# Summer / Fall 2004 Downtime
# AEG Preparation Work

In general the Alignment Engineering Group consulted with individuals involved in many of the scheduled downtime activities. Equipment was checked, manpower was increased, and various general preparation tasks were preformed prior to the first day of the down which was Sunday August 1st, 2004

## Babar/IR2 Survey

- Instrument calibration (laser tracker, levels, etc.)
- Reviewing of 2002 survey data and results

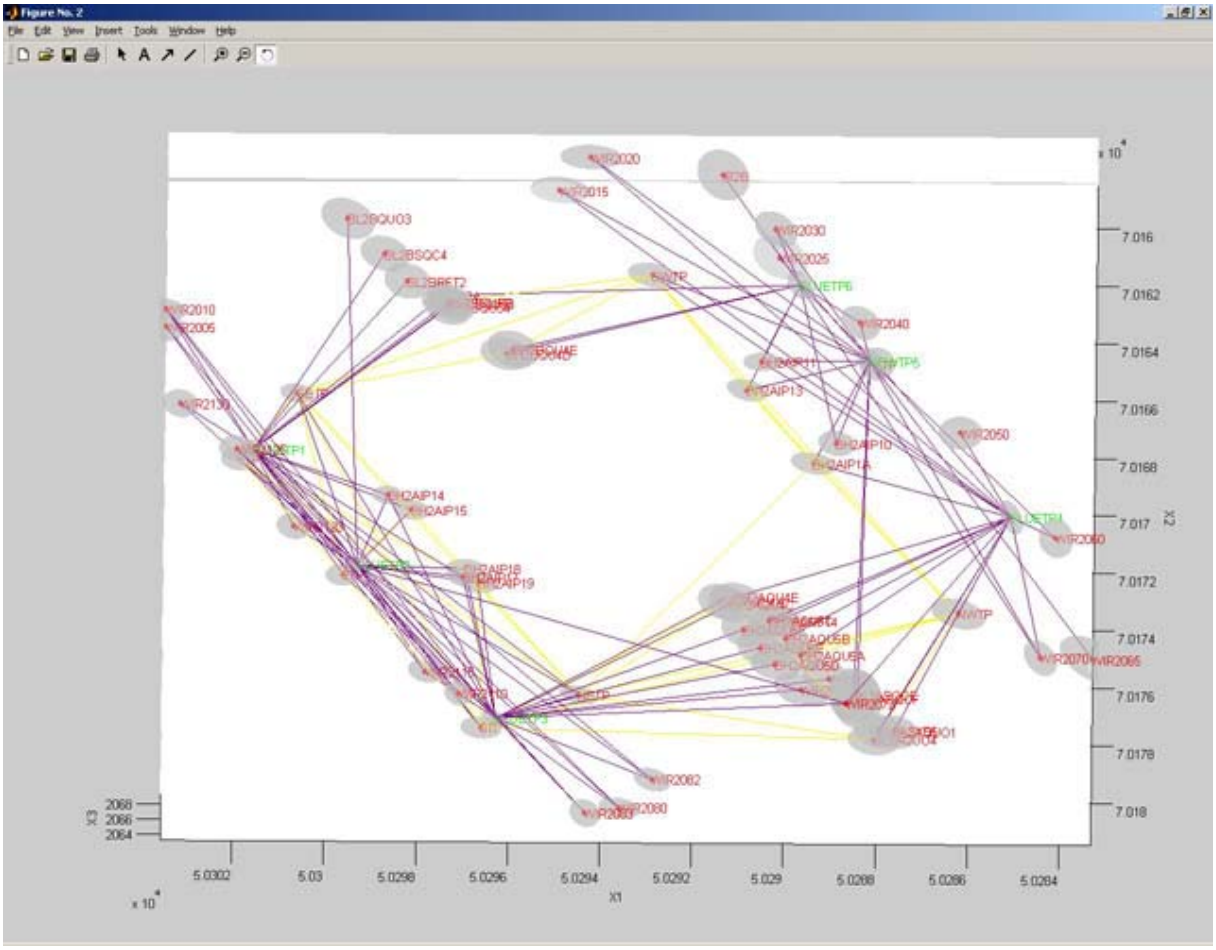
## Sector 20 LCLS Shielding Wall

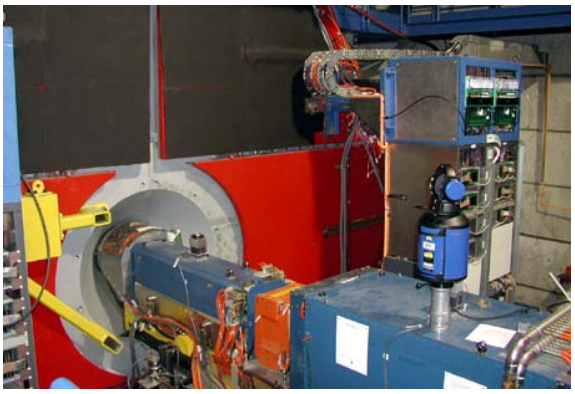
- Reviewing ROD data gathered June 3rd, 2004
- Gathering special alignment scope and targets (Note: the targets fit into bracket holes that are normally 2.250" diameter. In this particular case it was discovered that the holes were only 1.500" diameter. Only a few rare targets could be found for this size.)

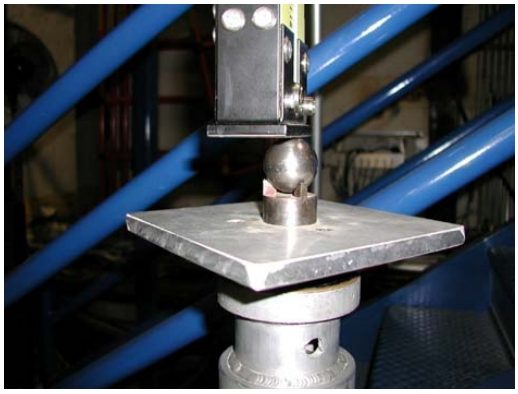
# Summer / Fall 2004 Downtime
# AEG Week 1 Summary

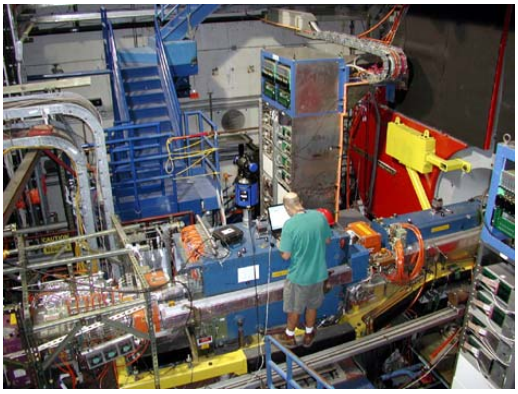
## BaBar/IR2 survey

| | BaBar | IR2 | IR2 - 02 |
|---|---|---|---|
| Number of Stations | 6 | 34 | 47 |
| Number of Points | 64 | 316 | 378 |
| | | | |
| Number of Tracker Triplets | 111 | 969 | 1281 |
| Number of Height Differences | 34 | 155 | 163 |
| | | | |
| Number of Coordinate Unknowns | 210 | 1050 | 1275 |
| Number of Nuisance Parameters | 18 | 102 | 141 |
| Number of Datum Parameters | 4 | 4 | 4 |
| | | | |
| Date | 8/1/04 | 8/1-4/04 | 2002 |
| Field Man-Hours | 52 | 184 | |









# Sector 20 LCLS shielding wall

- Tuesday August 3

1 TC2002 set-up

- Wednesday August 4

8 TC2002 set-ups
The wall was down at 12:30PM

- Thursday August 5

Levels through floor, wall and jack-points
Fit a line through the 7 jack-points:

| Point | X in mil | Y in mil |
|---|---|---|
| 20-6 | -0.009 | 0.006 |
| 20-7 | 0.004 | -0.014 |
| 20-8 | 0.011 | 0.005 |
| 20-9 | 0.007 | 0.005 |
| 21-1 | -0.011 | -0.005 |
| 21-2 | 0.001 | 0.004 |
| 21-3 | -0.002 | -0.002 |

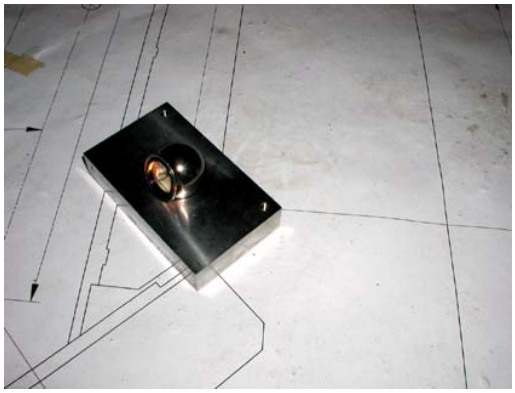
Set vacuum pipe with alignment scope

- Friday August 6

Compute quad position, assuming that Quad LI20 901 is at 2029.406 m:

| Quad | Survey in m | Drawing in m |
|---|---|---|
| LI20 701 | 2004.383 | 2004.386 |
| LI20 801 | 2016.733 | 2016.730 |
| LI21 201 | 2044.259 | 2044.257 |

The distance from Quad LI20 901 to the LCLS injector intersection point is 134.964 inches per the drawing.
Check quad with alignment scope
Mark 6 points for the 2 walls construction. The final decision was to have the walls vertical (not perpendicular to the accelerator-injector plane)

## PEPII LER SLM

- Wednesday August 4

1 crew set 2 out of the 5 stands. Waiting for PPS gate to be opened to lay out stands #2, #4 and #5

## SPEAR3 BL0 SLM

- Wednesday August 4

Enter drawing values into deck

- Thursday August 5

1 crew of 3 used the only 2 available wall monuments to get both X and Y guns. Checked 2 set-ups with SC04SD1, then checked the absorber and set:

- Vacuum valve assembly
- Drift pipe in permanent magnets
- Aperture mask
- Cold finger
- View port

- Friday August 6

1 crew of 3 to set a scribe line in the SLM room (X=0.000", Z=108.00")

## Miscellaneous

- Monday August 2 through Friday August 6
  - Checking and replacing linac laser retractable lens status lights

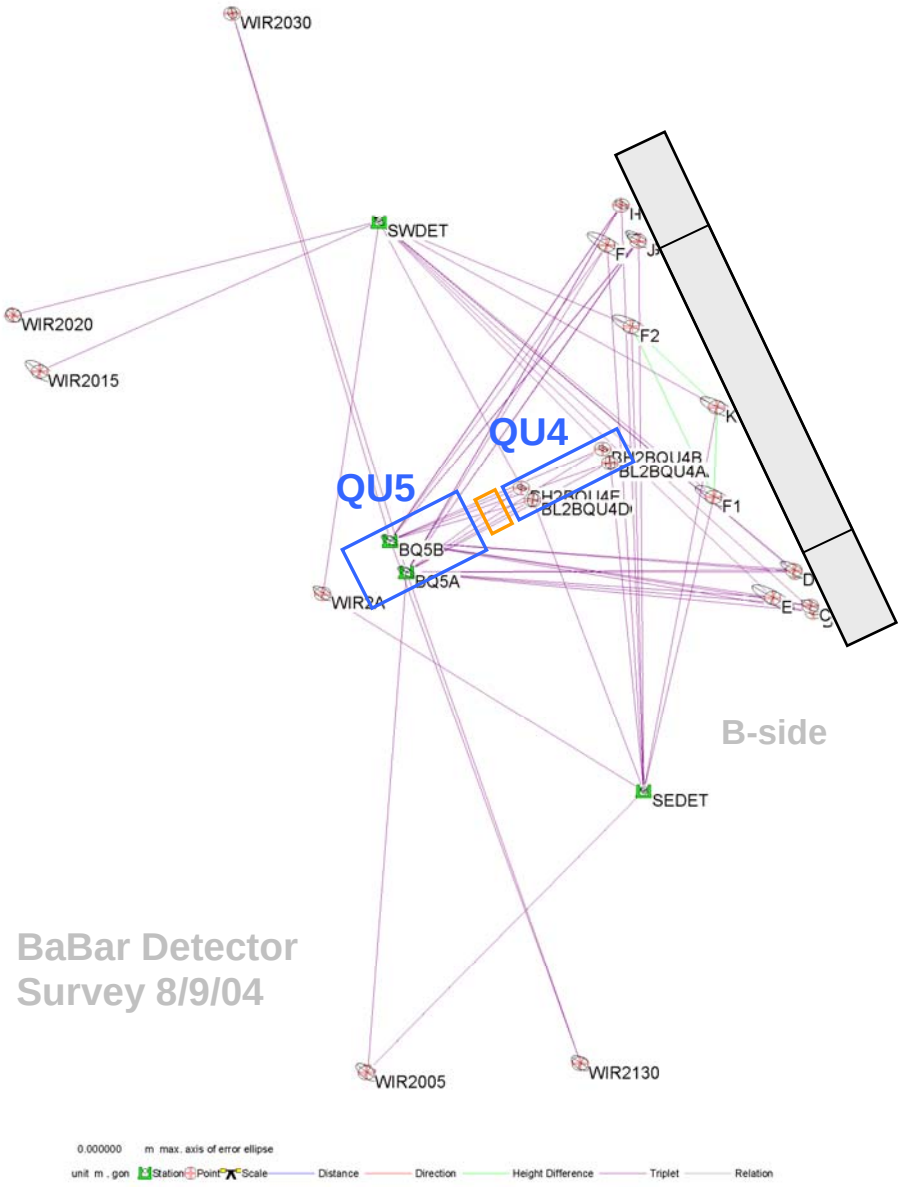
- Thursday August 5
  - Fiducialization of horizontal slits for SSRL BL4-2

- Friday August 6
  - Fiducialization of horizontal slits for SSRL BL4-2 and BL7-2
  - SPEAR3 survey of some wall blocks inside the ring for preparation of 2005 earthquake retrofit

# Summer / Fall 2004 Downtime
# AEG Week 2 Summary

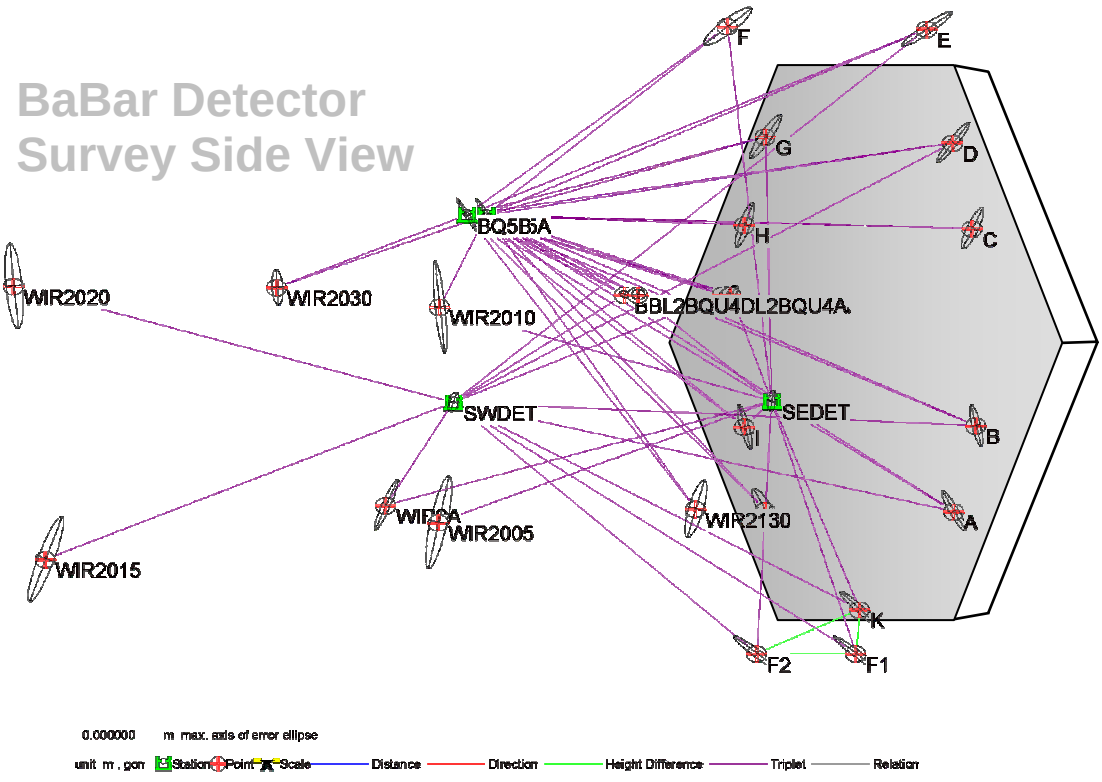
## BaBar Monitoring

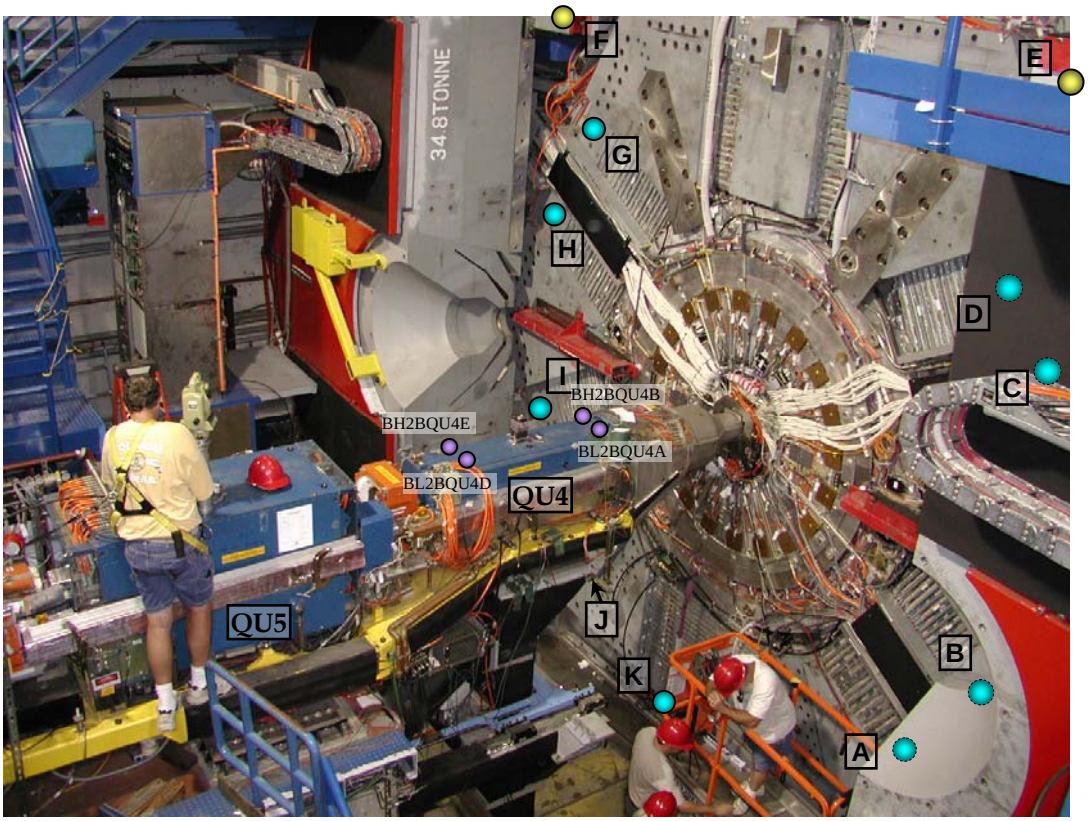
- Monday August 9
  - TC2002 network for baseline survey




