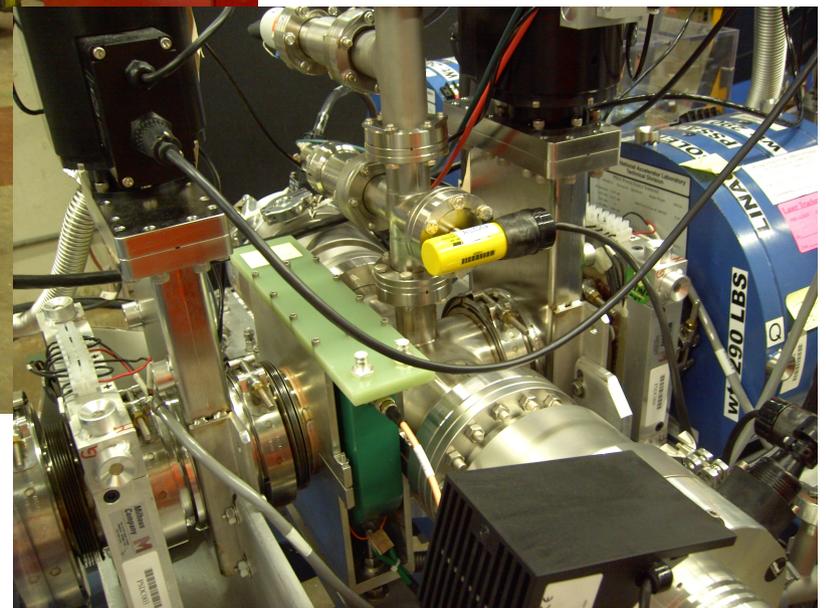
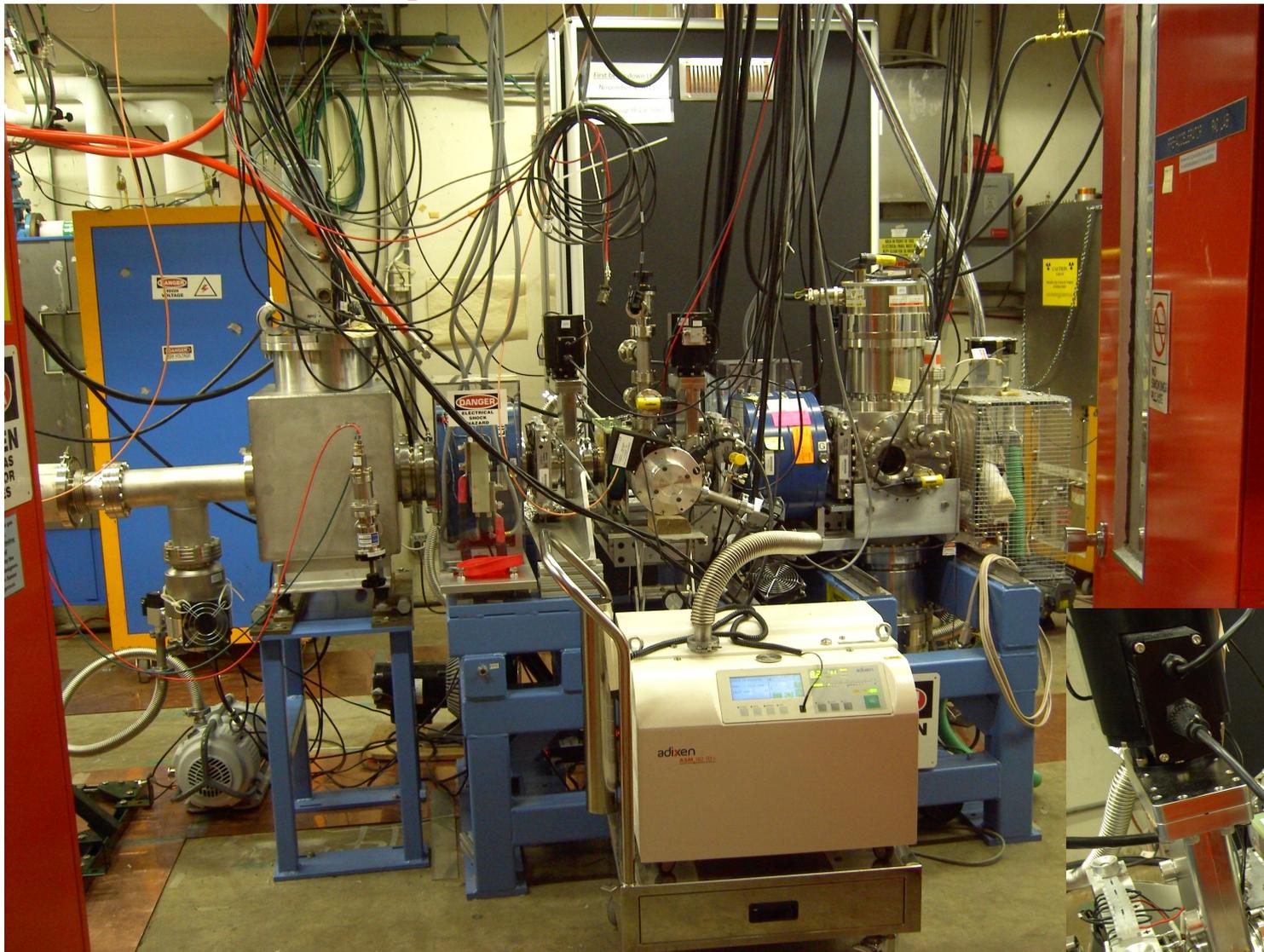
Emittances made more equal after tuning arc current and voltage. Note different solenoid settings.
 $E_h = 0.21 \pi \text{ mm mrad}$, $E_y = 0.17 \pi \text{ mm mrad}$ (1 sigma normalized). Ratio is 1.2.

