IP Carbon wire scanner

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D. McCormick, C. Field, P. Tennebaum,

J. Cruz, J. Wray, (SLAC)

N. Terunuma (KEK)

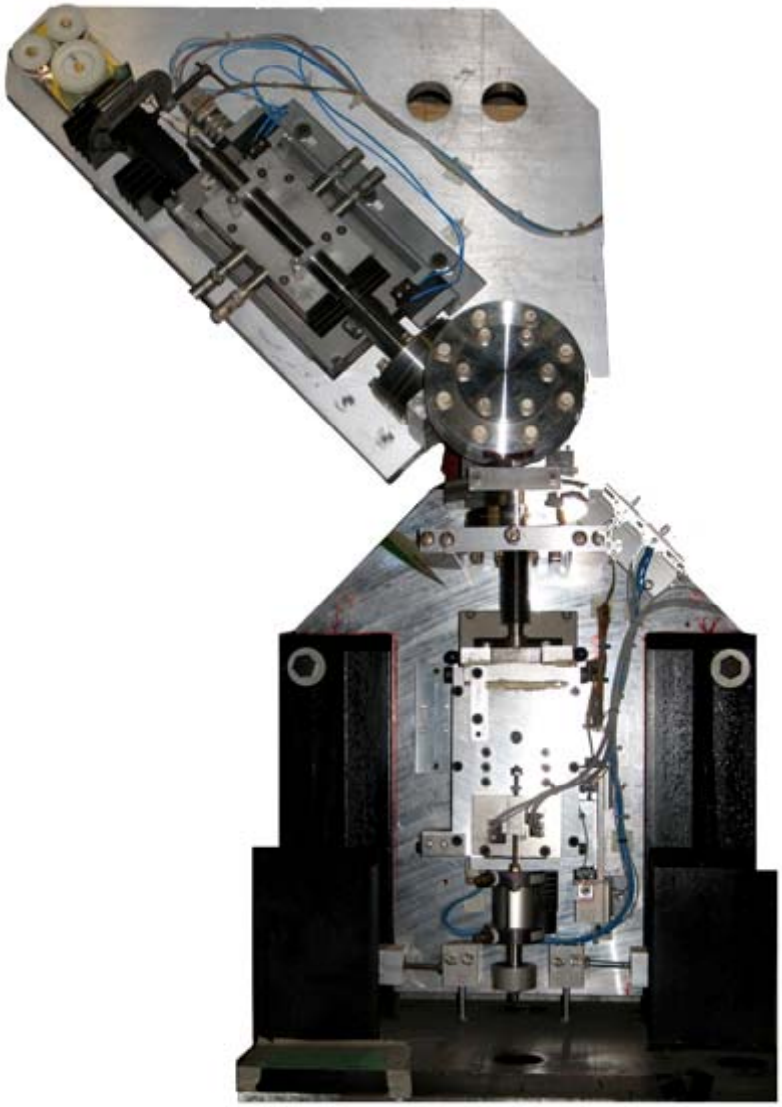
Goals

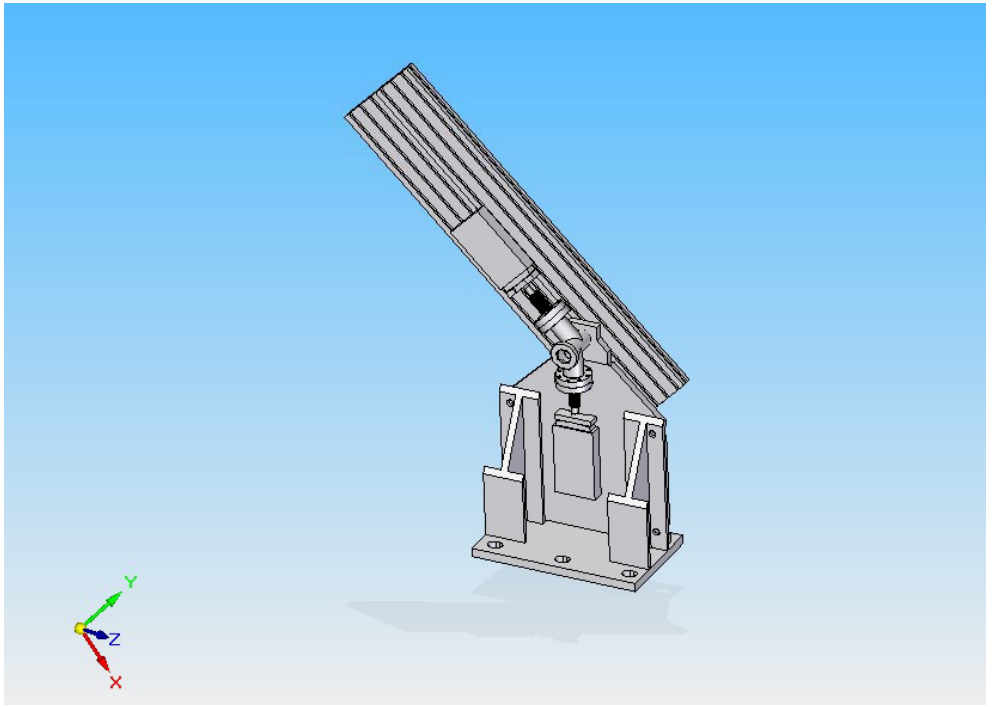