The options for the adjustment were to rely on the verticality of the set-ups and to use the coordinates of the wall monuments for the determination of the datum.

| | |
|---|---|
| Number of Stations | 4 |
| Number of Points | 26 |
| | |
| Number of TC2002 Triplets | 56 |
| Number of Height Differences | 3 |
| | |
| Number of Coordinate Unknowns | 90 |
| Number of Nuisance Parameters | 4 |
| Number of Datum Parameters | 4 |
| | |
| Field Man-Hours | 25 |



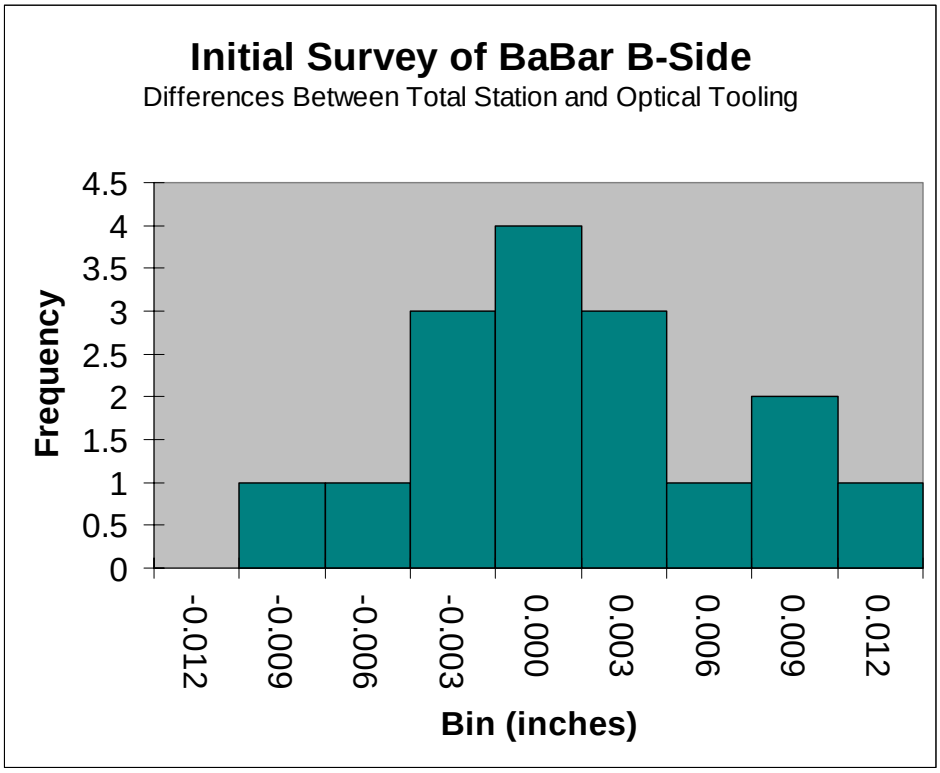



- Tuesday August 10
  - Optical tooling survey for baseline.

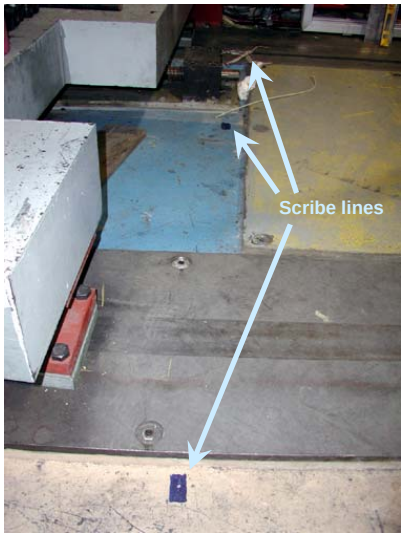
  Two scribe lines (one on each side of the B face) were established allowing the survey of A, B, C, D, E, F, G, H, I and K.

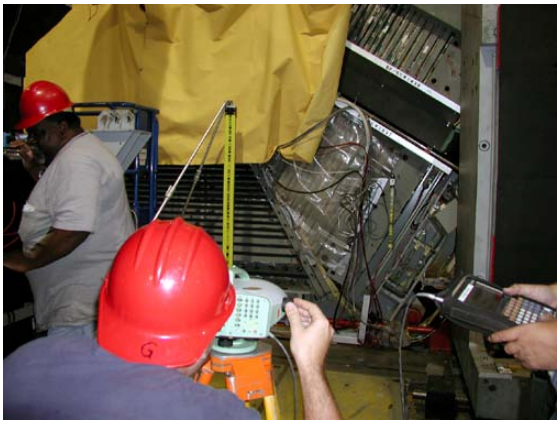
  The TC2002 survey was re-analyzed to allow direct comparison with the optical tooling solution. A plane representing the face of the detector was made from all the 9 points on the surface. The normal of this plane is called Z axis. Point K was used to set X=0. The average of points B&C and I&J determines Y=0.

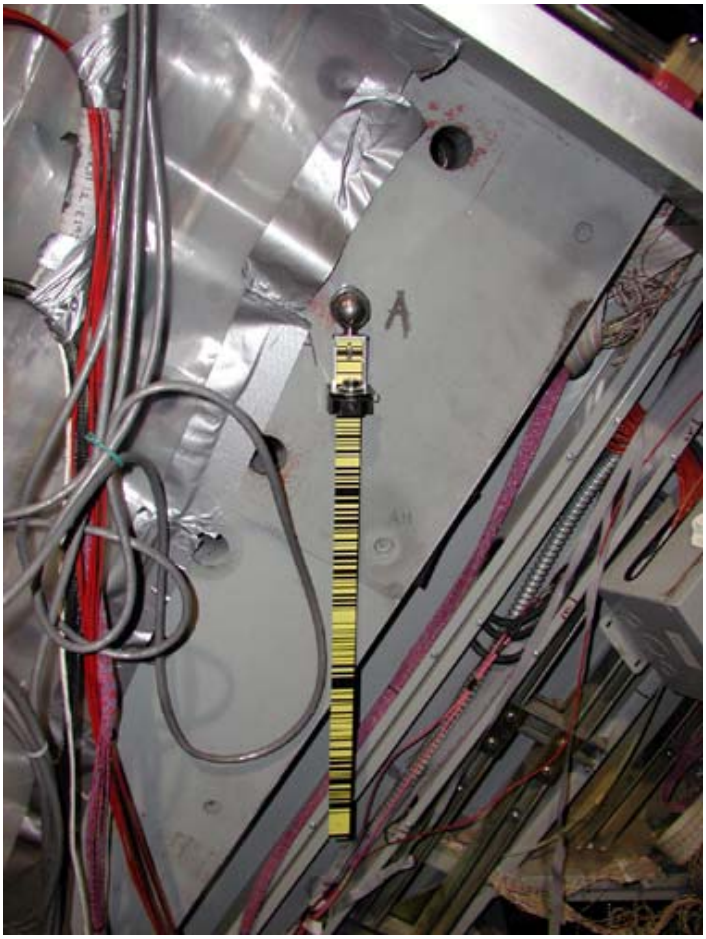
  The comparison between the TC2002 and the optical survey was very good except for point E. Presented on the next page is the histogram of the distribution of all possible X-distances between 2 points on the same side, excluding E:




- Friday August 13
  - o First check against baseline (Check #1) after lower blocks removed
    Since Monday's survey, 2 points disappeared: K and D. A replacement of D was installed and a survey made to allow future comparisons. Because of the space created by the lower block removal, the points A and J were opened to leveling observations. Two holes near the bottom points (A and J) were selected and cleaned to accommodate reflector balls. They were measured during this survey and will be used as back-up points in the event of losing more targets.








The TC2002 and the level observations were combined in a similar fashion as in the initial survey. In particular, the a-priori standard deviations were identical: 100 µm for distances, 50 µm for height differences, 50 µm over the distance in meters for horizontal angles, 70 µm over the distance in meters for vertical distances.

Again the comparison between the total station/level and the optical tooling surveys was very good except for ball E.

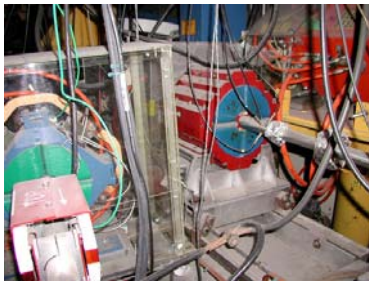
A 7-parameter transformation on all points was used to compare both Monday's and Friday's survey showing that the detector did not move significantly (from this end) between the 2 surveys. Here are the results:

| Name | DZ (m) | DX (m) | DY (m) |
|---|---|---|---|
| A | 0.000345 | 0.000006 | 0.000054 |
| B | -0.000071 | 0.000078 | -0.000012 |
| C | -0.000131 | 0.000047 | -0.000008 |
| E | -0.000204 | -0.000001 | 0.000014 |
| F | 0.000015 | 0.000024 | -0.000074 |
| G | -0.000035 | 0.000051 | -0.000101 |
| H | 0.000492 | -0.000025 | -0.000140 |
| I | 0.000031 | 0.000005 | 0.000004 |
| J | 0.000063 | -0.000036 | -0.000116 |
| F1 | 0.000093 | 0.000025 | 0.000293 |
| F2 | -0.000100 | -0.000051 | 0.000115 |
| WIR2030 | -0.000057 | 0.000004 | 0.000066 |
| BH2BQU4A | 0.000000 | 0.000028 | -0.000012 |
| BH2BQU4B | -0.000023 | -0.000024 | 0.000036 |
| BH2BQU4D | 0.000053 | 0.000080 | 0.000030 |
| BH2BQU4E | 0.000022 | -0.000003 | -0.000035 |
| WIR2130 | -0.000135 | -0.000069 | 0.000025 |
| WIR2010 | -0.000004 | -0.000143 | -0.000040 |
| WIR2005 | -0.000038 | -0.000137 | -0.000096 |
| WIR2A | -0.000092 | 0.000040 | 0.000004 |
| WIR2020 | -0.000198 | -0.000013 | -0.000041 |
| WIR2015 | -0.000027 | 0.000116 | 0.000033 |

The DZ values report changes in the direction perpendicular to the face of the detector. They are irrelevant for this deformation study and can be explained by the glue creeping into the tooling ball socket and preventing a good repeatability of the placement of the cup holding the reflector ball. The other 2 directions are the ones characteristic of possible deformations. The biggest one for points on the detector is 140 µm. The average for the 9 common points in the X direction is 17 µm with a standard deviation of ±37 µm. It is -42 µm with a standard deviation of ±67 µm for the Y direction.

## BSY Survey

- Monday August 9
    - Mapping of 50Q1, 2, 3, and 50B1



- Tuesday August 10
    - Mapping of 50Q1, 2, 3, and 50B1
- Wednesday August 11
    - Mapping and processing of survey data

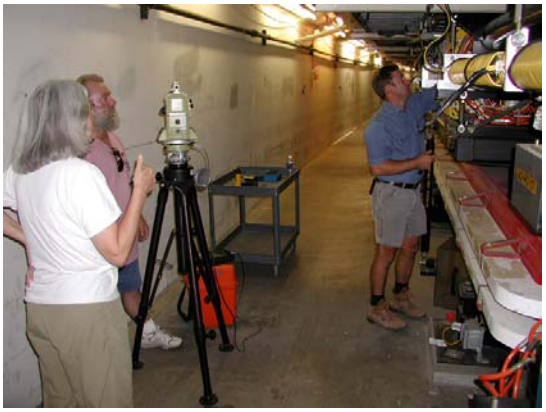
## Sector 20 LCLS Shielding Wall

- Thursday August 12
  - Setting of holes for metal forms on shield wall “B” (closest to the linac)


# PEPII Quadrupole & Sextupole Survey

- Monday August 9
  - Mapping R1


- Tuesday August 10
  - Continue mapping region R1





- Wednesday August 11
    - Continue mapping region R1
- Thursday August 12
    - Finish mapping R1 and start R5

## Miscellaneous

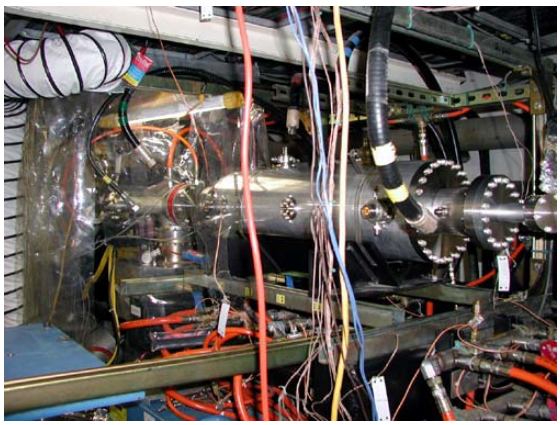
- Monday August 9
    - ESA: discussion for setting a scribe line and aligning a future laser
    - PEPII: walk around ring to plan for sextupole and quadrupole roll survey
    - Fiducialization of SSRL BL7-2 horizontal slits

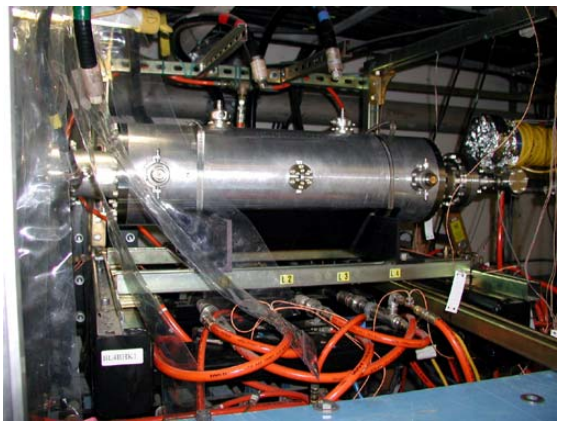
- Tuesday August 10
    - Fiducialization of SSRL BL7-2 horizontal slits
    - SPEAR3 wall block survey

- Wednesday August 11
    - Fiducialization for BL9-2
    - Set quad LI02 991
    - SPEAR3 wall block survey
    - PEPII R6: finished the layout of the stands for the LER SLM
    - Bld25: check magnetic measurement set-up for NLC permanent magnet

- Thursday August 12
    - Fiducialization for BL9-2
    - Check the fiduacialization of the SPEAR3 SLM mirror M0 after its drop earlier in the week: no change to the original numbers
    - ESA: scribe-lines