LEBT Status

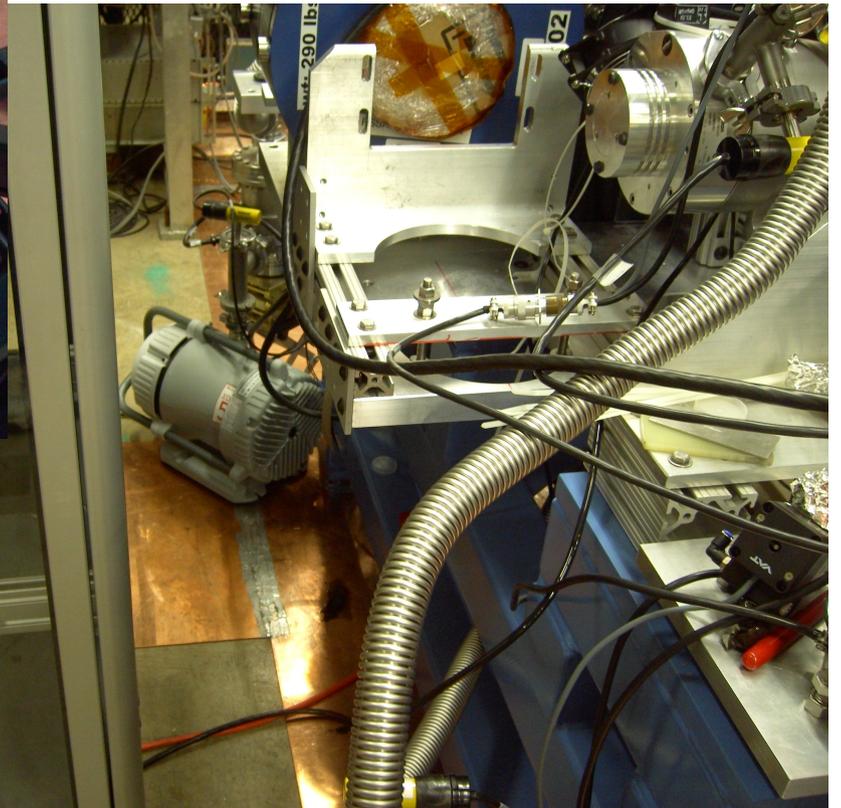
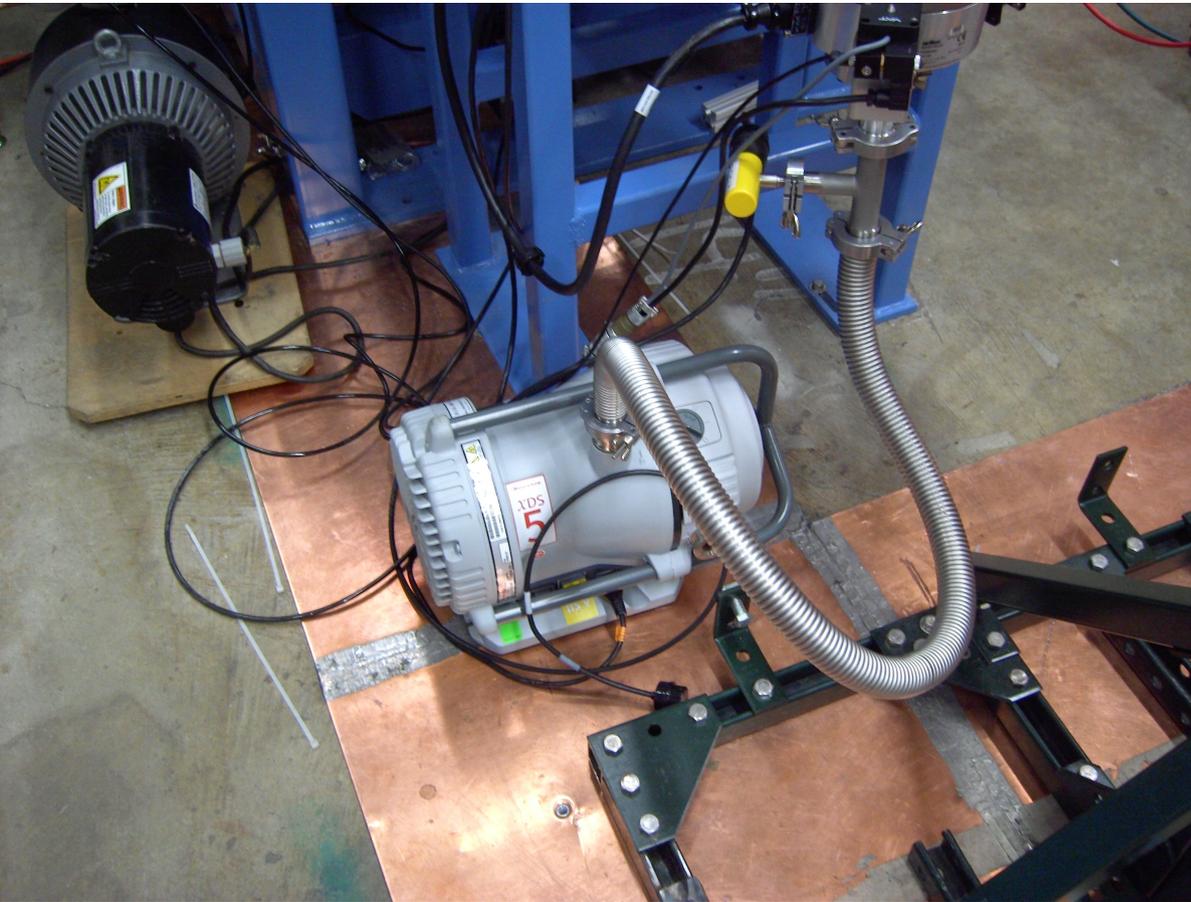


Device	Status	Comments
New slide	being designed	Expect to have by mid March 2012
Correctors	Last set of spare correctors done.	Here this week
Installed extra turbo	Twin turbos in LEBT	Vacuum has improved!