- Build a dual wire scanner with vertical and 45 degree scan directions.
- The 45 degree scanner to be used for measuring large spots encountered at initial stages of beam tuning
- The vertical scanner to be capable of measuring vertical beam sizes from about 10um down to around 1um.

Progress so far

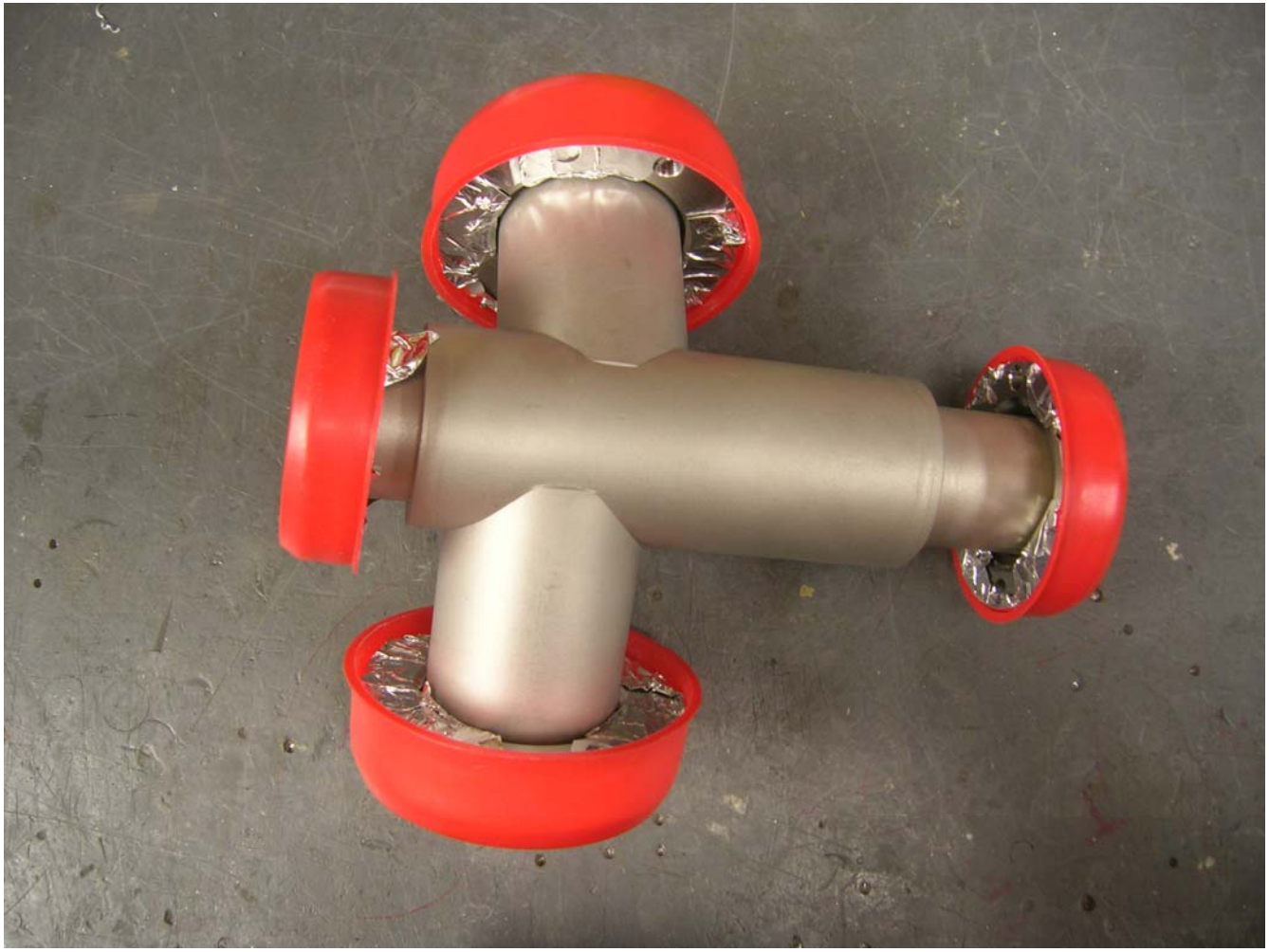
- Recovered two FFTB wire scanners.
- Modified supports and designed a new vacuum chamber to allow a vertical and 45 degree wire scanner to fit a 200mm space in the beam line.

