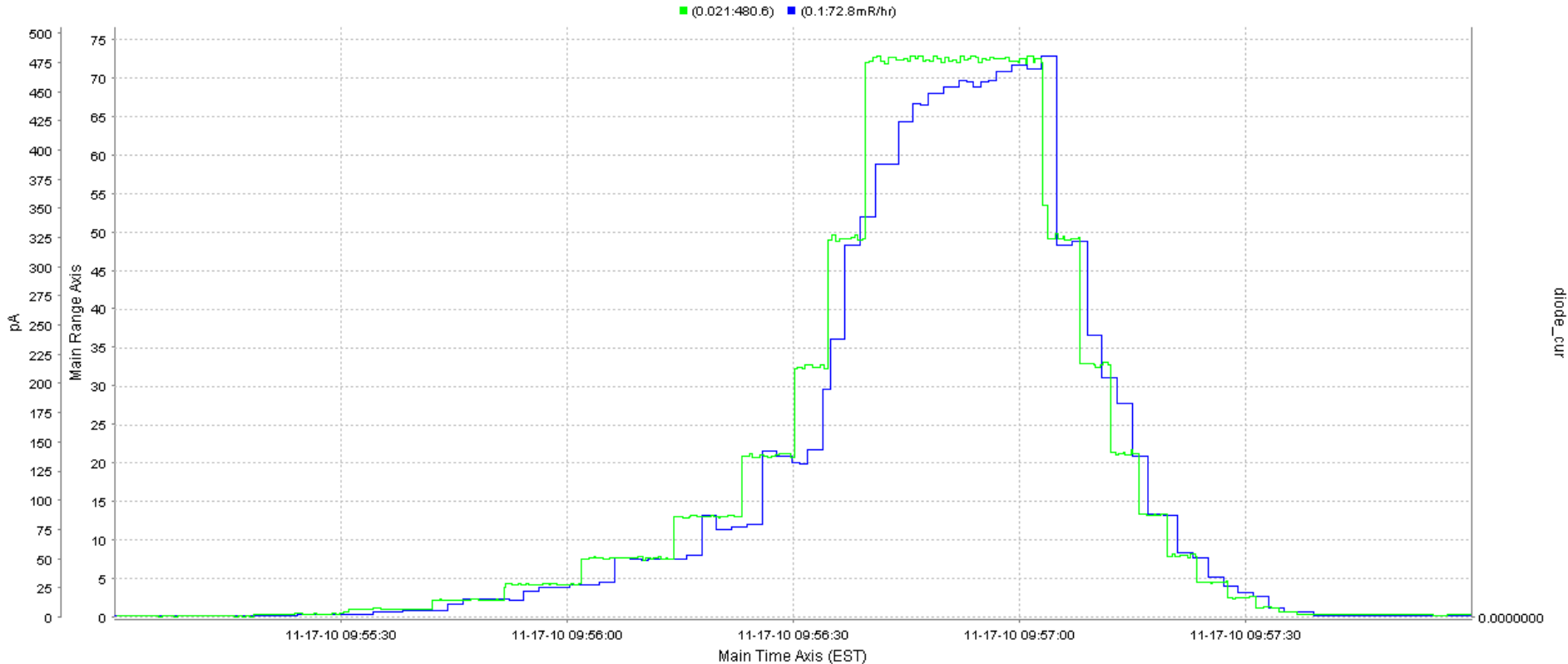


At low beam currents the greatest equipment hazard presented by the beam is irradiation of the permanent magnets.

CBETA machine note #036:

“Keeping lifetime radiation doses at the magnets below the 1kGy (100krad) level will ensure very safe operation with very small field errors generated. This equates to ~5kJ lost per magnet over its lifetime, or 10 rad/hr at the magnet with 10000 hr machine operational life.”

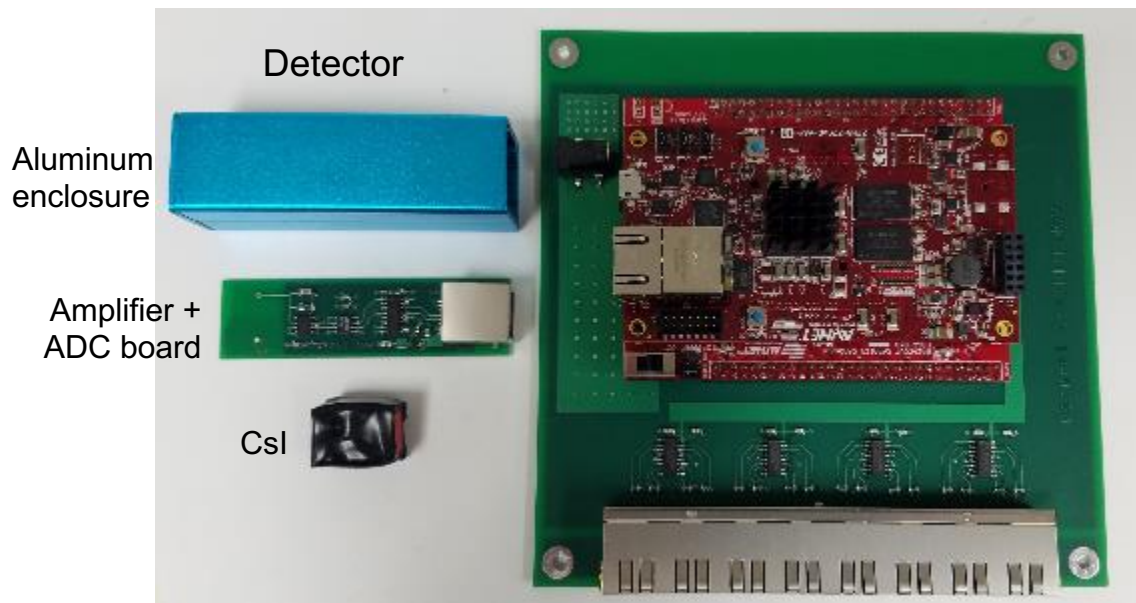
Radiation detector based on CsI crystal + Photodiode :