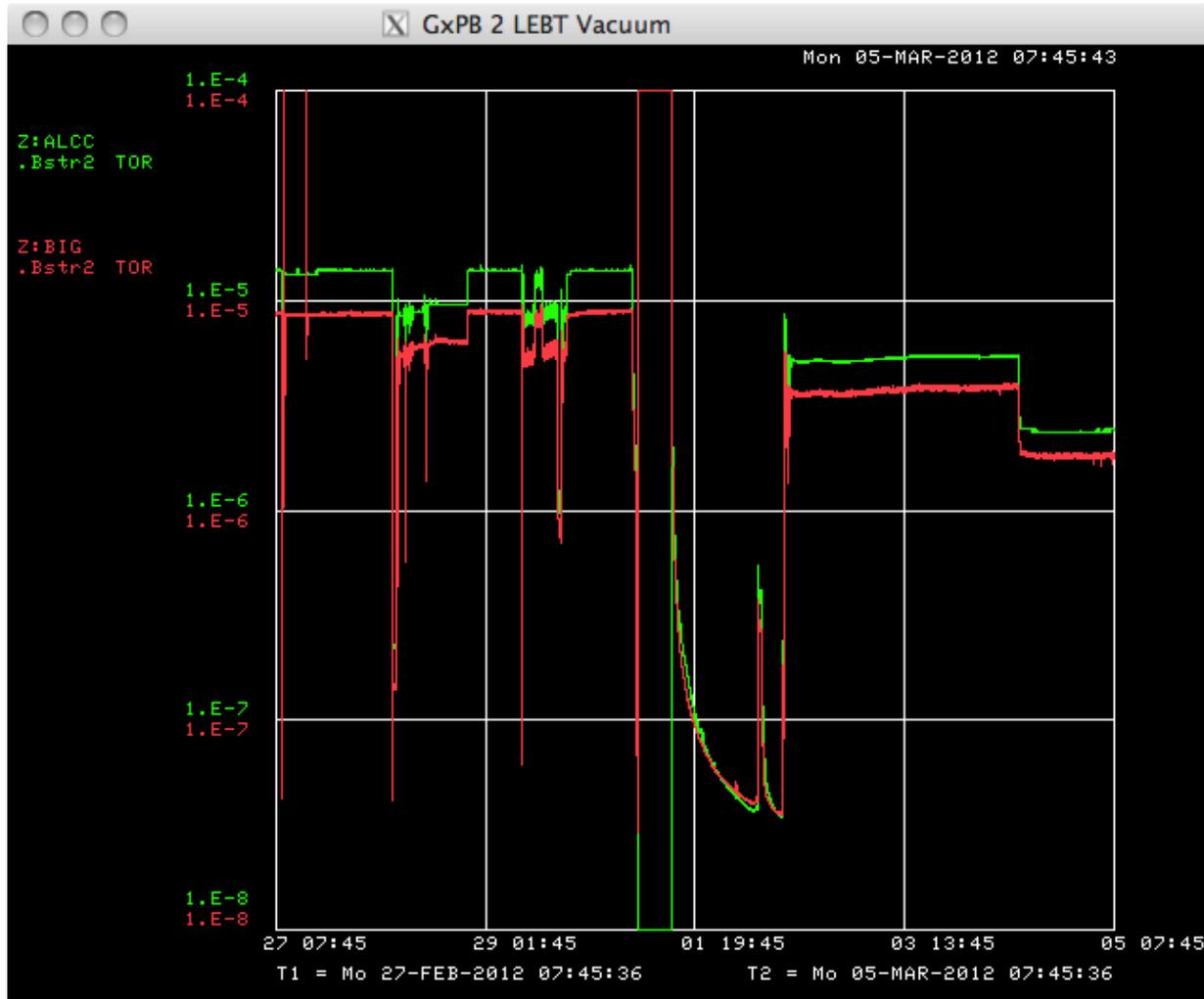
Improved line with 2 turbos



New scroll pumps

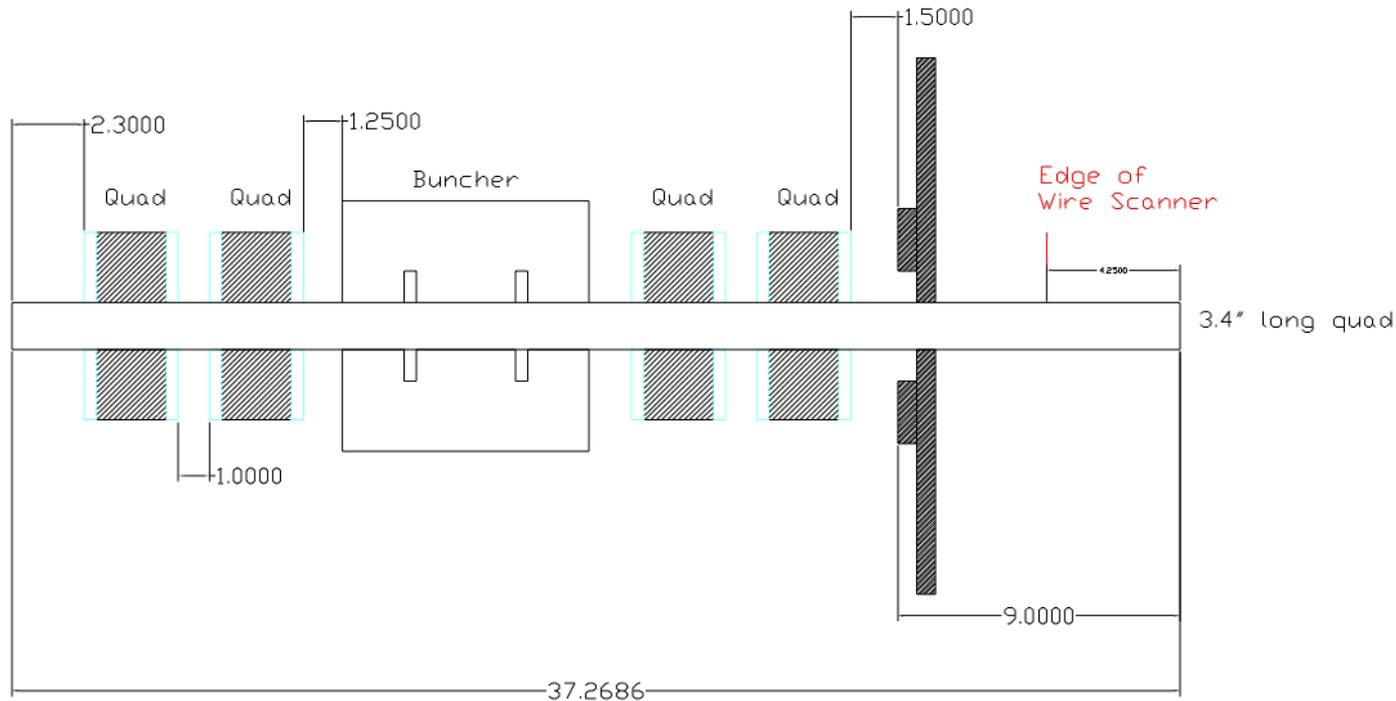


Improved vacuum



Vacuum improved from $> 1e-5$ torr to $2.5e-6$ with source running.