- Friday August 13
    - PEPII R4: set kicker BL4BHK1

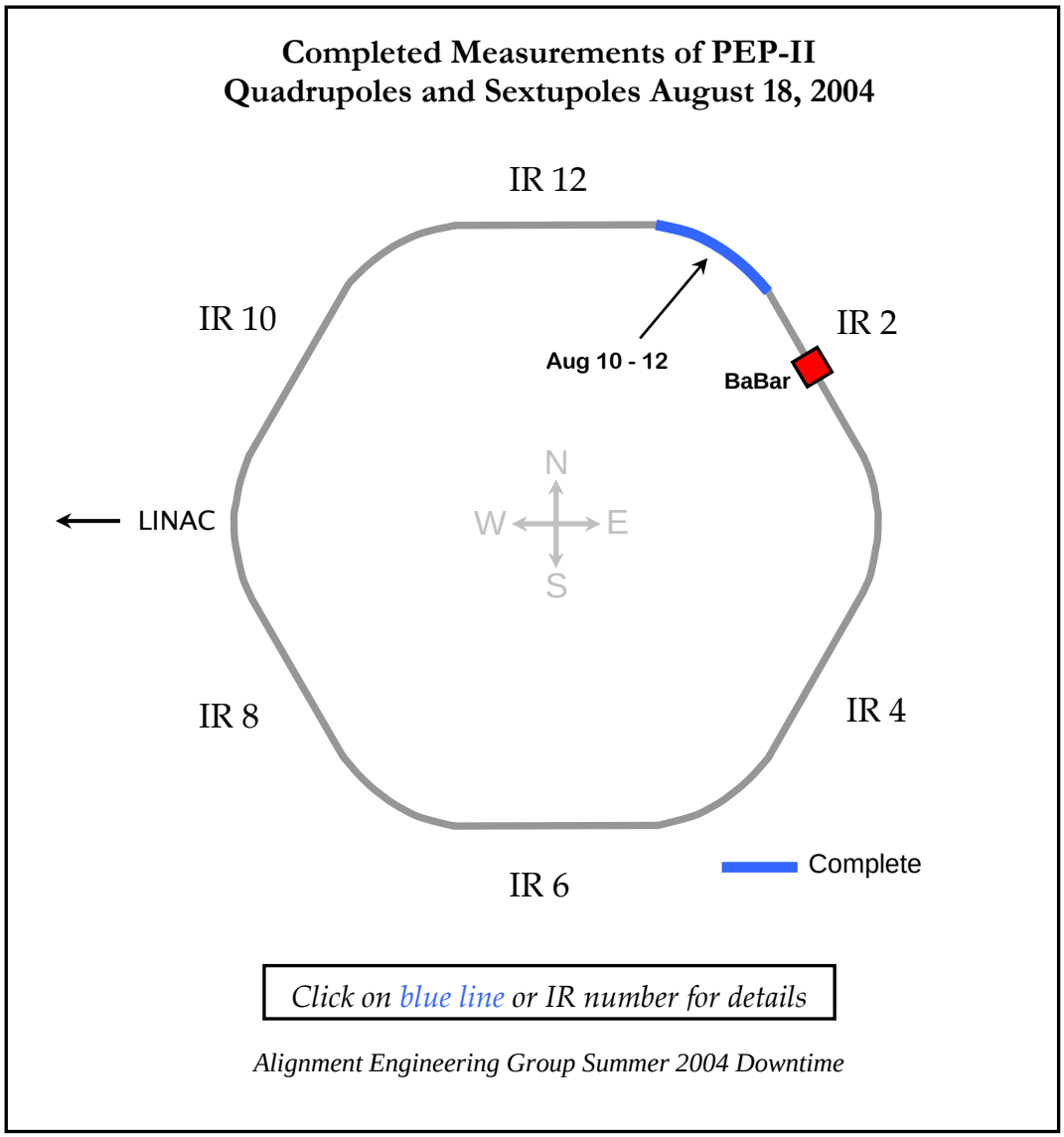




# Summer / Fall 2004 Downtime
# AEG Week 3 Summary

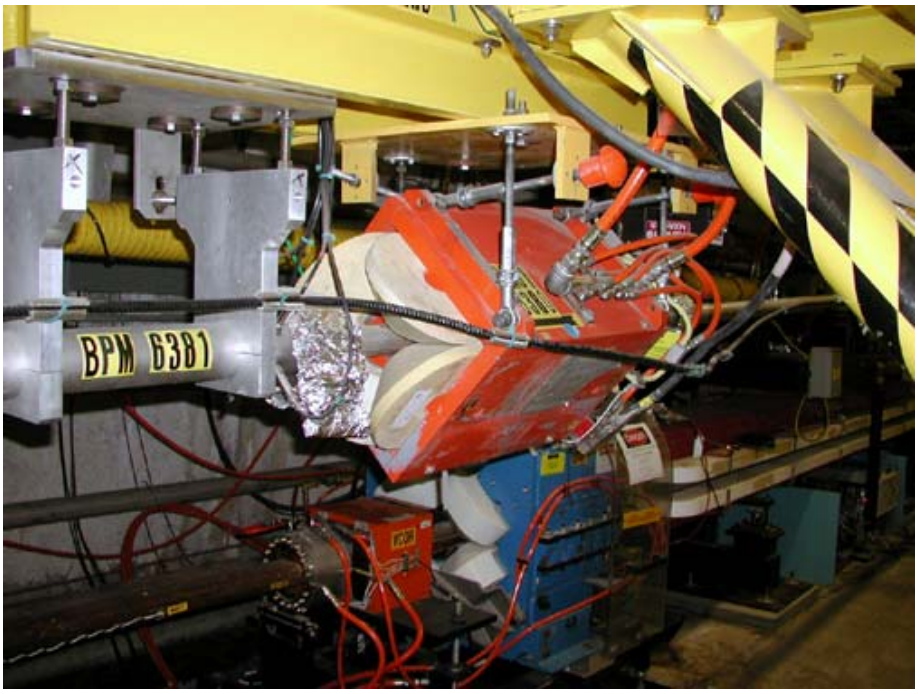
## PEPII Quadrupole & Sextupole Survey

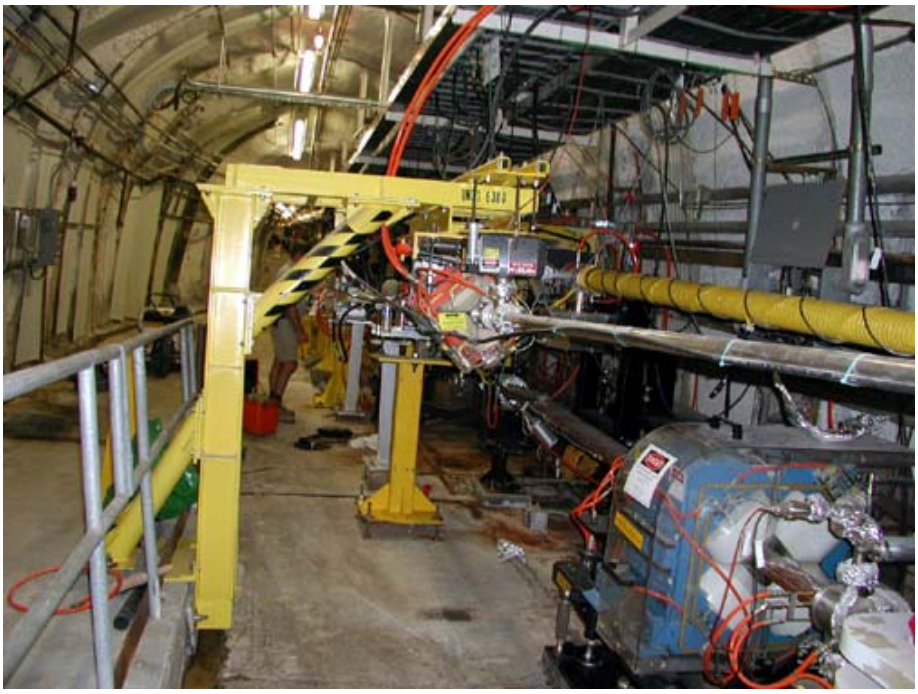
- Monday August 16
  - Continue mapping R5
- Friday August 20
  - Continue mapping R5
  - Start mapping R3



PEPII HER Injection Line

- Monday August 16
  - 6 TC2002 set-ups to read components from QM29 to QMR2. Move the bend BLP- and try to move QM31 but had problem with support.



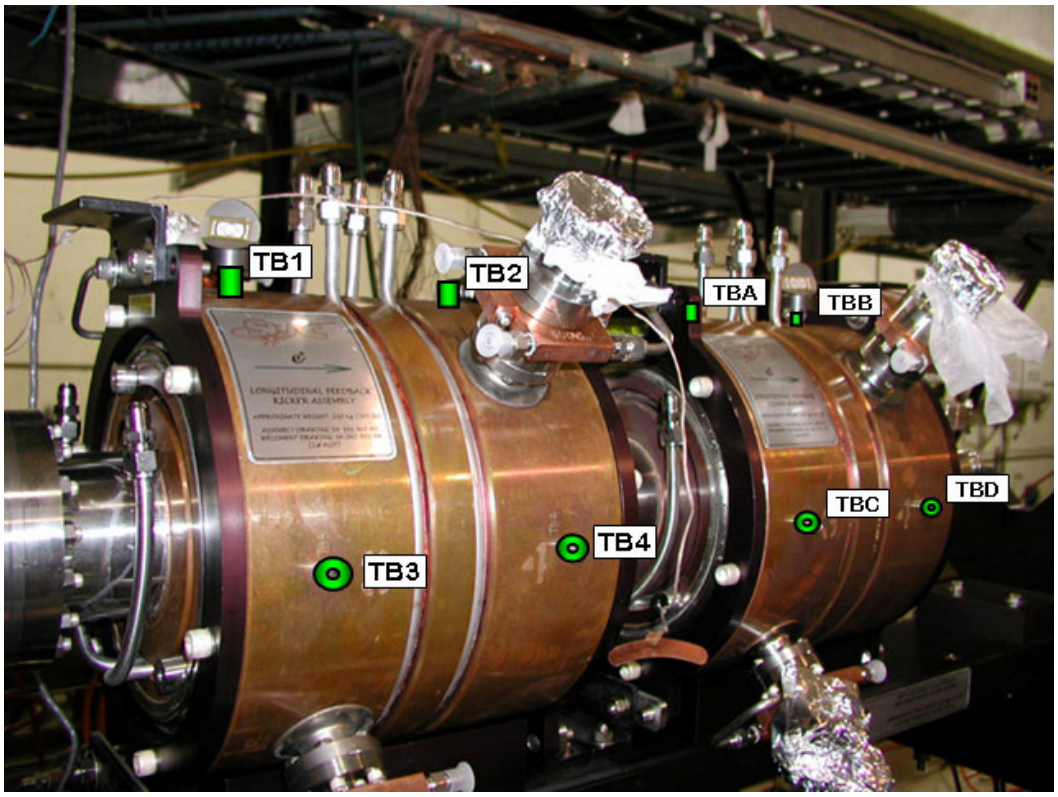
- Thursday August 19
    - Move QM31 after exchange of rod support

| | | Z (in) | X (in) | Y (in) |
|---|---|---|---|---|
| QM29 | HM06QU91 | -0.036 | 0.129 | -0.014 |
| | HM06QU92 | -0.029 | 0.152 | -0.017 |
| | HM06QU94 | -0.030 | 0.127 | -0.026 |
| | | | | |
| QM30 | HM07QU01 | -0.071 | 0.152 | -0.009 |
| | HM07QU02 | -0.061 | 0.150 | -0.008 |
| | HM07QU03 | -0.072 | 0.145 | -0.027 |
| | HM07QU04 | -0.072 | 0.139 | -0.030 |
| | | | | |
| QM31 | HM07QU11 | -0.042 | 0.144 | 0.015 |
| | HM07QU12 | -0.027 | 0.147 | 0.016 |
| | HM07QU14 | -0.039 | 0.141 | 0.016 |
| | | | | |
| | HM07BDAA | -0.031 | 0.145 | 0.036 |
| | HM07BDAB | -0.025 | 0.150 | 0.032 |
| | HM07BDAC | -0.021 | 0.143 | 0.039 |
| | HM07BDAD | -0.023 | 0.148 | 0.034 |
| | | | | |
| QM32 | HM07QU21 | -0.060 | 0.156 | 0.034 |
| | HM07QU22 | -0.043 | 0.158 | 0.039 |
| | HM07QU24 | -0.073 | 0.150 | 0.044 |
| | | | | |
| | HM07BDB1 | -0.021 | 0.166 | 0.051 |
| | HM07BDB2 | -0.010 | 0.169 | 0.050 |
| | HM07BDB3 | -0.018 | 0.155 | 0.030 |
| | HM07BDB4 | -0.005 | 0.156 | 0.029 |
| | | | | |
| | HM07BDC1 | -0.051 | 0.173 | 0.047 |
| | HM07BDC2 | -0.051 | 0.164 | 0.042 |
| | HM07BDC3 | -0.051 | 0.177 | 0.042 |
| | HM07BDC4 | -0.053 | 0.173 | 0.042 |
| | | | | |
| | HM07BDDA | -0.039 | 0.166 | 0.047 |
| | HM07BDDB | -0.039 | 0.162 | 0.056 |
| | HM07BDDC | -0.031 | 0.163 | 0.051 |
| | HM07BDDD | -0.033 | 0.161 | 0.065 |
| | | | | |
| QMR1 | HM08QU11 | -0.029 | 0.150 | 0.029 |
| | HM08QU12 | -0.019 | 0.159 | 0.031 |
| | HM08QU13 | -0.026 | 0.148 | 0.040 |
| | HM08QU14 | -0.017 | 0.153 | 0.042 |
| | | | | |
| QMR2 | HM08QU21 | -0.003 | 0.165 | 0.025 |
| | HM08QU22 | -0.003 | 0.173 | 0.016 |
| | HM08QU23 | -0.008 | 0.157 | 0.030 |
| | HM08QU24 | -0.001 | 0.161 | 0.020 |
| | | | | |

# PEPII LER R4 kicker

- Wednesday August 18
  - Set Frascati kicker

This longitudinal kicker is actually made of two modules. Each module had been fiducialized individually on the CMM. Then the 2 modules were bolted together. In the field, 2 TBs on one module and 1 on the other were used to set the kicker. Then some other TBs were read. See table below:




| | Z (in) | X (in) | Y (in) | Z (mm) | X (mm) | Y (mm) |
|---|---|---|---|---|---|---|
| BL4BLK11 | -0.014 | 0.001 | -0.008 | -0.4 | 0.0 | -0.2 |
| BL4BLK12 | -0.009 | 0.020 | 0.034 | -0.2 | 0.5 | 0.9 |
| BL4BLK13 | 0.036 | -0.003 | -0.002 | 0.9 | -0.1 | -0.1 |
| BL4BLK14 | 0.030 | -0.002 | 0.037 | 0.8 | -0.1 | 0.9 |
| BL4BLK1A | 0.005 | -0.113 | 0.078 | 0.1 | -2.9 | 2.0 |
| BL4BLK1B | 0.000 | -0.114 | 0.116 | 0.0 | -2.9 | 2.9 |
| BL4BLK1C | 0.044 | 0.006 | -0.037 | 1.1 | 0.2 | -0.9 |
| BL4BLK1D | 0.050 | -0.001 | -0.003 | 1.3 | 0.0 | -0.1 |

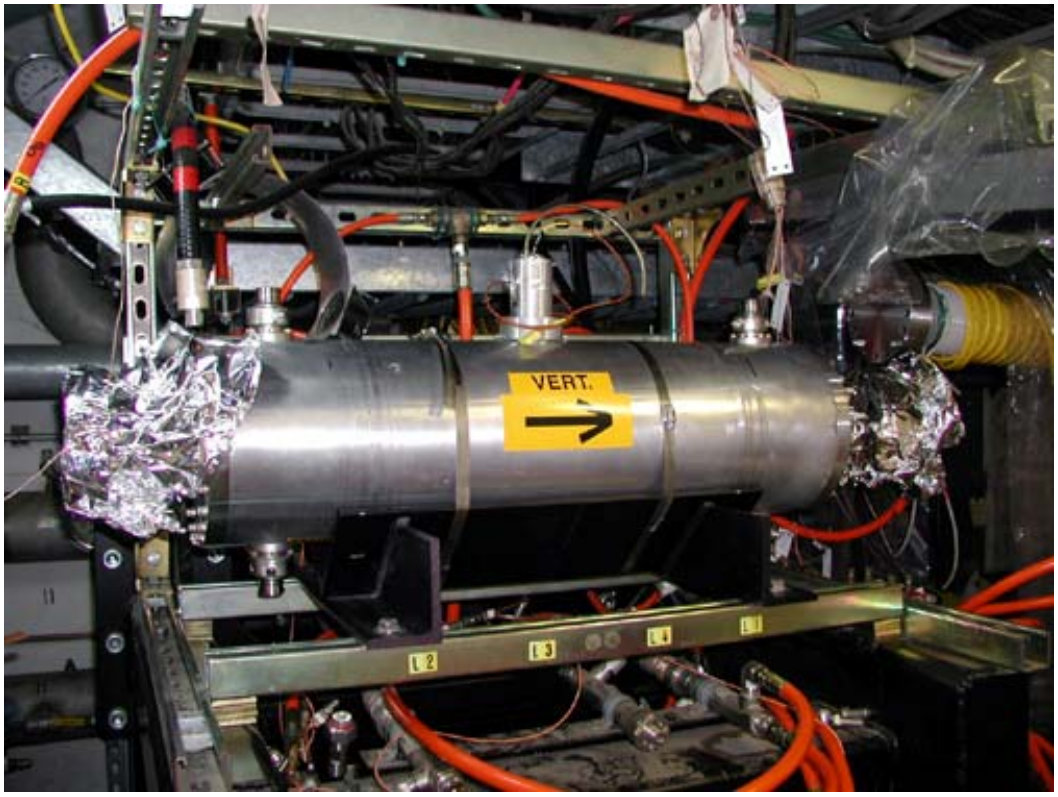
The yellow lines indicate the 3 TBs that were used for the setting.

After discussions with Mohammad Dormiani and David Kharakh, it was decided to roll the second module. Here are the new found values:

| | Z (in) | X (in) | Y (in) | Z (mm) | X (mm) | Y (mm) |
|---|---|---|---|---|---|---|
| BL4BLK11 | 0.000 | -0.001 | -0.007 | 0.0 | 0.0 | -0.2 |
| BL4BLK12 | -0.005 | 0.009 | 0.000 | -0.1 | 0.2 | 0.0 |
| BL4BLK13 | 0.013 | 0.001 | -0.002 | 0.3 | 0.0 | 0.0 |
| BL4BLK14 | 0.012 | 0.004 | 0.006 | 0.3 | 0.1 | 0.2 |
| BL4BLK1A | 0.020 | 0.058 | 0.003 | 0.5 | 1.5 | 0.1 |
| BL4BLK1B | 0.020 | -0.110 | 0.006 | 0.5 | -2.8 | 0.2 |
| BL4BLK1C | 0.019 | 0.006 | -0.114 | 0.5 | 0.1 | -2.9 |
| BL4BLK1D | 0.023 | 0.010 | -0.111 | 0.6 | 0.3 | -2.8 |

Again the highlighted boxes reflect the values set in the field. The second module is rolled to the first one by approximately 10 milliradians.

- Friday August 20
    - Set transverse vertical kicker using flanges and features.



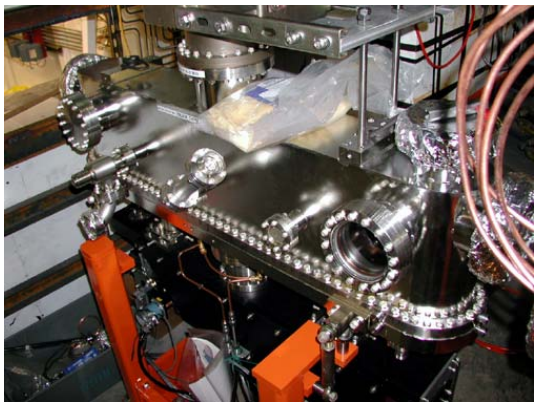

## SPEAR3 BL6-0

- Monday August 16
    - Set the 4-jaw slit tank, the BPM and the tapered mask

- Tuesday August 17
    - Set the M0 mirror tank and 1 slit on the 4-jaw slit tank

- Wednesday August 18
    - Set the remaining 3 slits

- Thursday August 17
    - Set the M0 mirror

## Linac Laser Alignment System

- Monday August 16
    - Plug open
    - Special AEG built indicator box used

- Tuesday August 17


- Wednesday August 18
  - The laser was down because of power outage, so no actual visual check of image quality could be done. The last10 sectors were physically inspected both from the klystron gallery and the accelerator housing; no target was found “in”.
  - 20-6 air shut off; 5-9 electricians???

- Friday August 20

## Miscellaneous

- Monday August 16
  - SSRL Vacuum: Fiducialization of graphite filters for SSRL BL9-2, BL4-1 and BL4-2
  - PEPII: gather CMM data for Frascati kicker set-up
  - Sector 20 LCLS shielding wall: verify location of holes in shield wall "B" after setting the wall

- Tuesday August 17
  - SSRL Vacuum: Fiducialization of graphite filters for SSRL BL4-3, BL7-2. BL7-3, BL9-3 and BL10-2

- Wednesday August 18
  - Check paperwork for all the previous graphite filter fiducialization
  - SSRL: start layout for stairs foundations outside building 130

- Thursday August 19
  - Assemble paperwork for all the previous graphite filter fiducialization
  - SPEAR3 BL0: set mirror M0 in beamline
  - Sector 20 LCLS shielding wall: check progress
  - PEPII SLM: review the strongback alignment procedure for the PEPII LER vacuum arc chamber (SA-340-410-30)
  - FFTB E166: review the alignment schemes for the Tungsten collimators (PC7 and PC7.8)

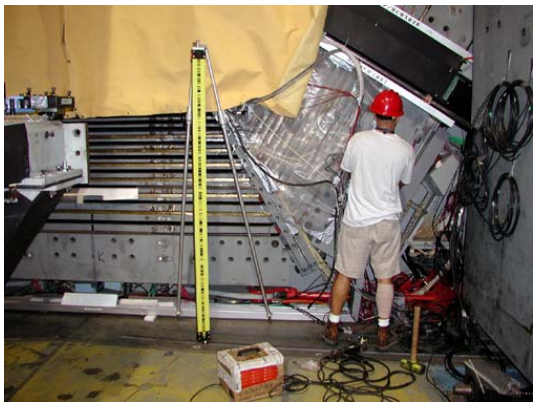
- Friday August 20
  - SSRL Vacuum: design support plate for future assembly
  - SSRL: finish layout for stairs foundations outside building 130

# Summer / Fall 2004 Downtime
# AEG Week 4 Summary

## BaBar Monitoring

- Monday August 23
  - This survey is designed to check the detector after the installation of the brass plates in the lower part of the detector.