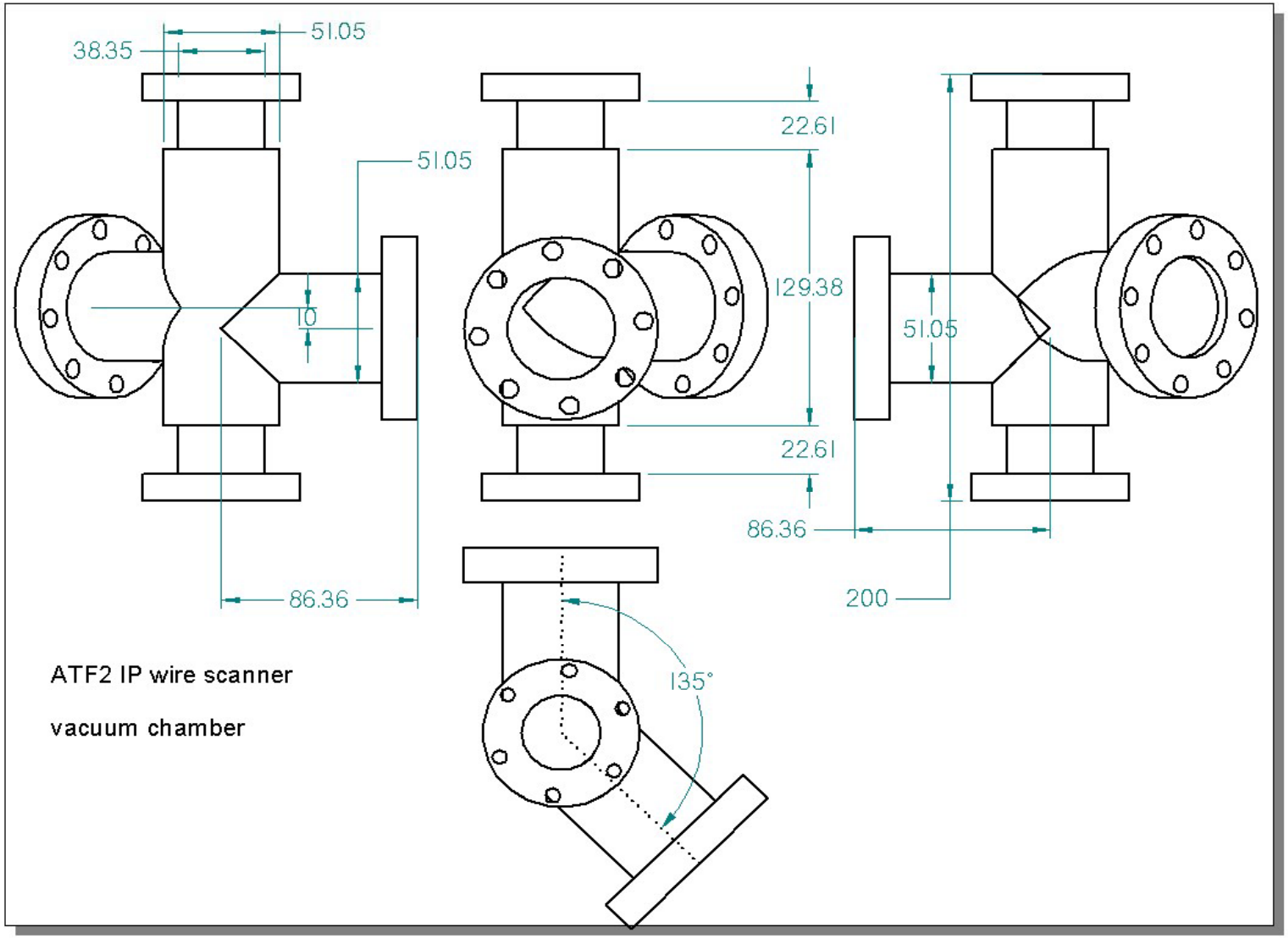
General layout of dual wire scanner





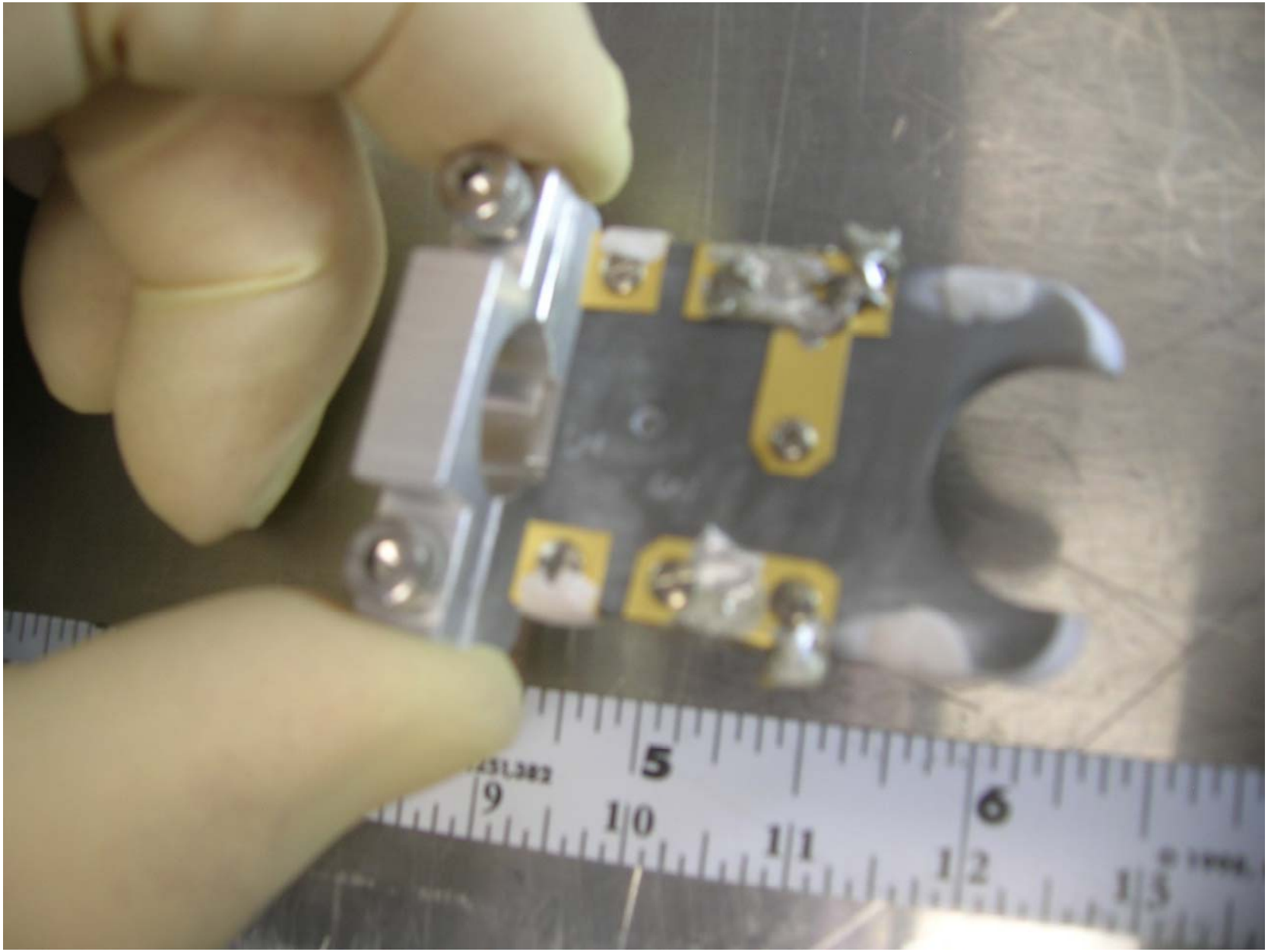
- Vacuum chamber is complete. Support modifications to be finished when vacuum chamber is installed.




51.05
38.35
51.05
10
86.36
22.61
129.38
22.61
86.36
51.05
200
135°
ATF2 IP wire scanner
vacuum chamber

Wire scanner cards

- 45 degree scanner will use a card with X Y U wires. The wire size is to be determined but one possibility is 7um carbon or silicon carbide.
- Vertical scanner wire card at this time has four tungsten wires:
  - + 0.7 degree
  - + 1.4 degree
  - Wire sizes and angles will have to optimized for expected beam sizes.


5
6
9
10
11
12

Scanner motion

- 45 degree scanner has a vacuum compensation spring and a step size of 1um.
- Vertical scanner has no vacuum compensation spring but step size is reduced to 0.1um by means of a 10 to 1 reduction gear.
  - Vertical scanner also has an air solenoid that moves the scanner into and out of scanning position. This reduces the time required complete a scan.

Scanner Control and Read Back

- Control method still to be determined but could be by Joerger camac stepper motor or the NIM base controller used by the ATF wire scanners.
- Position of wire during a scan can be accomplished by counting stepper motor steps and relying on motor/reduction gear accuracy or buy using a Sony Magnascale with 100nm resolution.

Wire Detector

- Carbon IP wire scanners will use the Shintake monitor detectors.

Software

- Scanner motion, scanning and wire signal readout will be handled by ATF personnel.

Conclusion

- Carbon IP scanner rework almost complete
- Wire sizes and angles to be determined
- Could be ready for shipping to KEK by end of February 2008
- Stepper motor control and position read back method still to be determined..
- ATF programmers to integrate scanner into the control system.