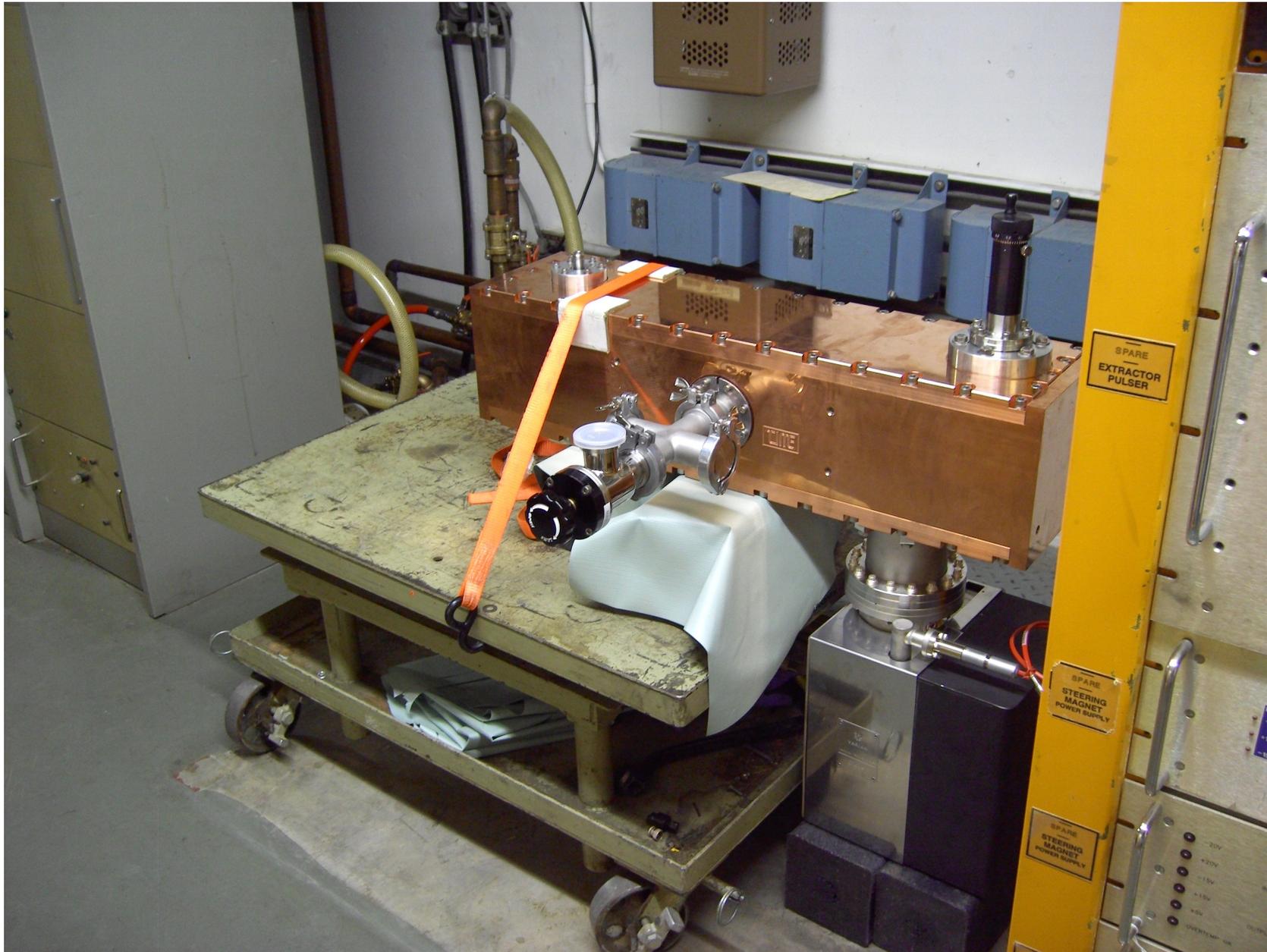
MEBT Status



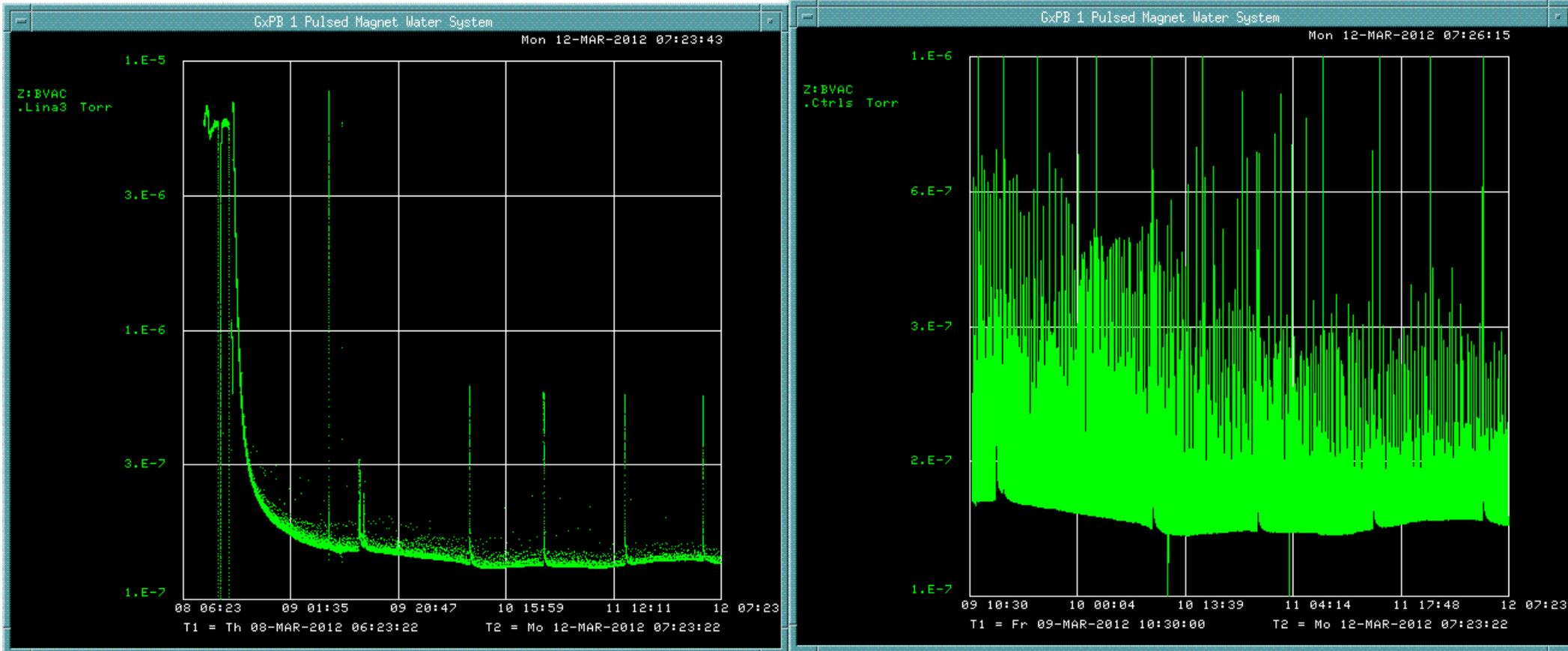
Device	Status	Comments
MEBT Stand	Being designed	Another 2 more weeks (13 Mar)
Quad doublets	Being paired and tested	Field measurements complete on 1 st pair (#5, #6) 13 Mar. 2 nd pair being measured
Buncher	low power conditioning complete	High power started.