  - It is based on the same observation scheme as the one described in week 2. The problems encountered this time:
    - Loss of tooling ball socket J after the 4 TC2002 set-ups and before the optical tooling reading. A new socket, called J2, was installed for future surveys. Its X offset was read and an additional total station set-up was made to determine its position.
    - The tooling ball socket for F1 seems to have some glue in the hole and/or the nearby concrete fillet blocks the cup from sitting down fully: special attention should be made in choosing the appropriate Hubbs cup (it may need a short shank).



The TC2002 data adjustment based on the previous coordinates show no significant movements. The 2 sets of optical tooling data match the adjusted X-coordinates. The level data are set apart right now in order to study the non-repeatability of F1 in the Y direction.

## PEPII Quadrupole & Sextupole Survey

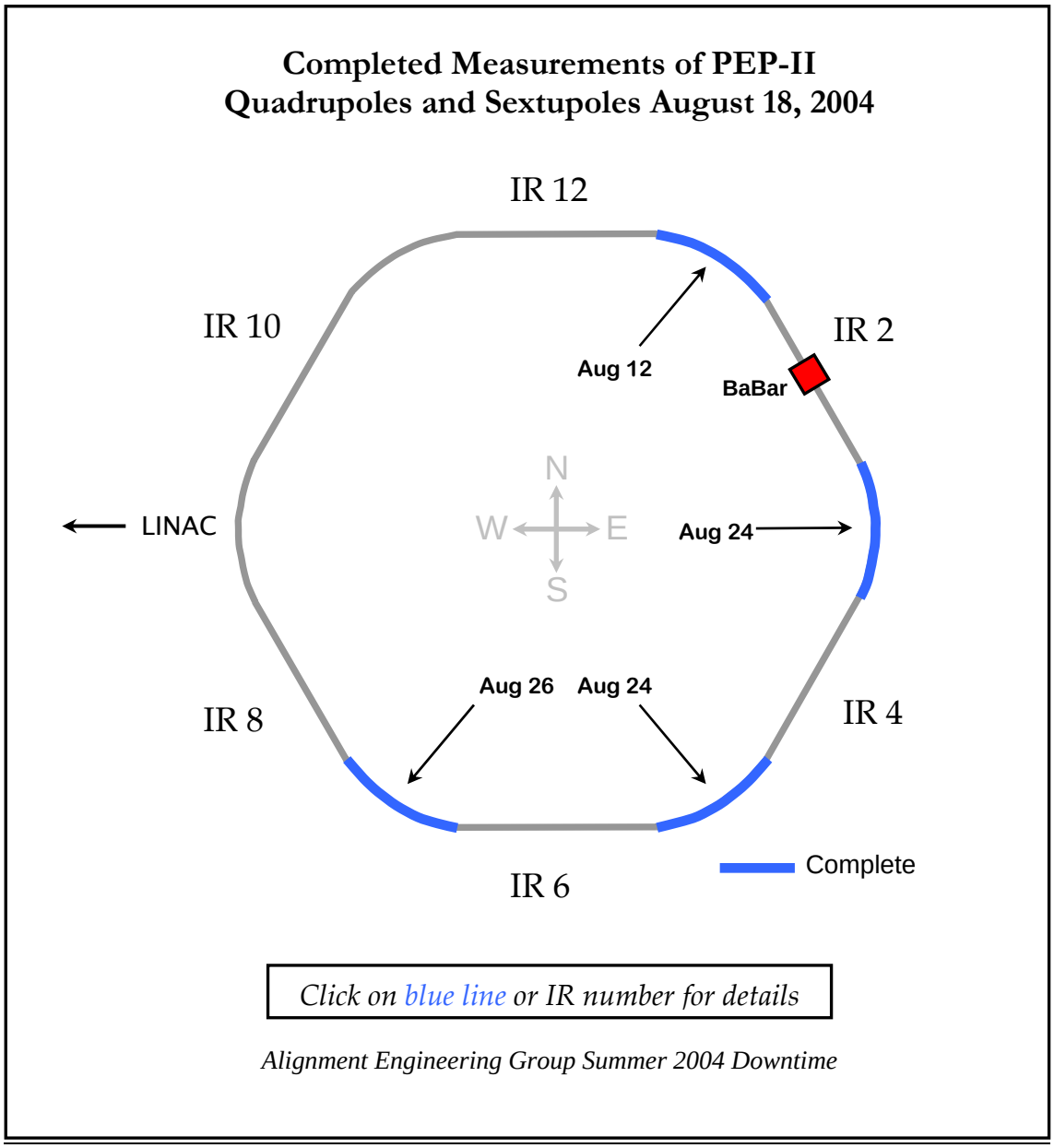
- Monday August 23
  - Continue mapping R3

- Tuesday August 24
  - Finish mapping R3 and R5
  - Start mapping R7 and R11

- Wednesday August 25
  - Continue mapping R7 and R11
  - Start mapping R9

- Thursday August 26
  - Finish mapping R7
  - Continue mapping R11

- Friday August 27
  - Start mapping R9 & R11




## Sector 20 LCLS Shielding Wall

- Monday August 23
  - Read the upstream wall A: found that it was placed 7/8" too high and 3/8" too close to the tunnel wall. It was moved and ended still 1/4" too high and 1/4" too close. The bolts have not been tightened yet.




- Tuesday August 24


- Thursday August 26
    - The following results were sent:

| Pipe | X (in) | Y (in) |
|---|---|---|
| Beam Line Pipe 1 | 0.14 | -0.26 |
| Beam Line Pipe 2 | 0.00 | 0.08 |
| Beam Line Pipe 3 | 0.21 | -0.00 |
| Beam Line Pipe 4 | -0.37 | -0.01 |
| | | |

| | | |
|---|---|---|
| Laser Pipe (East) 1 | -0.14 | 0.13 |
| Laser Pipe (East) 2 | 0.08 | 0.26 |
| Laser Pipe (East) 3 | 0.13 | 0.28 |
| Laser Pipe (East) 4 | -0.78 | 0.31 |
| | | |
| Laser Pipe (West) 1 | 0.10 | -0.07 |
| Laser Pipe (West) 2 | 0.08 | -0.09 |
| Laser Pipe (West) 3 | 0.13 | 0.22 |
| Laser Pipe (West) 4 | -0.28 | -0.01 |

These are as-built values with the following convention: the numbering starts from the linac and goes towards the injector room. In other words: 1 is South and 4 is North.

- The distance from the linac floor to the klystron gallery floor was measured by a Disto to be 10.70 meters

## South Damping Rings

Summary of Original Job Request:

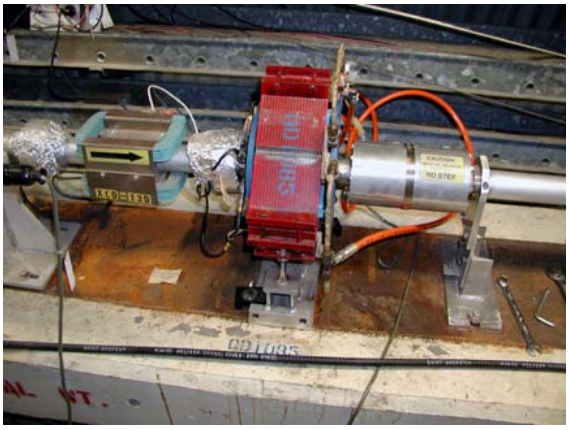
**QD1085 DS10QU7**
SLTR QF1085: ready for alignment. On downtime schedule, job #D-MMR-080.
All four coils removed, support stand was not adjusted.

**DS13QU2**
SLTR QD 1355: ready for alignment. Not scheduled.
All four coils removed, magnet support stand was removed.

**DS02BD1**
SLTR Bend 291 (dipole): Not scheduled.
Need to read magnet position and possibly move. Magnet support removed, coils removed.
Vacuum chamber has been dimpled. Need alignment to read magnet, once we know how much we need to move magnet, Mechanical Engineer will determine if moving in direction needed would damage vac. chamber further

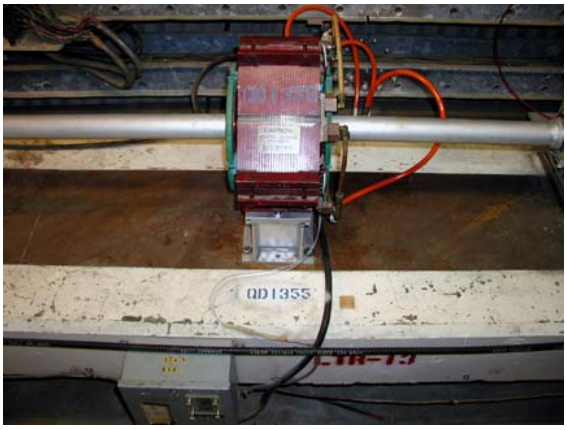
**DN07BD5**
NRTL Bend 790 (dipole): ready for alignment. Not scheduled.
Magnet support stand not adjusted, coils replaced. Very difficult location to access.

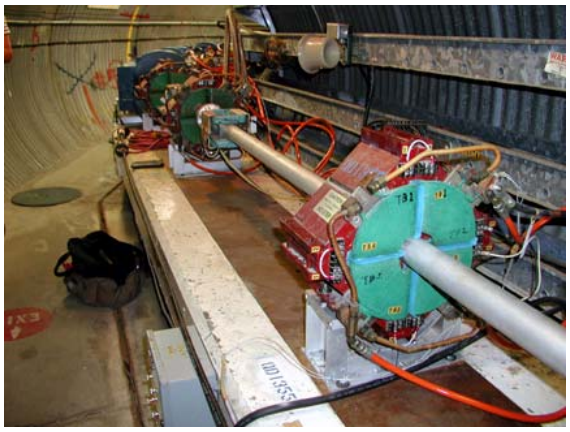
- Friday August 27
    - QD1085



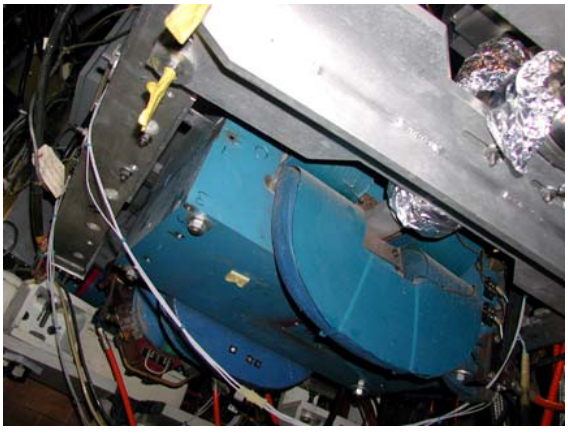
This quad was set using optical tooling methods and was left off ideal in X 8 mils US and 12 mils DS, for lack of proper movers.

    - QD1355 (optical tooling set-up)



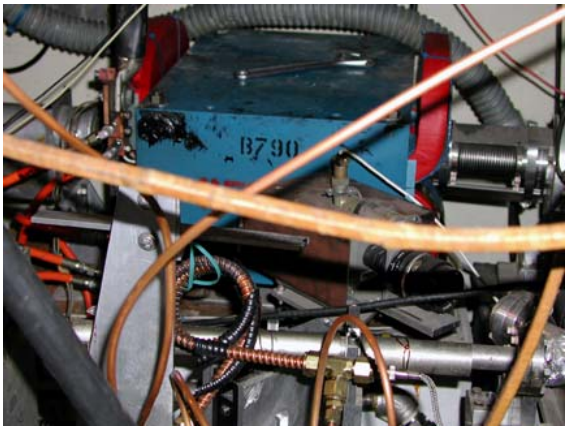



    - Bend 291 (TC2002 set-up)



This bend was measured and values were given for future work.

- Bend 790 (TC2002 set-up)




## LER Vacuum Chamber

- Friday August 27

## SPEAR3 BL0 SLM

- Monday August 23
  - Read the cold finger after the installation of the bellows: found it 150 mils out in X (towards SPEAR). It cannot be moved because of the bellows, so this final position was accepted and recorded.

## SPEAR3 BL6-2

- Thursday August 26
  - Align mono and mirror

- Friday August 27
  - Align slits and check mirror

## Linac Laser Alignment System

- Monday August 23
  - The baffle activation late last Friday did not bring any positive conclusion. With only one key, only one baffle at a time could be activated and the presence of one baffle did not seem to change the image of a target.

- 2-9 has its panel missing so it could not be activated and thus prevented any attempt to start a recording, as the reference line is established from the laser position to 2-9 with a check on 21-9.
- The visual inspection of targets failed. It was later found that 2 targets were in after the electrical panel replacement.

- Tuesday August 24
  - A decision was made and relayed by Tom Graul that all sector 2 panels will not be replaced because of potential electrical hazards. We requested to have the ability to manually activate 2-9 from the klystron gallery.
  - A first attempt at using the program "imdetect" showed that:
    - There is a factor 10 between the position recorded in the database and the positions read on the magnescale.
    - There is no easy way to repeat a displacement with the mouse alone. So it seemed difficult to "fake" the 2-9 position to start a new recording with the automatic image detection and the right relation to 2-9 as it was made in 1999.

- Wednesday August 25
  - Tom Graul arranged for the installation of the air solenoid in 2-9: a temporary power cord (see the enhanced picture above) is attached directly to the solenoid and can be plugged into any of the regular electrical outlets on the other side of the panel in order to move the target into the "in" position. The target was tested and produced the following image in the "blue room".

- Thursday August 26
- Friday August 27
    - Contact Bill Herrmannsfeldt for insight on use of baffles.

## Miscellaneous

- Tuesday August 24
    - SSRL Vacuum: install slits into tank for BL6-2

- Wednesday August 25
    - SSRL Vacuum: install slits into tank for BL6-2

- LCLS Preparation: Generate elevations for floor and ceiling of the PEP tunnel and SLC tunnel at the intersection locations where the LCLS tunnel will pass over them:
  - SLC ceiling 68.7 m, floor 65.5m
  - PEPII ceiling 68.4 m, floor 65.2m

  The values for the SLC are based on GS52YY1 and checked with the floor rivet: RSFF1371. The values for PEPII are based on BH3AQUQ and checked with the wall monument: 226A.

- Thursday August 26
  - E166

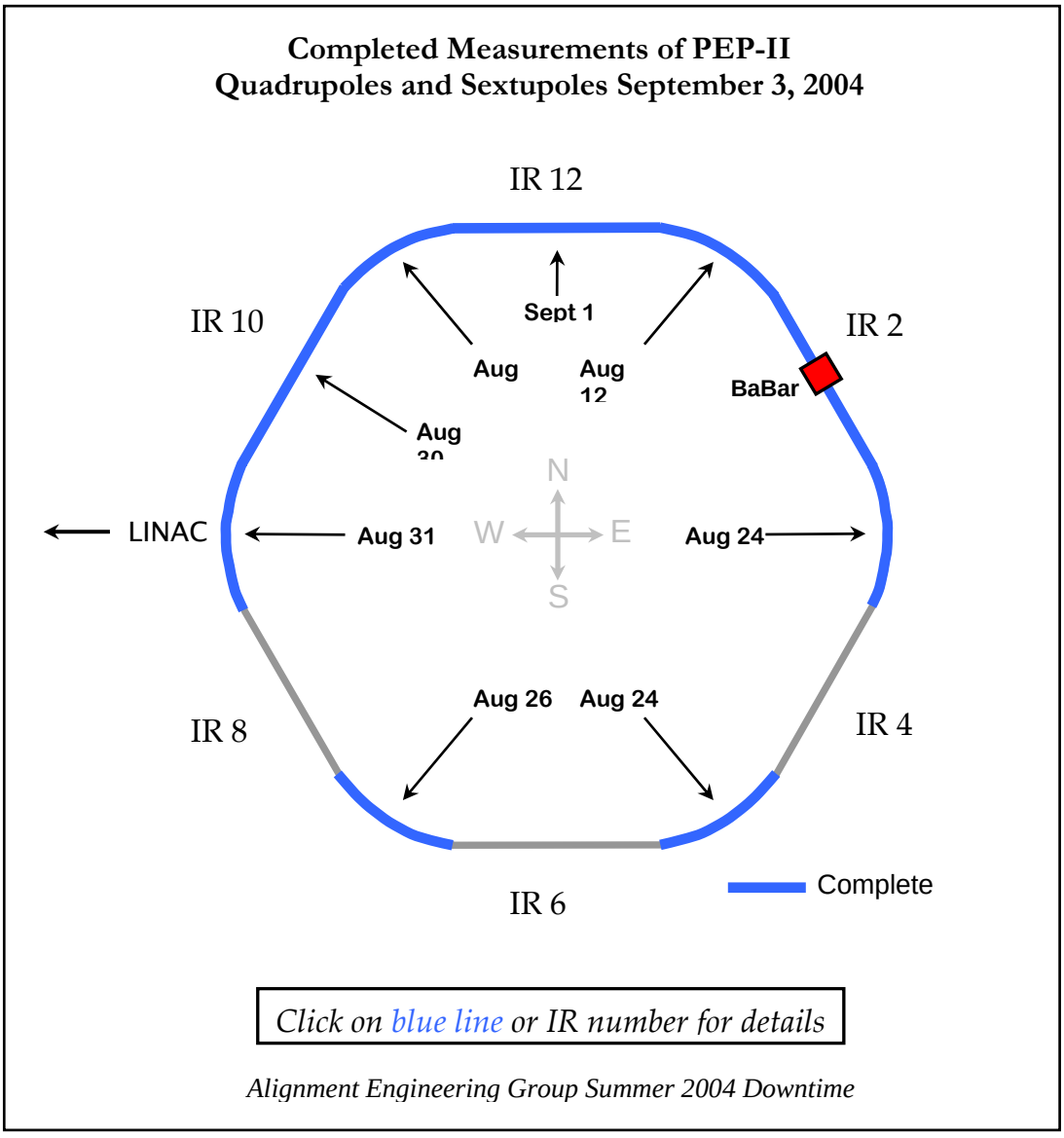
    The collimator PC7.7 was set using both the adjustments at the base of the pedestals and the ones on the top.

    A new table was set in elevation (pitched to match the $\gamma$ line) with the constraints of the future lead shielding and the presence of the flanges under the table top.