Green: diode current (pA) Blue: gamma probe (mR/hr)

Implementation:

Data Acquisition (hosts 8 detectors)



Detector connections

Tested in FAT.

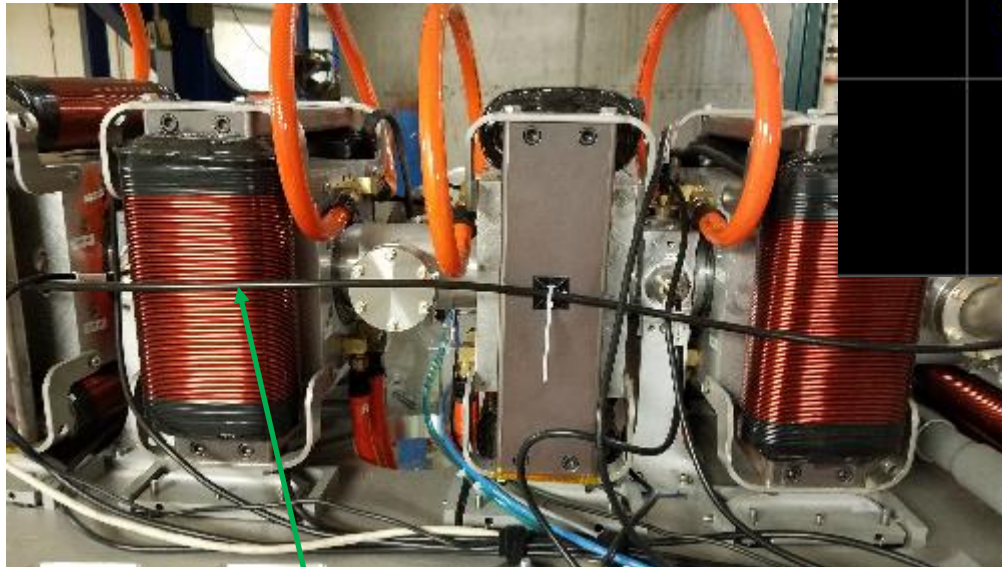
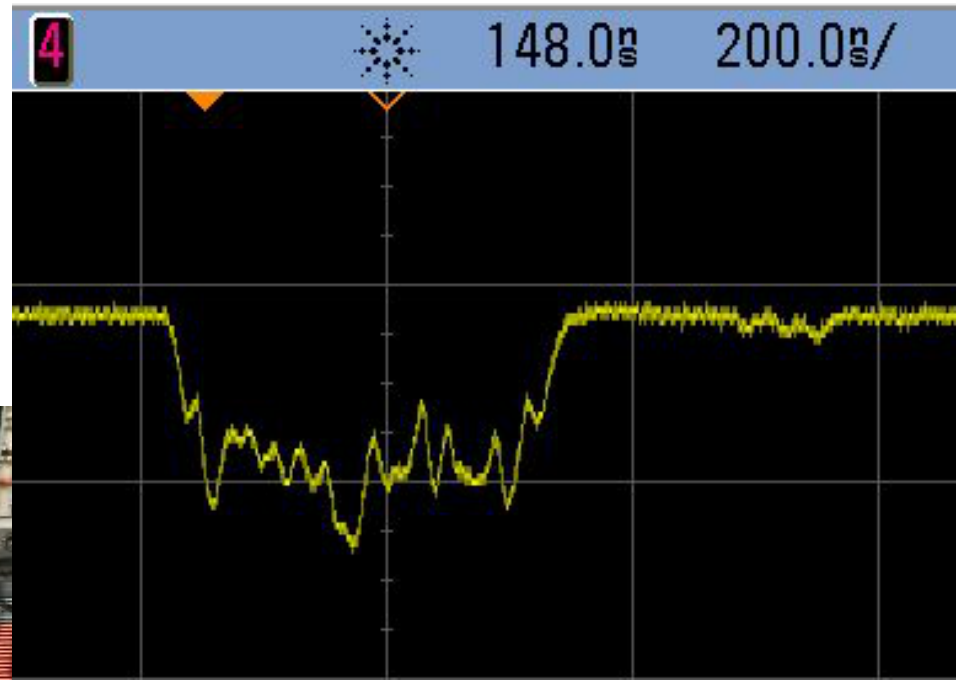
- wide range (5 mR/hr ~ 500 R/hr)
- B field OK
- easily relocated (100 total)
- 7.5 Hz update rate



To be done: calibration of detectors against gamma probe

PMT based fast loss monitor

- not yet ready
- designed for fast response/intended for high current running
- however can detect loss of a single bunch – so incentive to get running ASAP



Scintillating fiber (2 m long) inside black plastic tubing, both sides of magnets

FAT PMT output for 300 nS train of 10 pC bunches @ 50 MHz