Are we buying PA for buncher?
 Ion pump, controller gauging status?

Buncher readied for high power test



Spikey vacuum



Base vacuum is not fantastic: $1.5e-7$ torr.
Many spikes – virtual leak?

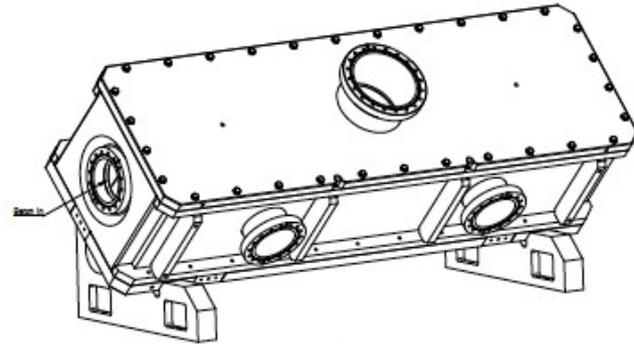
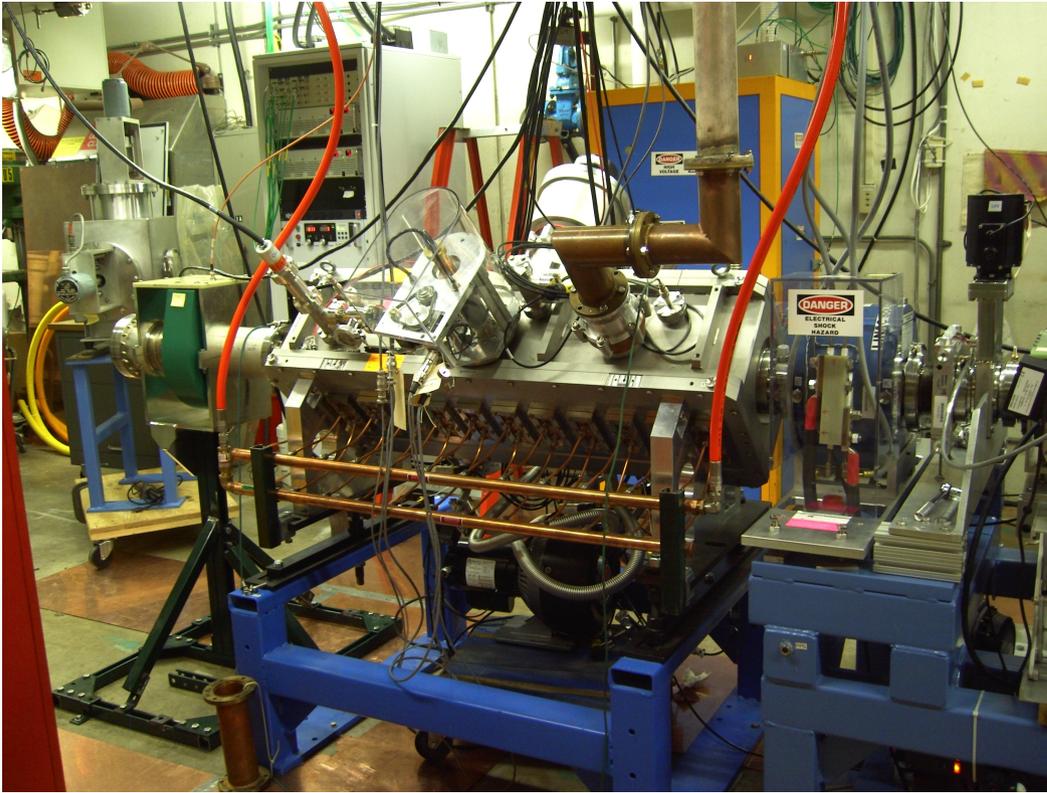
Doublets



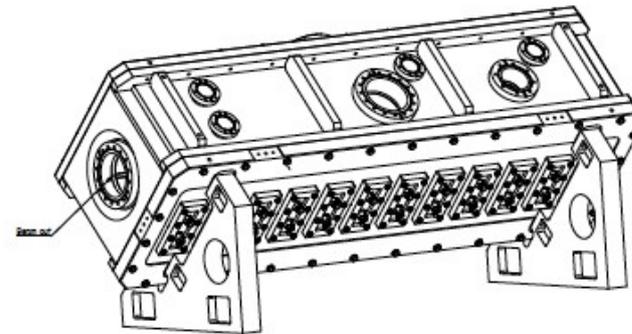
1st pair complete.
2nd pair being measured.