- Friday August 27
  - Outside wire set-up testing for LCLS

# Summer / Fall 2004 Downtime
# AEG Week 5 Summary

## PEPII Quadrupole & Sextupole Survey

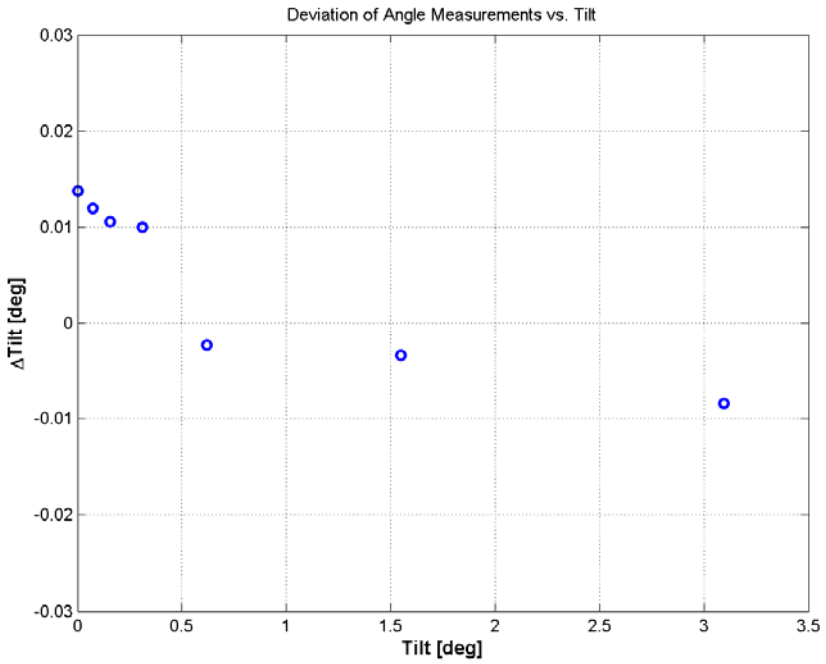


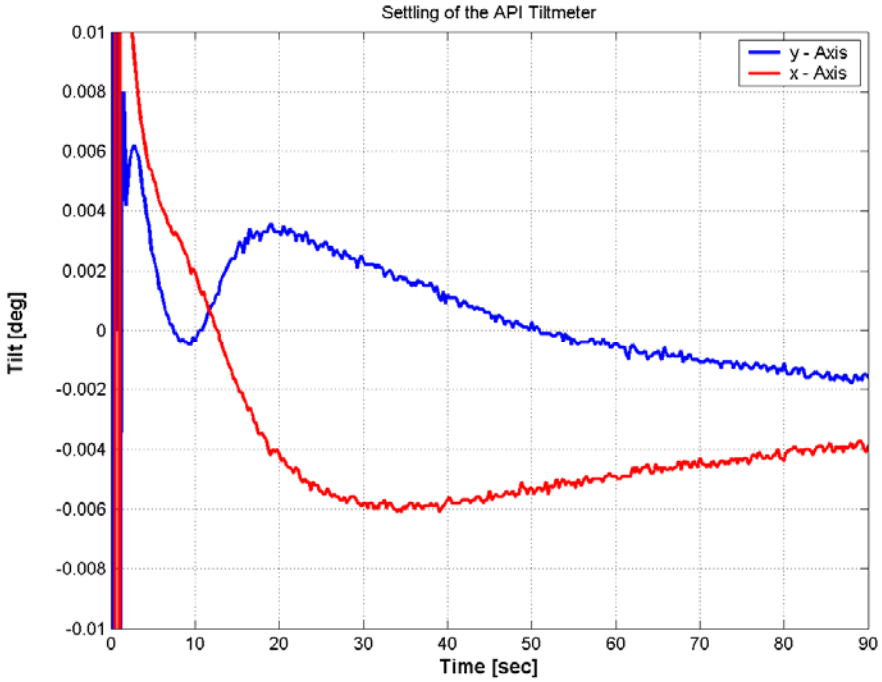

- Monday August 30
  - Finish R11
  - Start and finish R10

- Tuesday August 31
  - Finish R9

- Wednesday September 1
  - R8 is closed for RF testing
  - Start and finish R12
  - Went to pick up the tiltmeter from Applied GeoMechanics in Santa Cruz

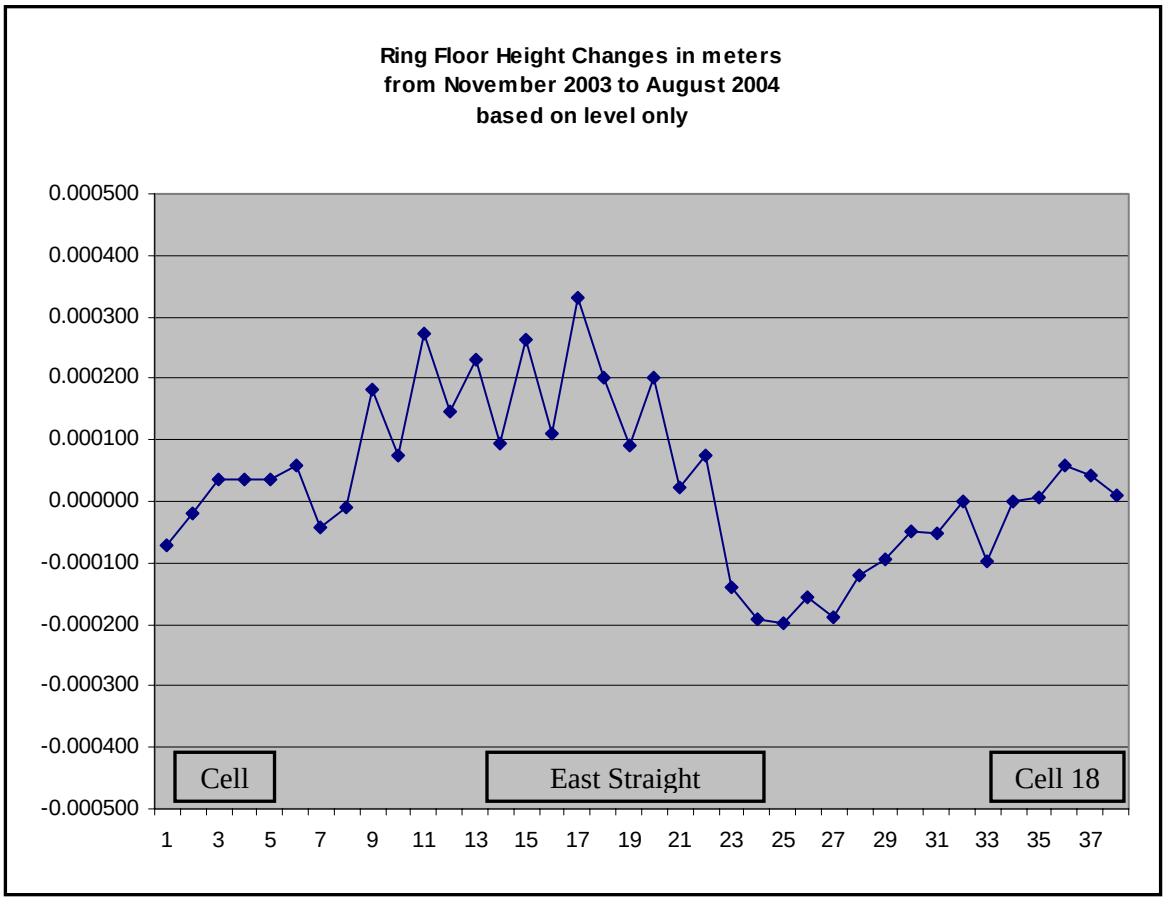
- Thursday September 2
  - R4
  - Study the repaired tiltmeter



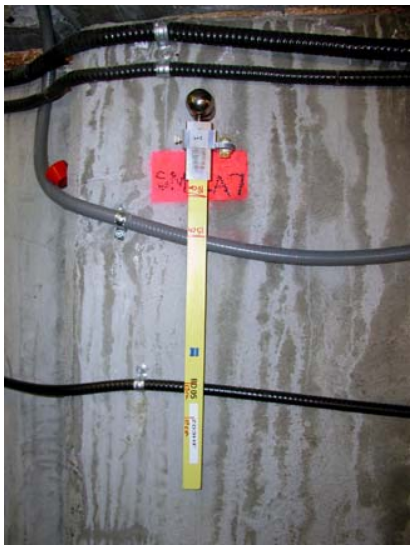



SPEAR3 Alignment

- Monday August 30
  - Finish level shot on floor points:
    - 89 height differences
    - 46 points surveyed (38 ring floor)




- Tuesday August 31
  - Start level shots to wall points
  - Add extension to wall monuments in areas where light fixtures prevent placement of regular tooling. (Note sticky notes added to back of rod to indicate “safe zone” to read bar code.)




- Wednesday September 1
  - 2 crews of leveling (1 Zeiss, 1Leica for the high ceiling area)

- Thursday September 2
  - 1 leveling crew finished the wall points
  - Calibration of trackers in Sector10 in preparation of next week mapping

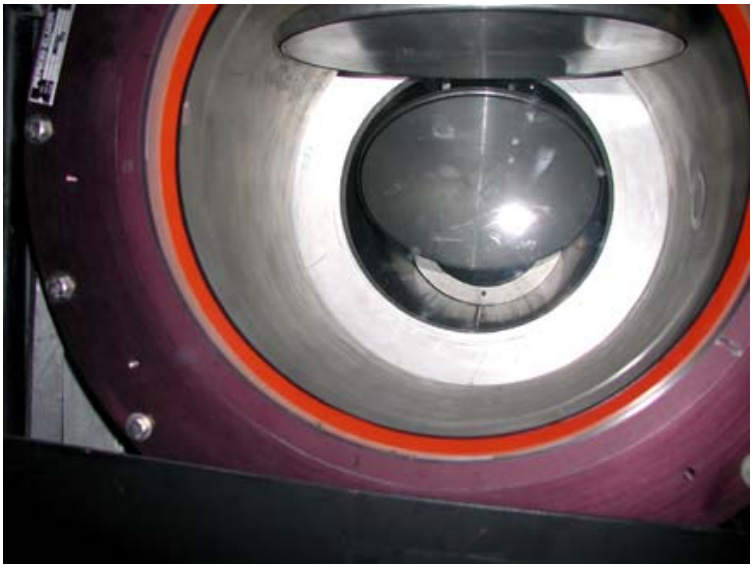
- Friday September 3
  - Move gear in the tunnel

# Linac Laser Alignment System

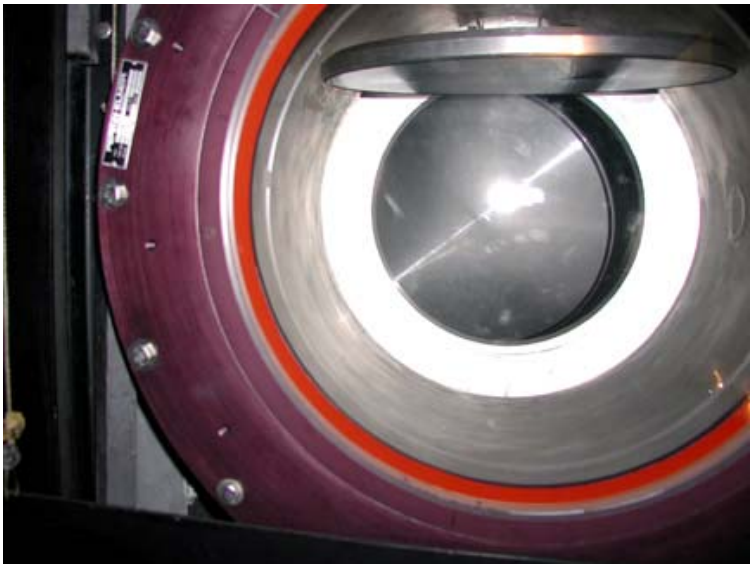
- Monday August 30

    - Before damage to flap (August 17, 2004)


    - Flap partially failing



- Flap broken



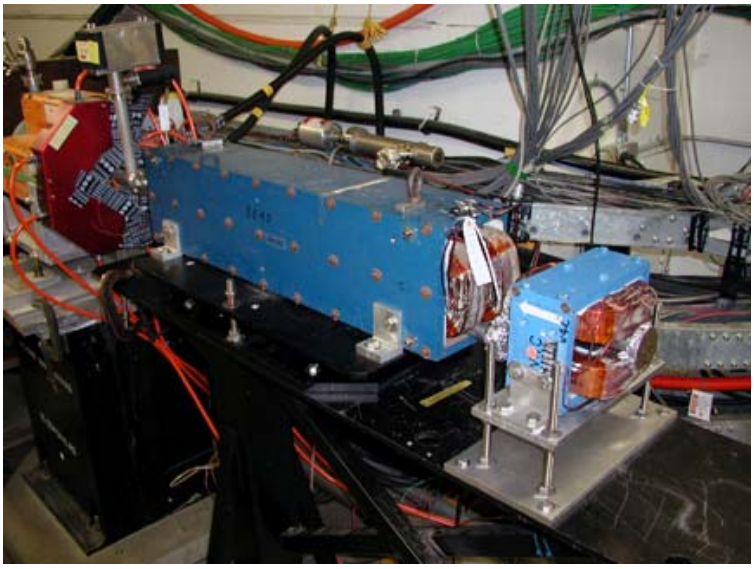
- Tuesday August 31
  - Show flap problem and wait for repair decision

- Friday September 3
  - Light pipe vented and flap repair begun

## Miscellaneous

- Tuesday August 31
  - SSRL Vacuum: BL9-3 vertical slits

  - FFTB 166: gather deck data to set vertical bend



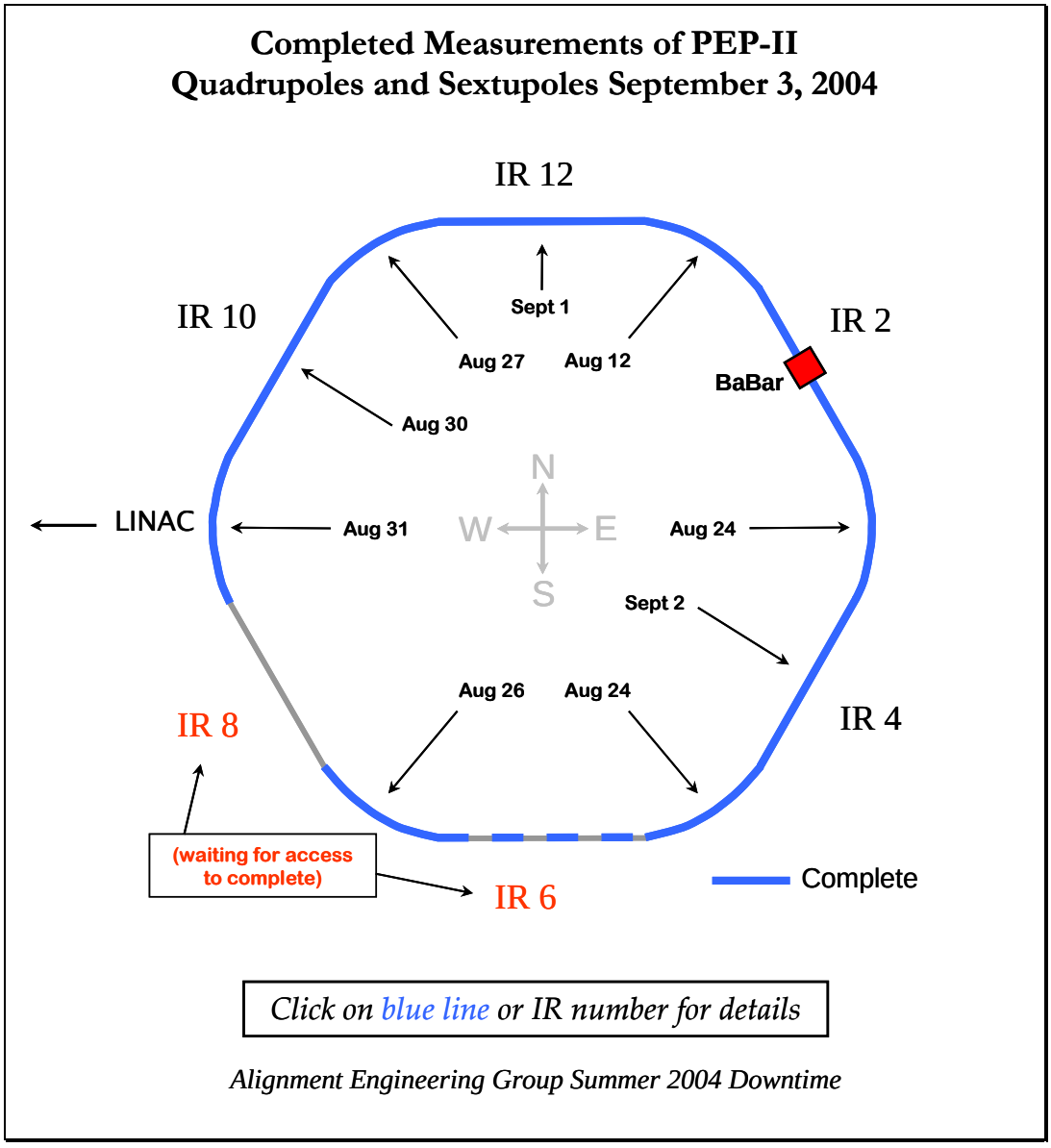
- Wednesday September 1
    - SSRL Vacuum: BL9-3 vertical slits
    - FFTB 166: set vertical bend and corrector