RFQ Status

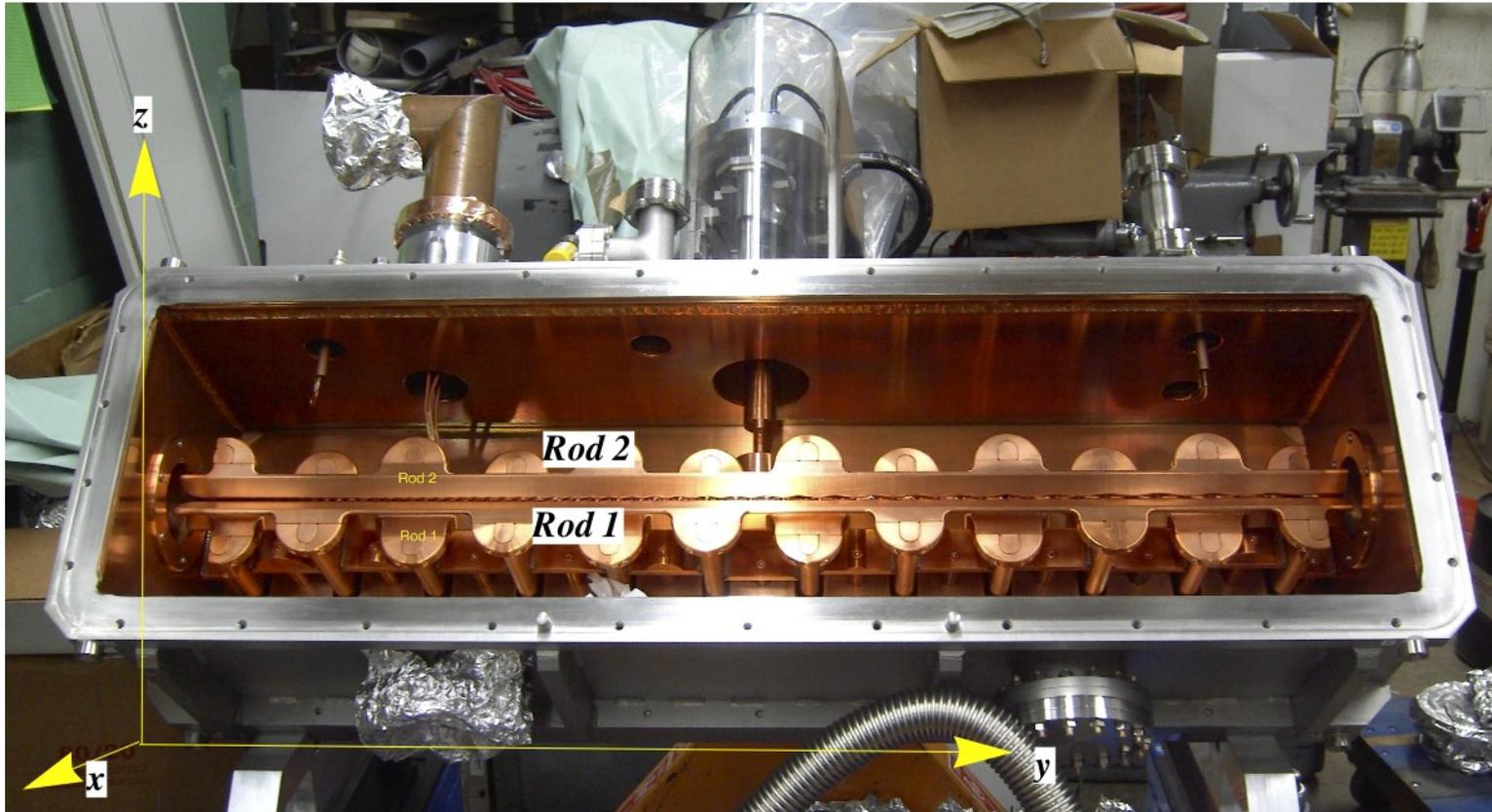


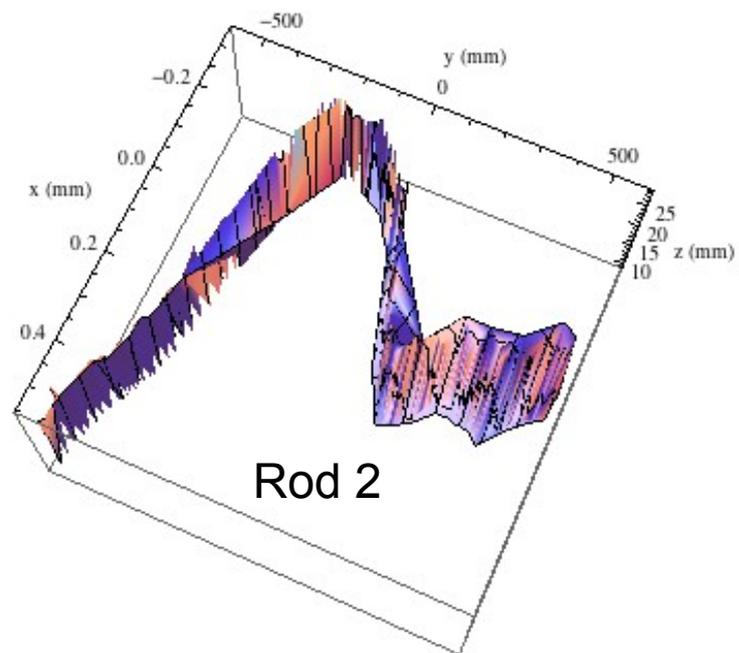
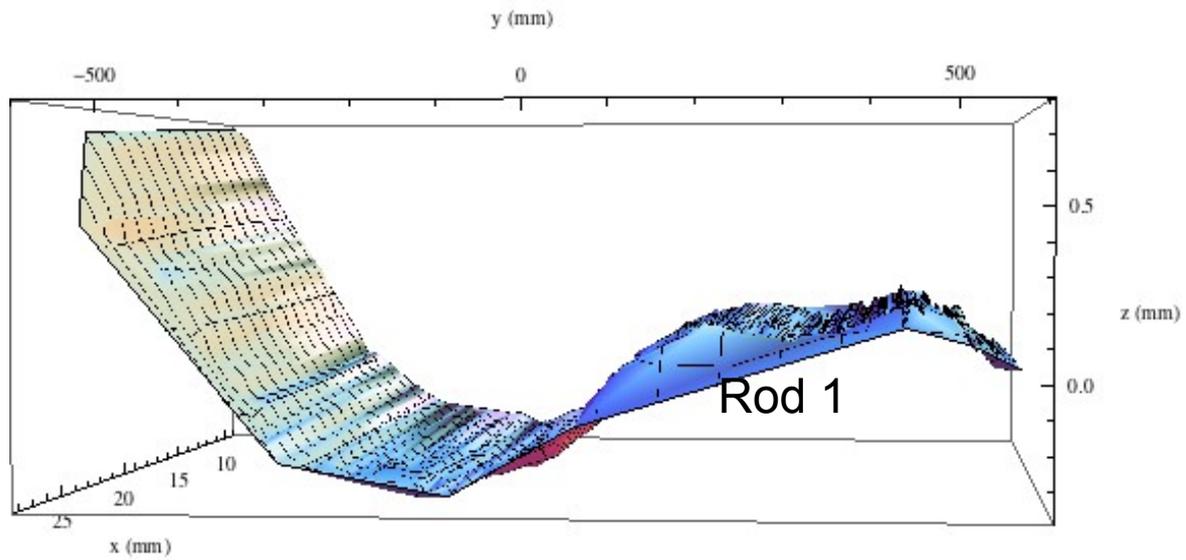
15



Device	Status	Comments
PLL work	Continues ...	
RFQ	warped rods!	

Rods are warped!

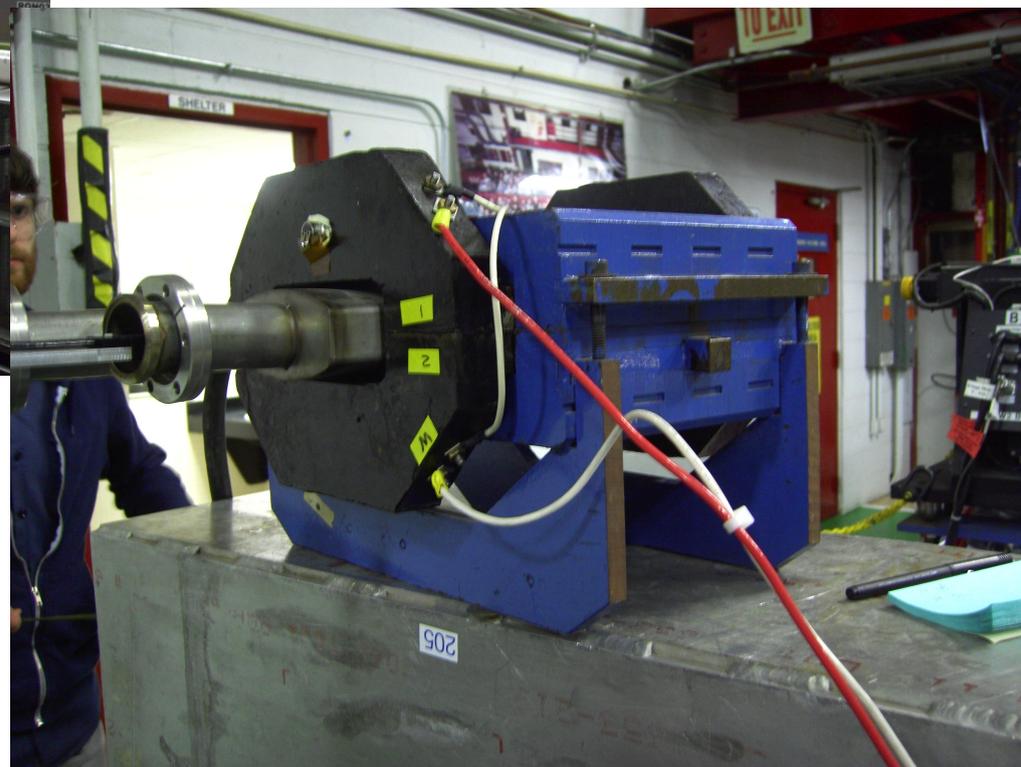
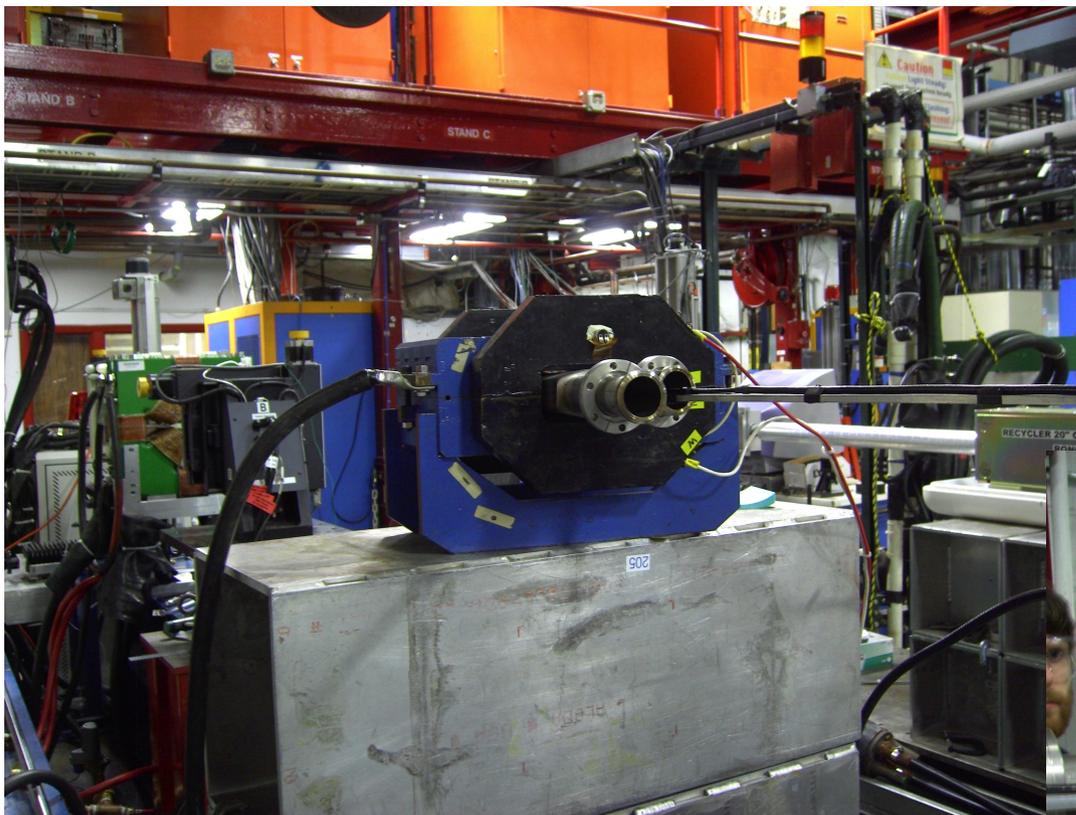