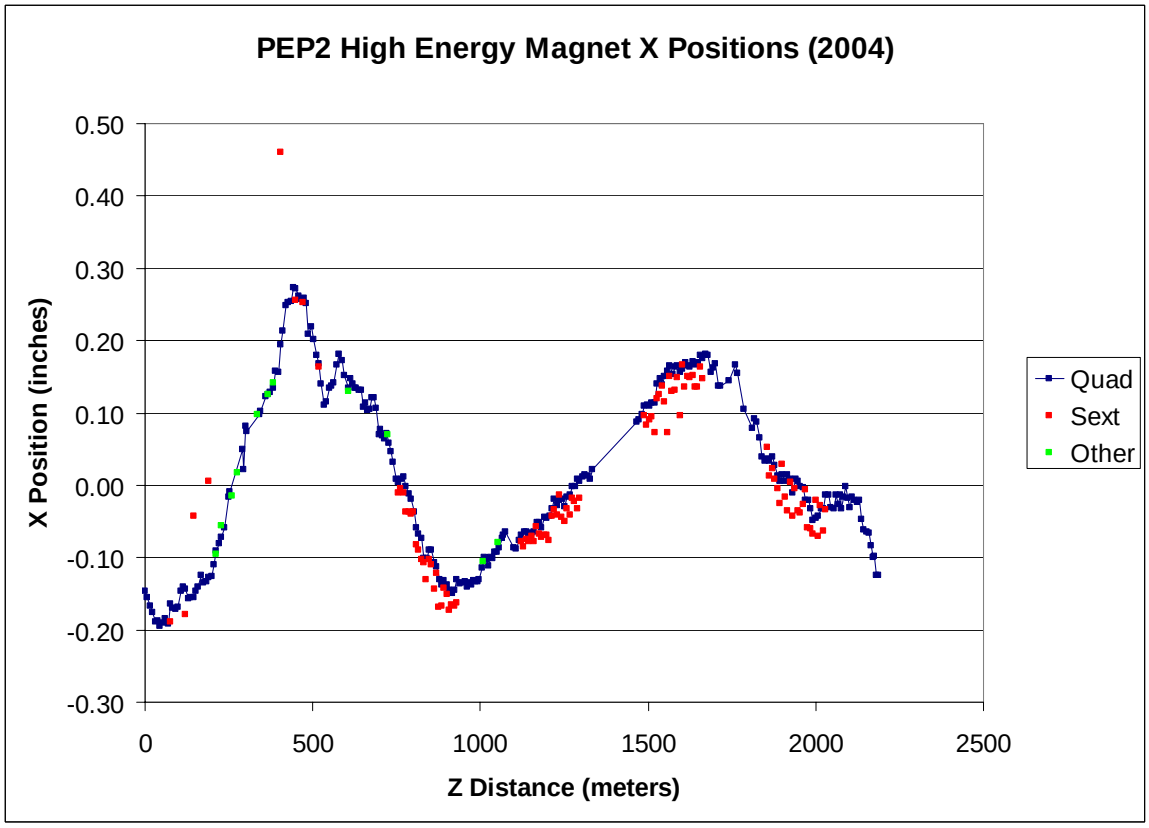
- Thursday September 2
    - SSRL Vacuum: BL9-3 vertical slits
    - FFTB 166
        - Reset the table to the pitch after the vertical bend [.2727 (linac) - .0165(bend angle)]
    - Set pipe

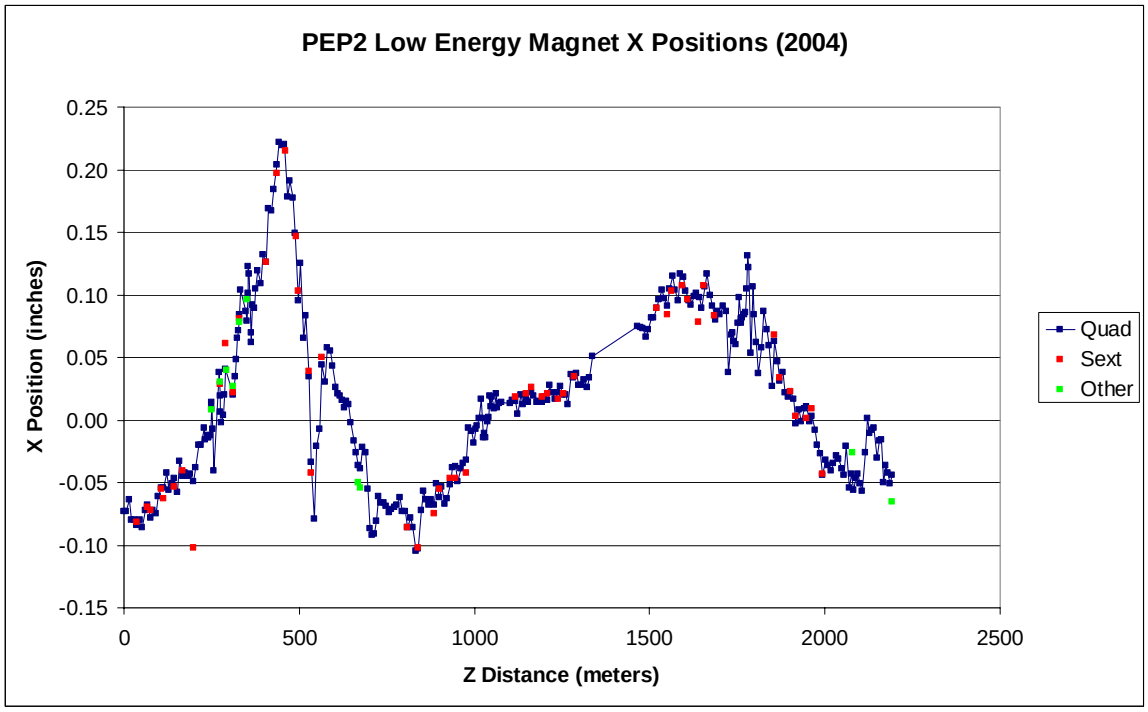
- Friday September 3
    - FFTB 166

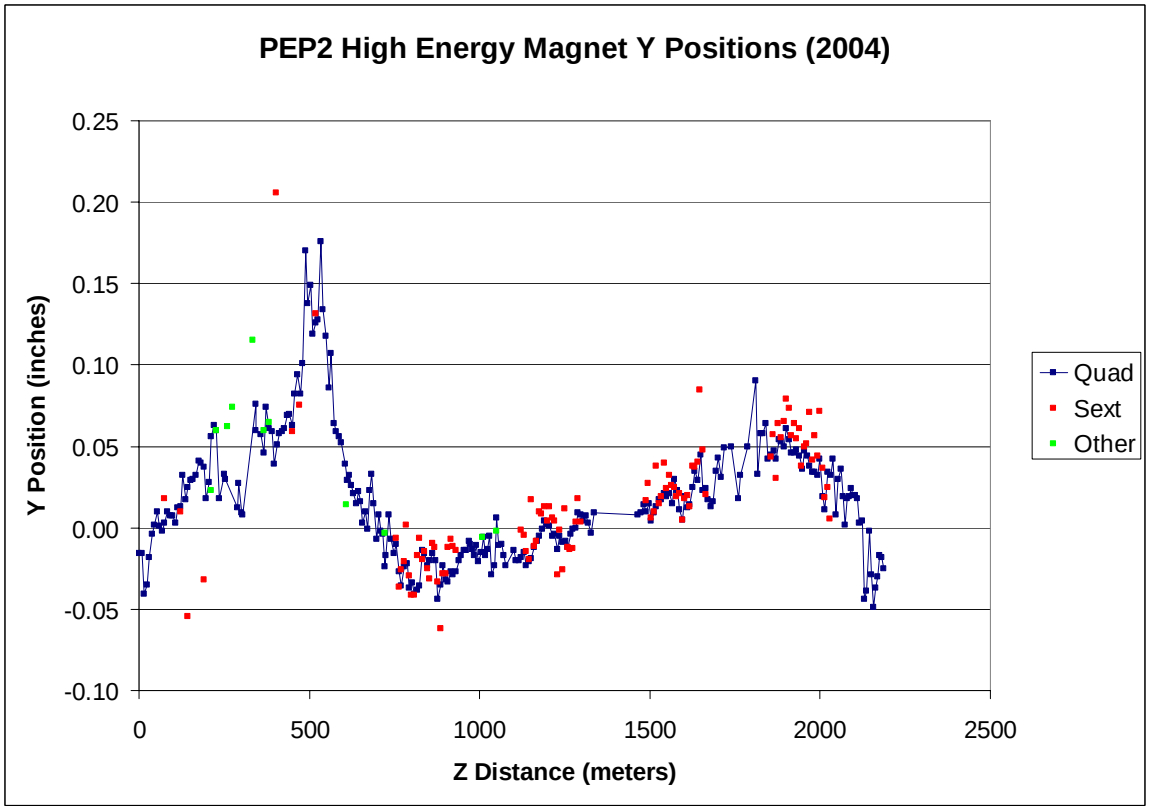
# Summer / Fall 2004 Downtime
# AEG Week 6 Summary

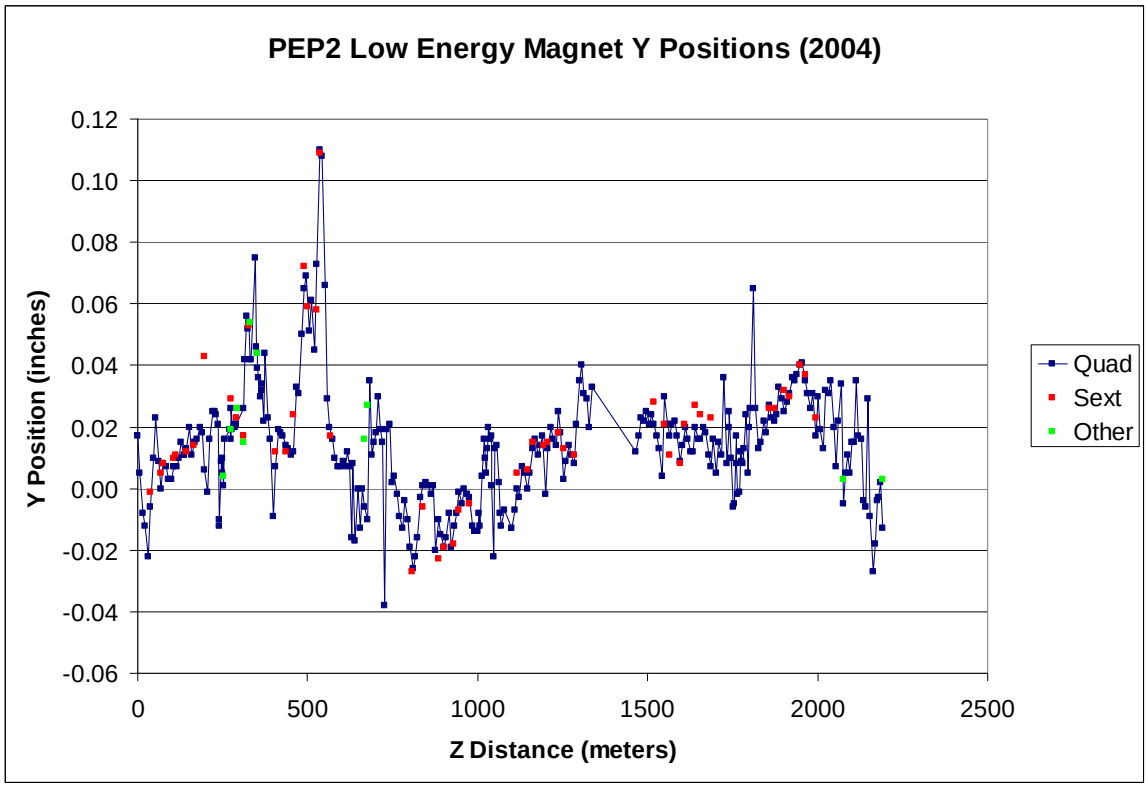
## PEPII Quadrupole & Sextupole Survey



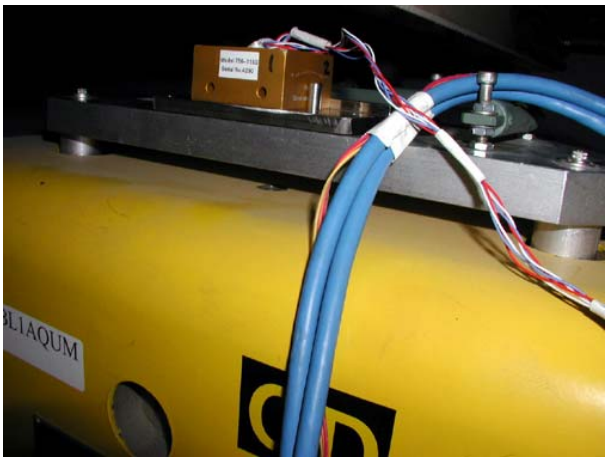

PEP2 High Energy Magnet X Positions (2004)
X Position (inches)
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
0
500
1000
1500
2000
2500
Z Distance (meters)
Quad
Sext
Other

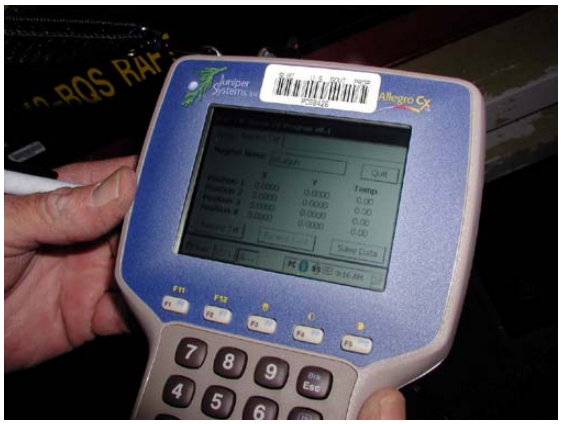

PEP2 Low Energy Magnet X Positions (2004)
X Position (inches)
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
0
500
1000
1500
2000
2500
Z Distance (meters)
Quad
Sext
Other




- Wednesday September 8
  - Tiltmeter measurements of low energy quadrupoles





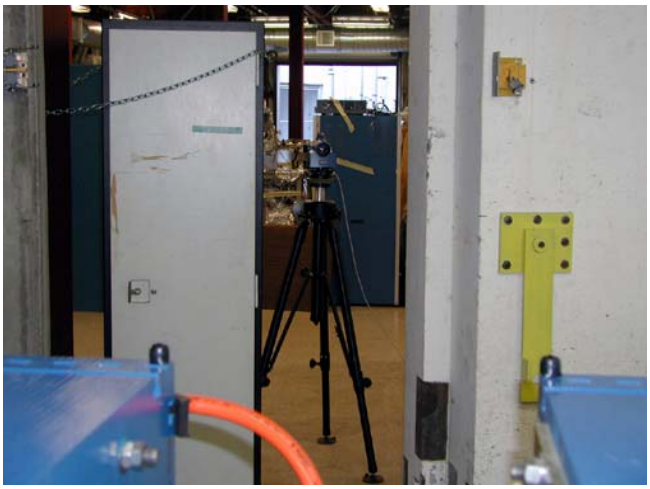
- Thursday September 9
  - Continuing tiltmeter measurements

- Friday September 10
  - Check quadrupole roll showing major difference since 2000 as well as sextupole position far from neighboring quad.

## SPEAR3 Alignment

- Tuesday September 7
  - 2 crews for laser tracker mapping

- Wednesday September 8
  - 2 crews for laser tracker mapping and 1 crew for leveling through the doors



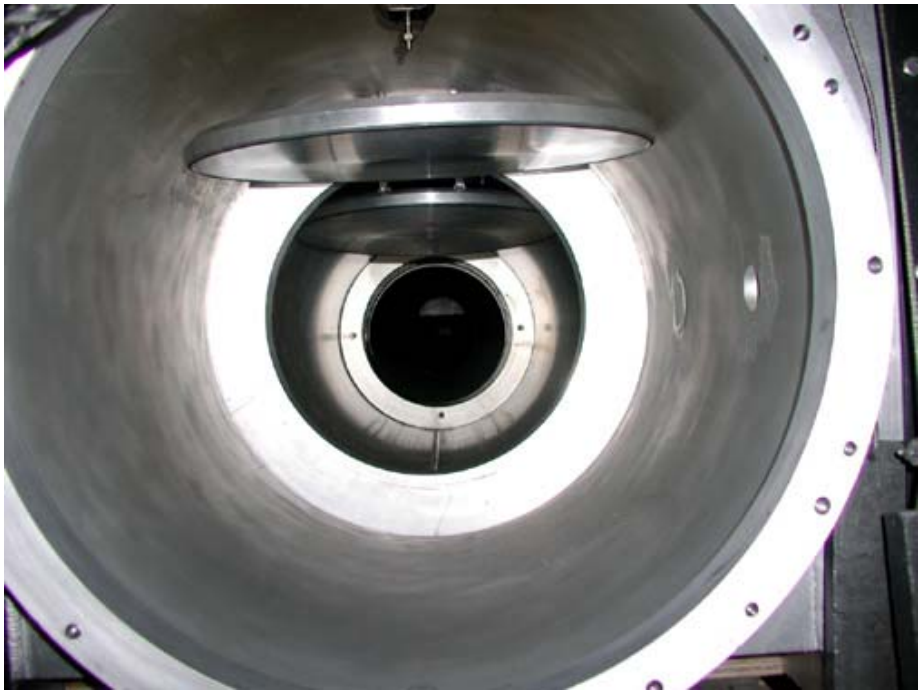
- Thursday September 9
  - 2 crews for laser tracker mapping

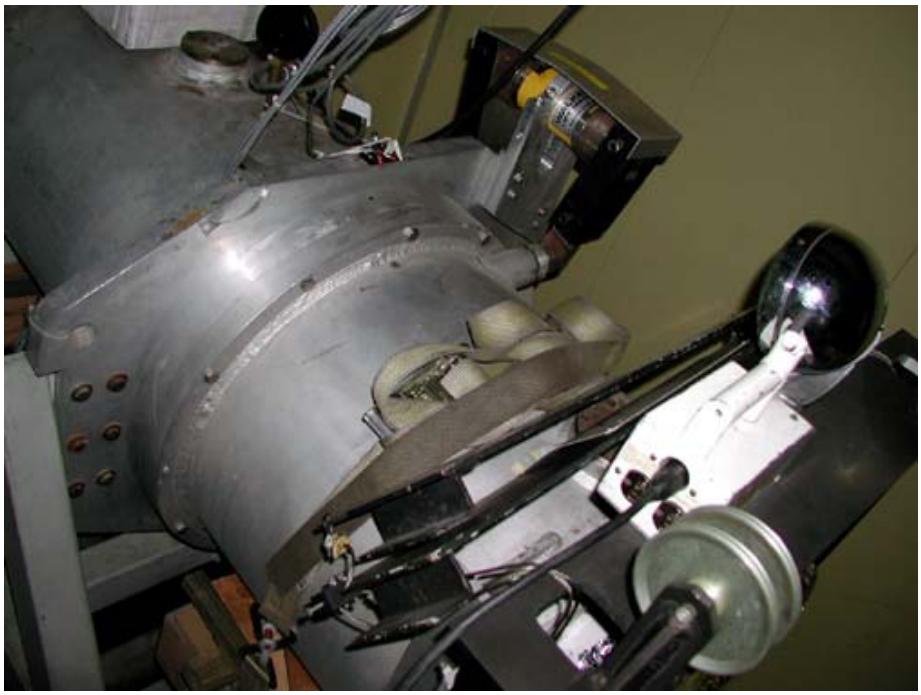
- Friday September 10
  - Mapping completed
  - Review BL11 area

## Linac Laser Alignment System

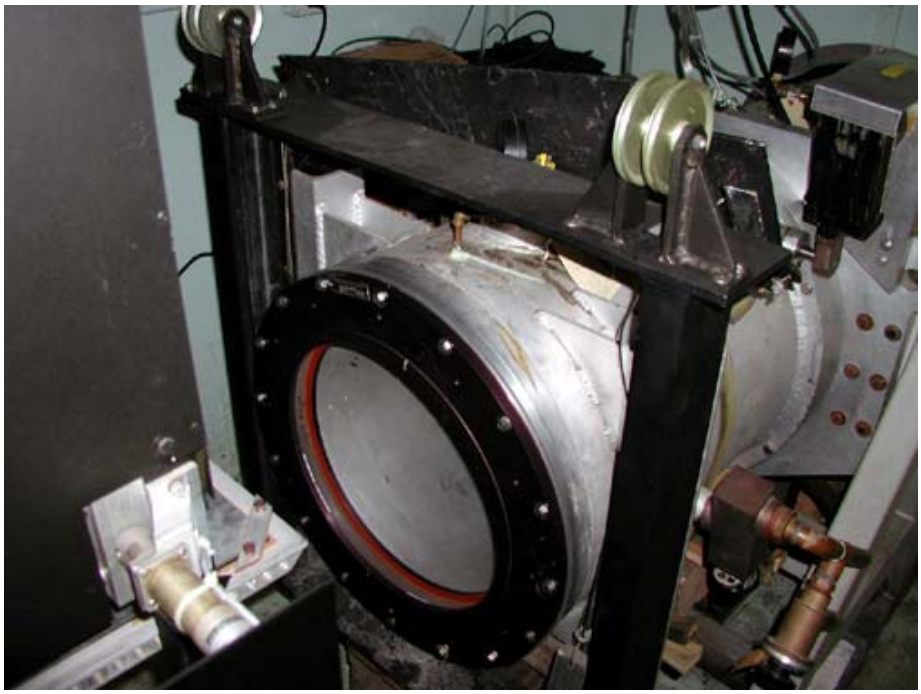
Flap repair continuing during this week.

- Thursday September 9
  - flaps were repaired and installed





- Friday September 10
    - Glass cover replaced



## Miscellaneous

- Tuesday September 7
    - SSRL Vacuum: BL9-3 vertical slits

- Wednesday September 8
    - SPEAR3 Ring: BL9 preparation for Xmas installation

- Thursday September 9
    - SLTR: Went to check the following 2 magnets (QD1295 and QF1315). Could not adjust one of them in X for lack of a proper mover. Will wait for the insertion of a plate to allow for proper moves.

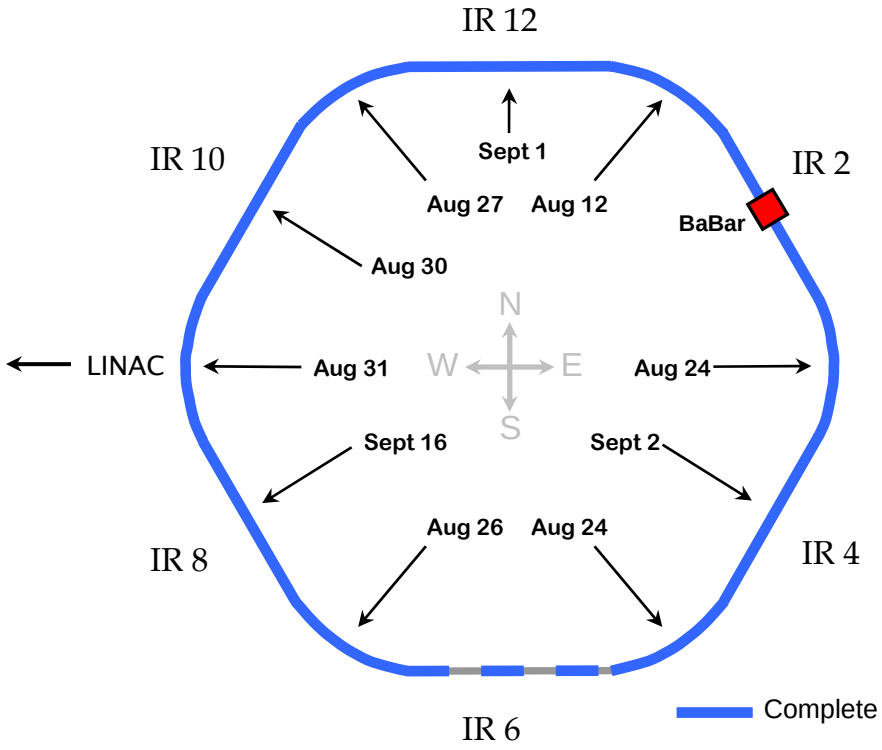
- Friday September 10
    - SPEAR3: Survey wall in the East Straight (9S) for future beamline.

- Saturday September 11
    - LCLS Injector area:
        - as-built survey (map) of wall A and wall B.
        - read fast valve and flanges on accelerator line.

# Summer / Fall 2004 Downtime
# AEG Week 7 Summary

## PEPII Quadrupole & Sextupole Survey

**Completed Measurements of PEP-II**
**Quadrupoles and Sextupoles September 17, 2004**




*Click on blue line or IR number for details*

*Alignment Engineering Group Summer 2004 Downtime*

- Tuesday September 14
  - Finish R6
  - Start R8

- Wednesday September 15
  - Finish R8
  - Finish tiltmeter observations

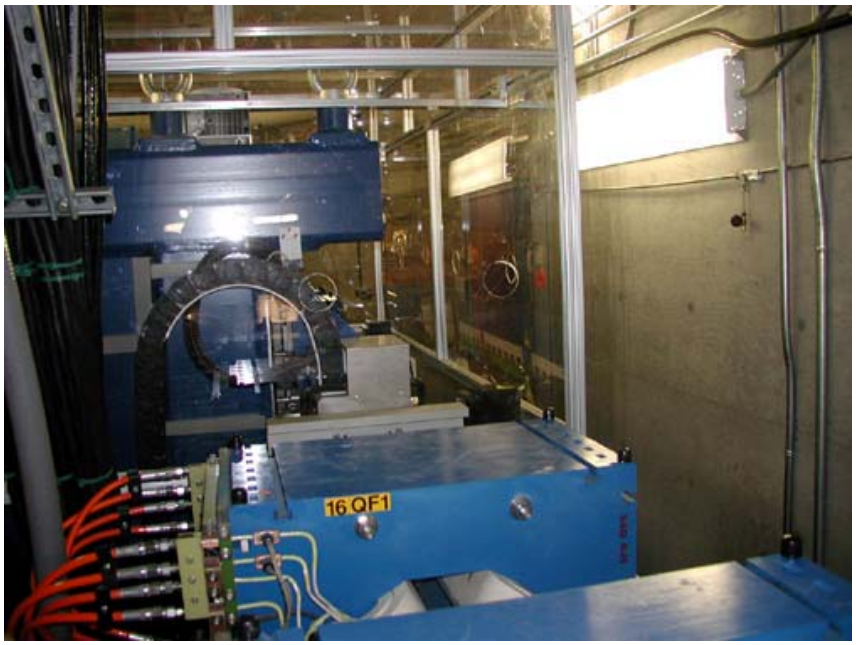
- Thursday  September 16
    - Repeat of some magnets in R8. Only 4 magnets at the end of R6B to record in order to have the full ring. Waiting until the area is less crowded.

## SPEAR3 Alignment

- Monday September 13
    - Start processing  tracker and leveling data

- Tuesday September 14
    - Study changes in monument positions since last map as well as magnet center position versus ideals.

- Wednesday September 15
    - Add 2 tracker stations around the West Straight area. One just in front of BL11 ID (needed to install an orange bracket on the wall and drill holes in the protective cover in order to allow cross shot)




- Thursday September 16
    - Laser tracker survey using arcing techniques for the matching cells in the East Straight
    - Decide on a global X move in the West straight area.
    - Perform the X moves in cell 1 and part of cell 18

- Friday September 17
    - Move cells 18 and 17

- Saturday September 18
    - Continue to move cells

## Linac Laser Alignment System

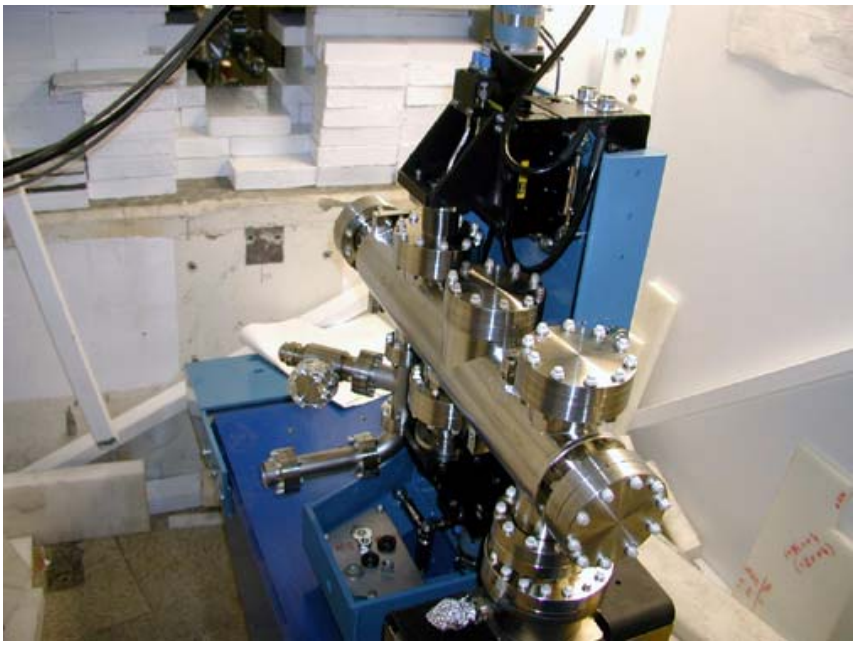
- Thursday September 16
    - Pumping started, need to wait for proper pressure.

- Friday September 17
    - Still waiting.

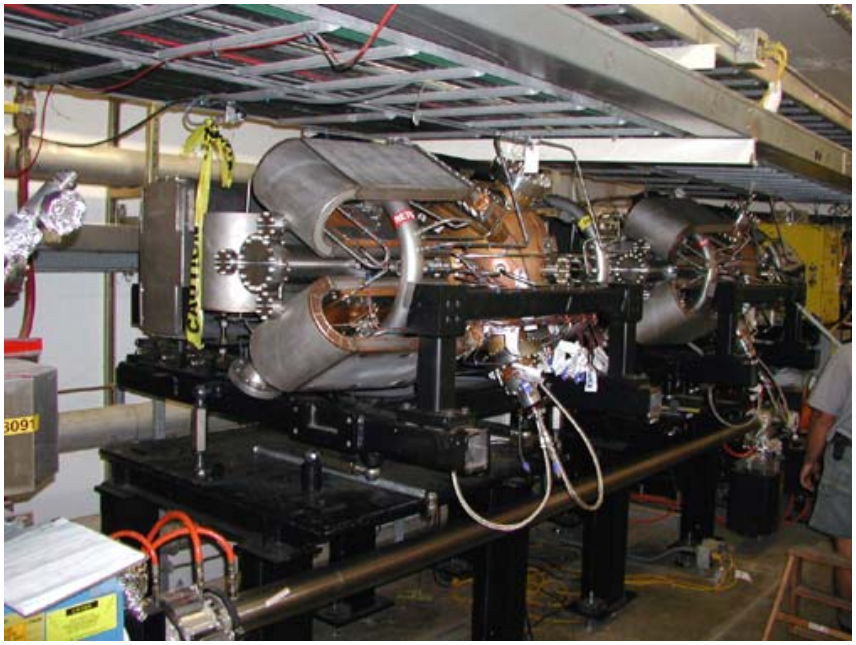
## Miscellaneous

- Monday September 13
    - SSRL Vacuum: BL4-2 vertical slits

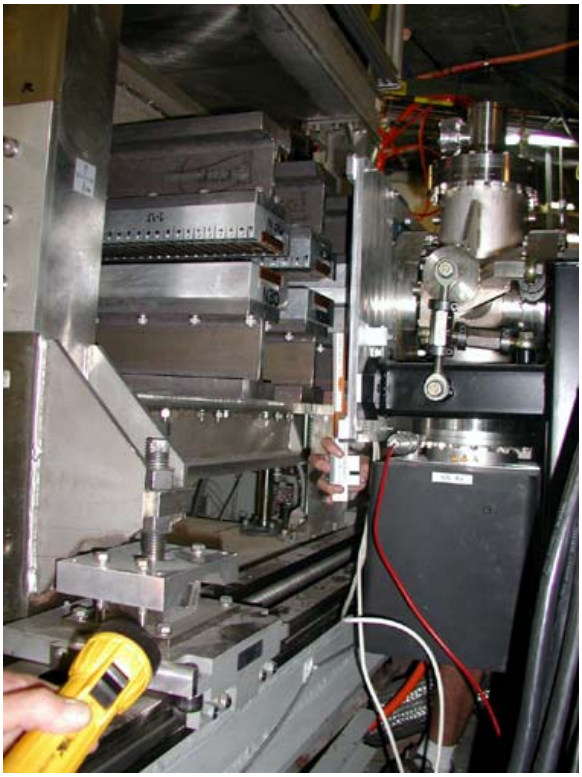
    - SPEAR3: BL6-2 vertical slits
        - The brass plugs in the hutch were found to be of different dates.



- PEPII R4: set the 2 new RF cavities
  The cavities were set through optical tooling set-ups based on the flanges of the neighboring quads.

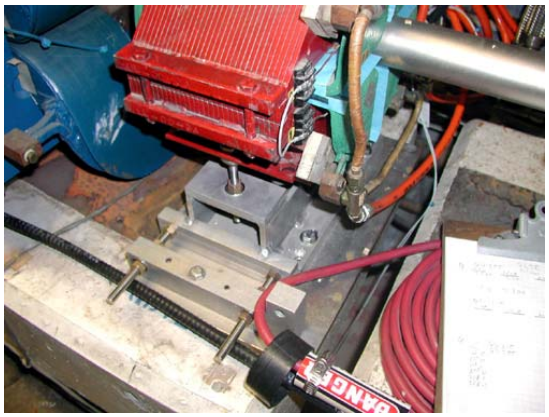


- Tuesday September 14
    - SPEAR3: BL6-2 vertical slits
        - Remark the plug line
        - Align the vertical slits
    - SPEAR3: BL5 ID repeatability test



- SPEAR3: as-built of 9S in preparation for the installation of a new undulator for a new beamline (BL12) in Summer of 2006

- SDR: set the 2 quadrupoles (QD1295 and QF1315) after plate installation for correct moves



- Wednesday September 15

    - SSRL Vacuum: fiduacialization of BL4-2 vertical slits

- Thursday September 16

    - SSRL Vacuum: fiducialization of BL4-2 vertical slits

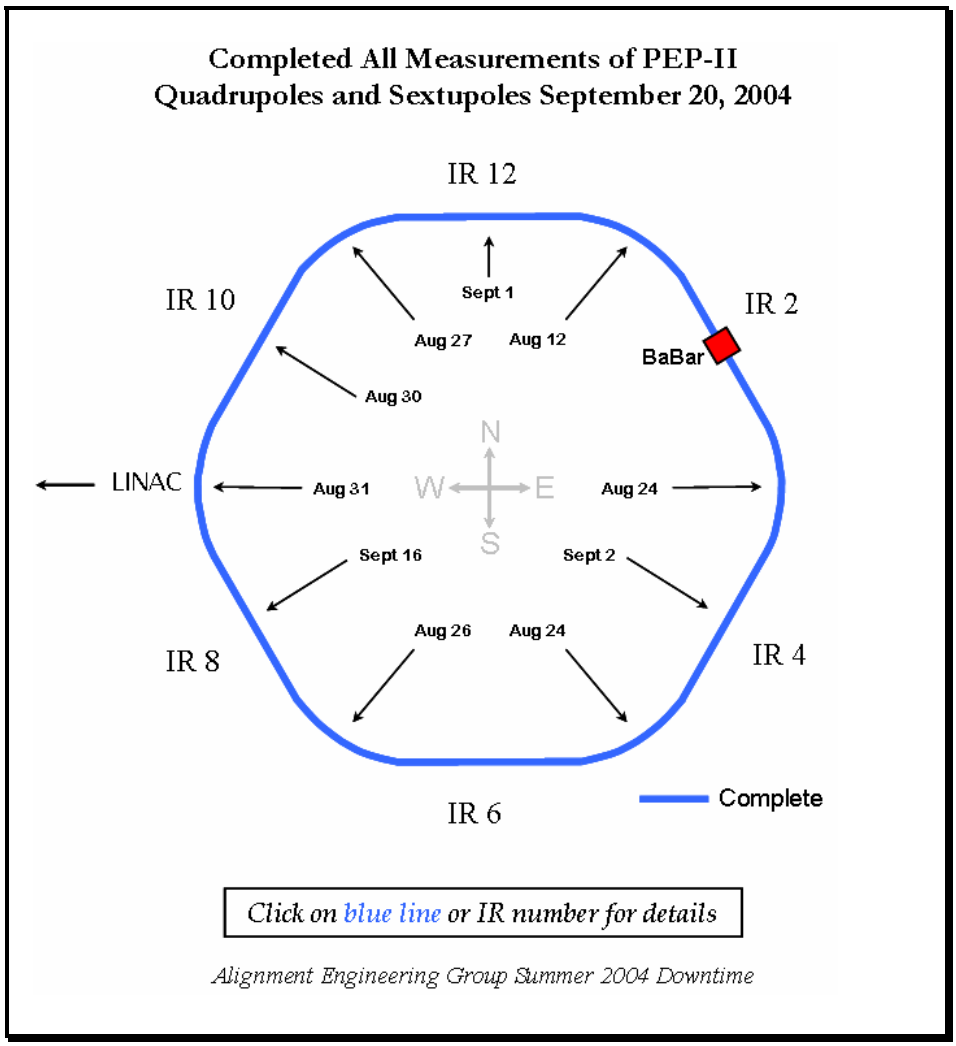
- Friday September 17

    - SPEAR3: BL6-2 re-check components (mirror, slit, BPM and tempered mask) after vacuum.