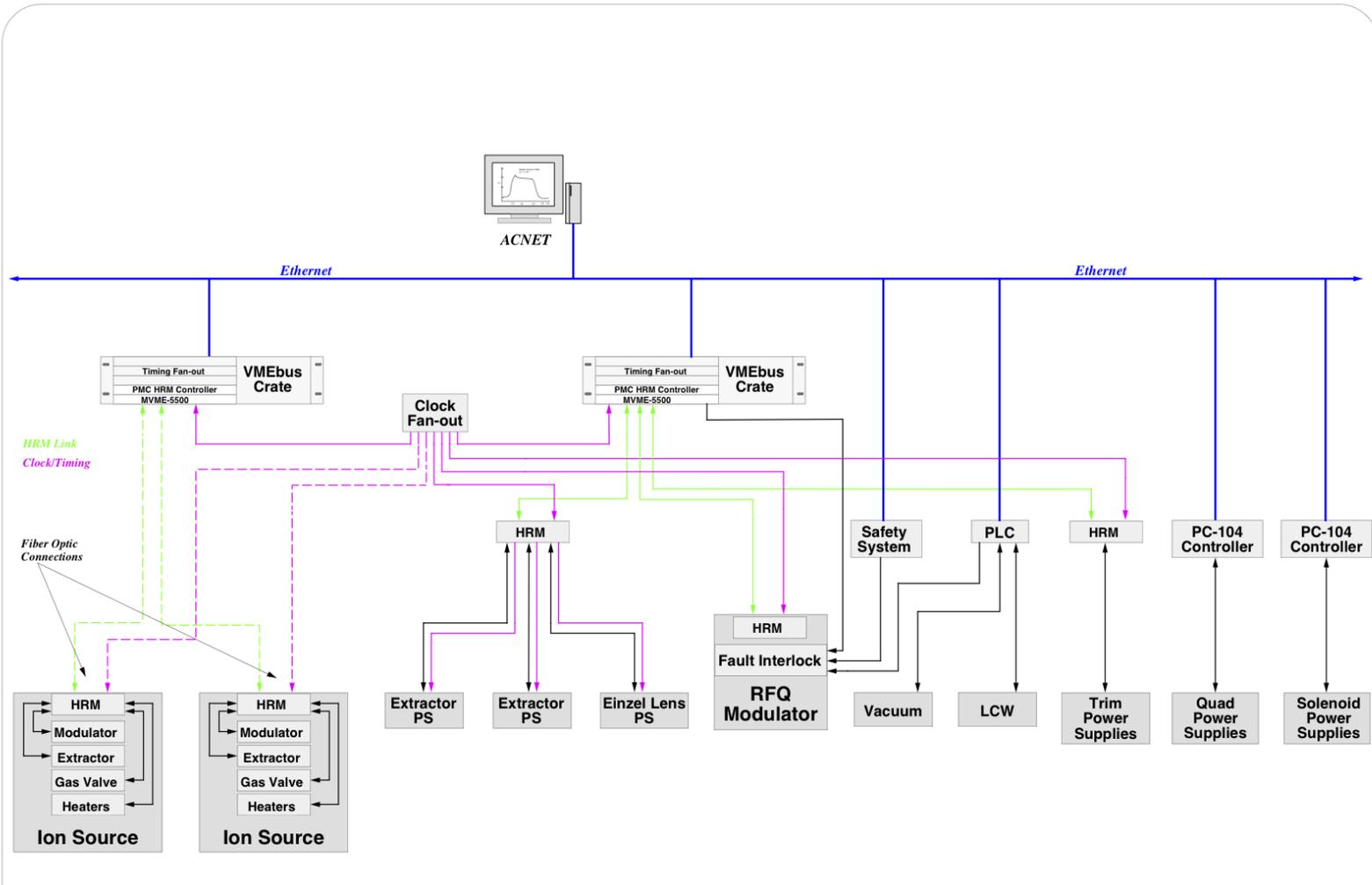
Test area, test stand and instrumentation

Device	Status	Comments
spectrometer	dipole B dl field measured.	

Spectrometer magnet



Controls



Linac RFQ Upgrade Controls Block Diagram

Controls



Safety