# Summer / Fall 2004 Downtime
# AEG Week 8 Summary

## PEPII Quadrupole & Sextupole Survey

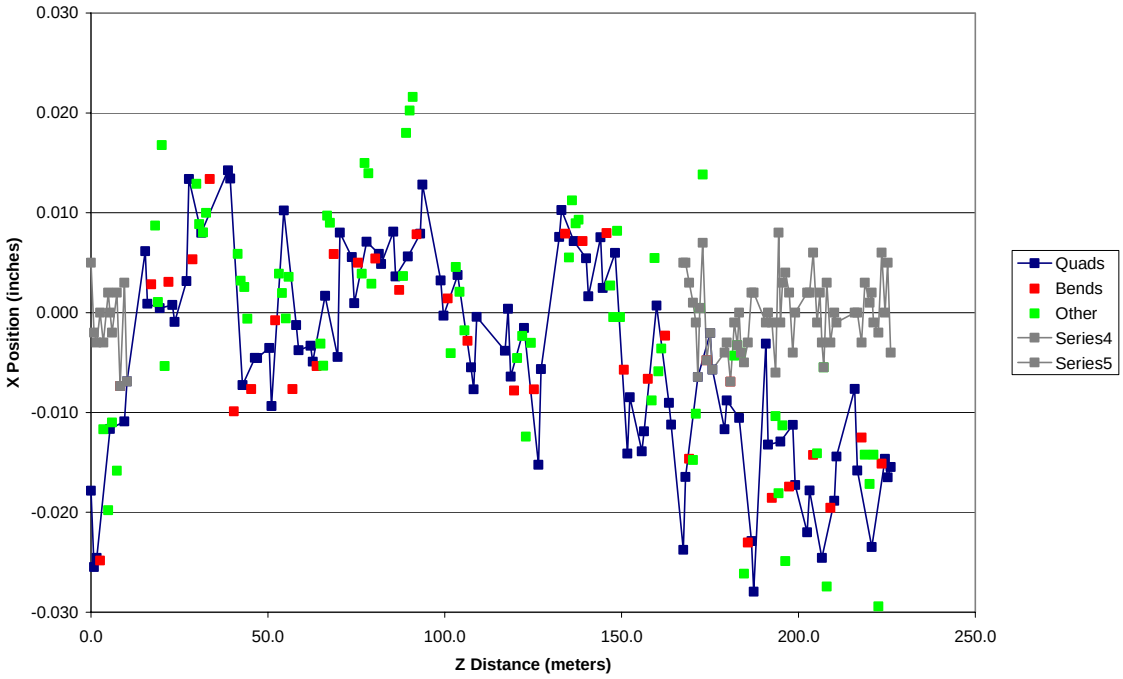
- Monday September 20: last magnets observed



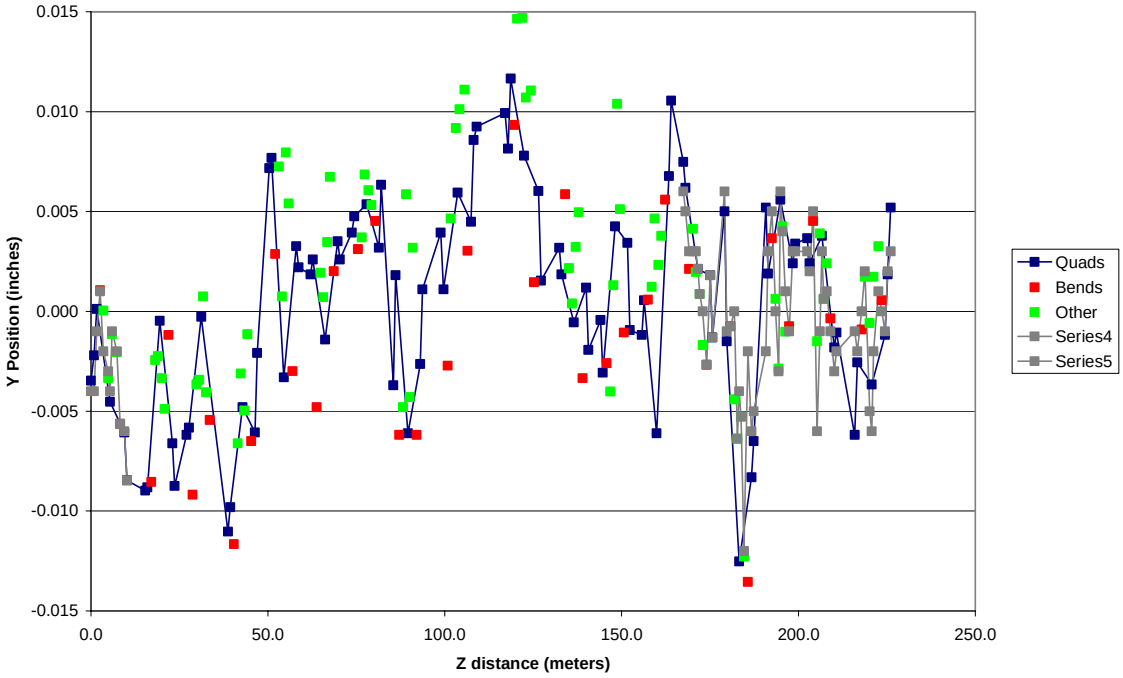

## SPEAR3 Alignment

- Monday September 20
  - All the necessary magnets were moved in X from cell 14 to cell 1. Here are the updated graphs:

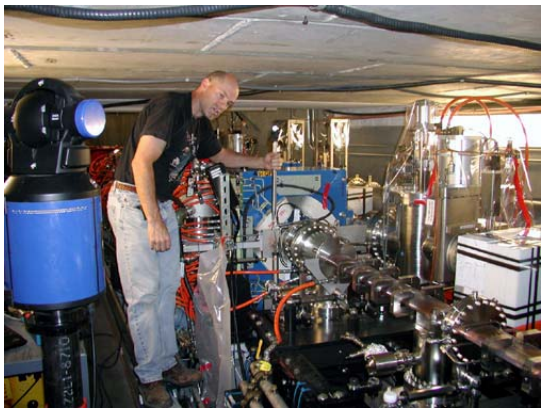
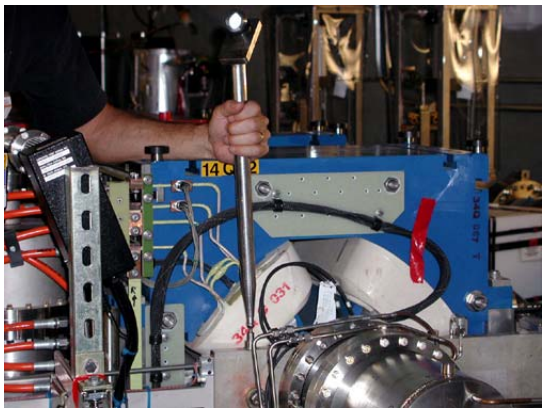
## Magnet X As Builts




## Magnet Y As Builts



- Start moving the vacuum chambers using the sphere fitting technique as well as re-mapping the areas with moves.

- Tuesday September 21

    - Move vacuum chambers using and map cells 16 and 17.
    - Set BPM mask in BL5 in alcove.

- Wednesday September 22

    - Finish moving vacuum chambers and map cells 18 and 1.


    - Look at BL9 possible plug line additions. Get back about 150 new plugs from our brass supplies.

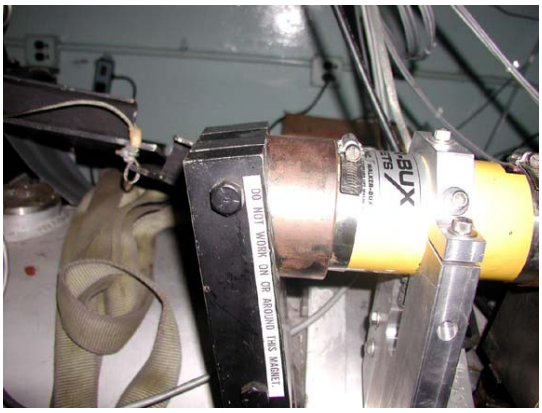
- Friday September 24

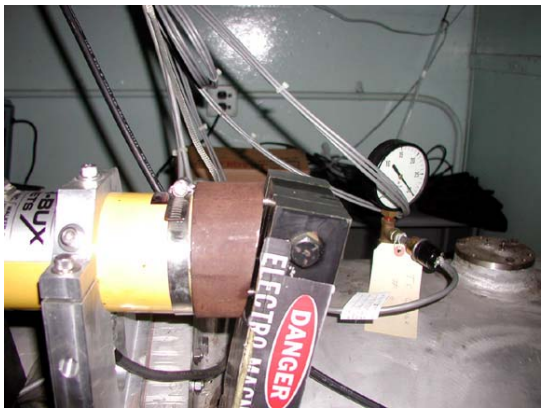
    - Set scrapers in 1S.
    - Put brass plugs in BL9.
    - Set pivot mask in BL6

# Linac Laser Alignment System

- Monday September 20
  - Still waiting.

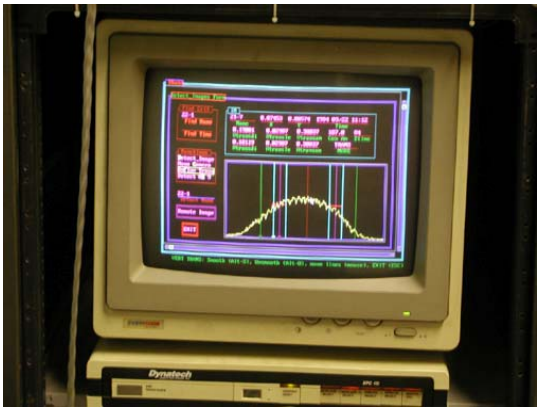
- Tuesday September 21
  - Vacuum is OK. Needed to work on the flap to make them operational. Measure targets from sector 11 to 15.



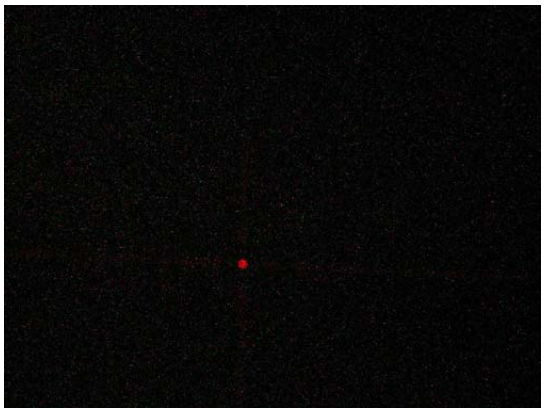



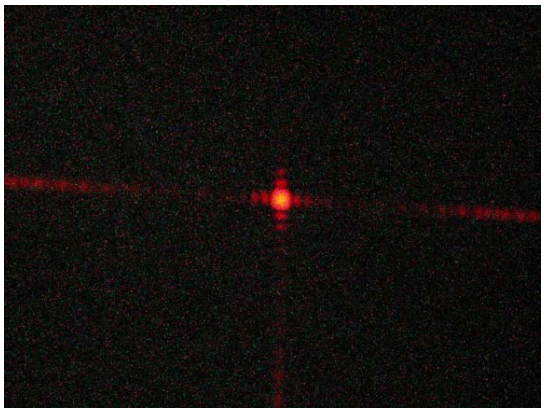


- Wednesday September 22
  - Measure targets in sectors 16 to 19, 21 and 22 as well as 23-1 and 23-2.



- Thursday September 23
    - Measure targets from 23-3 to 28-2
    - Experiment with digital picture of target on paper screen in front of camera (2-9 [near to camera] and 28-1 [far to camera] targets).





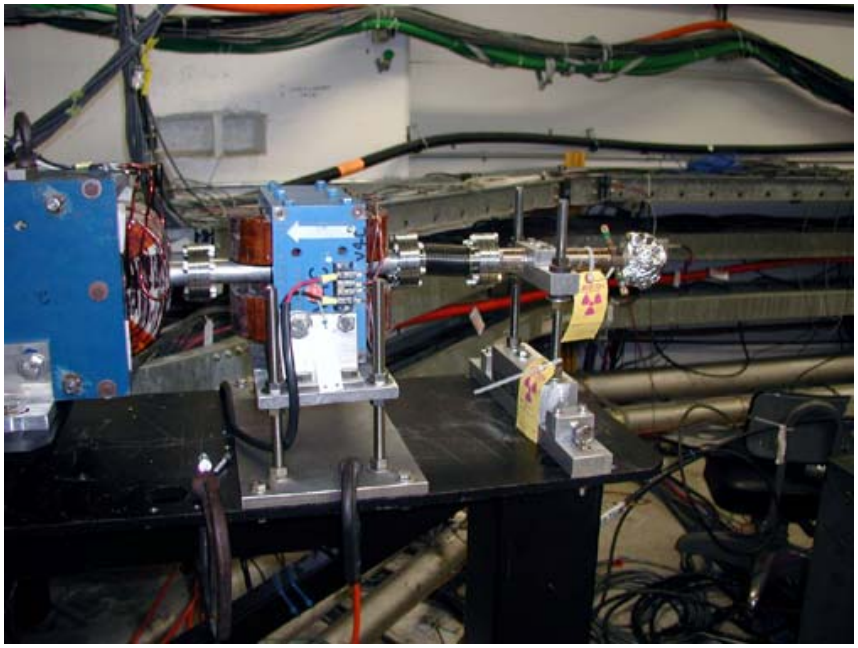
## Miscellaneous

- Monday September 20
    - SSRL Vacuum: BL4-2 vertical slits

- Tuesday September 21
    - SSRL Vacuum: BL4-2 vertical slits
    - ESA align table and laser to beam pipe

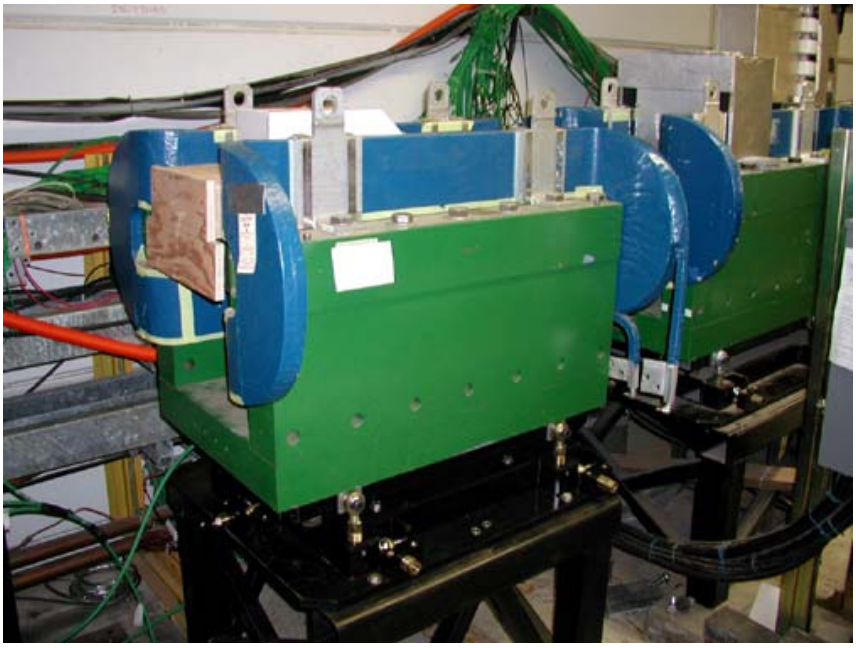

- Thursday September 23
  - FFTB E166
    - Set height and scribe line on table


    - Mark bolt pattern on the 2 tables
    - Set BPM upstream



- SSRL Vacuum: wait for BL6 M2 mirror fiducialization.
- SSRL Vacuum: 1S scraper fiducialization.
- Finish block survey of SPEAR3 ring.
- PEP SLM R7: discuss alignment requirements and gather drawings.

- Friday September 24
  - FFTB E166: set bend magnet downstream of the 6 existing bends.



- PEP SLM R7: prepare files for field work next Monday.

# Summer / Fall 2004 Downtime
# AEG Week 9 Summary

## SPEAR3 Alignment

- Monday September 27
  - Mapped 1S straight and set scraper limits using total station.

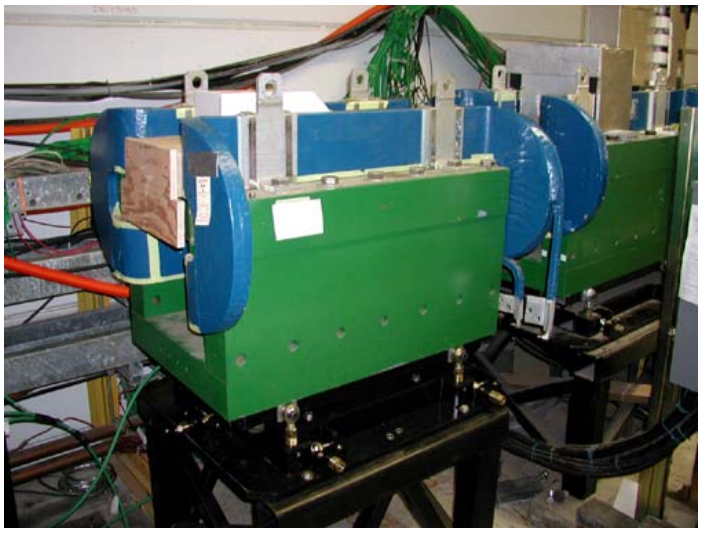
- Wednesday September 29
  - Measure and record all TB positions on sextupole SC02QFZ to validate network data
  - Record position of ceramic pipe in 1S.
  - Move tracker and all other misc. AEG equipment out of SPEAR.

## Linac Laser Alignment System

- Nothing this week.

## Miscellaneous

- Monday September 27
  - BL9: Levels to find rivet elevation
  - PEP SLM R7: alignment
  - FFTB E166: Re-set bend magnet downstream of the 6 existing bends.



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- Tuesday September 28
  - GLAST: set relative heights for pivot plates.
  - BL6 set mask
  - PEP SLM R7: alignment.

- Wednesday September 29
  - SSRL Vacuum: BL5-2 M2 mirror fiducialization.
  - SSRL Vacuum: BL7-3 Slit fiducialization
  - PEP SLM R7: alignment / check as needed.

- Thursday September 30
  - SDRL: set sextupole
  - ASSET Linac Sector 2: alignment using optical tooling because of glued tooling balls.
  - PEP SLM R7: alignment / check as needed.

- Friday October 1
  - IR2: BaBar Survey

# Summer / Fall 2004 Downtime
# AEG Week 10 Summary

## SPEAR3 Alignment

- Nothing this week.

## Linac Laser Alignment System

- Nothing this week.

## Miscellaneous

- Monday October 4
  - SSRL Vacuum: BL 7-3 Vertical Slits
  - PEP R10: align BPM and Pipe
  - PEP R8: Measure Flanges for future component installation.
  - PEP SLM R7: alignment

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- Tuesday October 5
  - Level Triangle
  - SSRL Vacuum: BL 5-1 M3 Mirror fiducialization.

- Wednesday October 6
  - SSRL Vacuum: BL 4-3 Vertical Slits
  - Mag. Meas. : Solenoid for Klystron XP Development

- Thursday October 7
  - FFTB: Collimator location & Pipe alignment.
  - Lab: E166 spectrometer fiducialization

- Friday October 8
  - IR2B: Checking/Setting slip magnets to replace beam pipe.

# Summer / Fall 2004 Downtime
# AEG Week 11 Summary

## Safety Shutdown

Due to an electrical accident at SLAC normal work has been suspended. During this week, before the full shut down beginning October 18th, some office related work including data processing continued. All other activities including field work were suspended.