

Update on Beam Test Preparation for the Tagger Microscope Prototype

for the GlueX Collaboration Meeting: May 2010

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Fiber array assembly approach

Reported at previous meeting: we could not reliably mate SciFi to waveguide fibers.

Resolved: As advised by George and Zisis, rougher finish on fiber binds better without apparent loss in transmission.

- ▶ This is adequate for the beam test.
- ▶ Splicing still considered for the mass production (manpower currently tied up to work on this + the necessary glass ferules to maintain splicing joint shape still not available)
- ▶ neat, robust bundles have been demonstrated: churning out one for the prototype is a few days' work (mostly function of curing time at each stage)

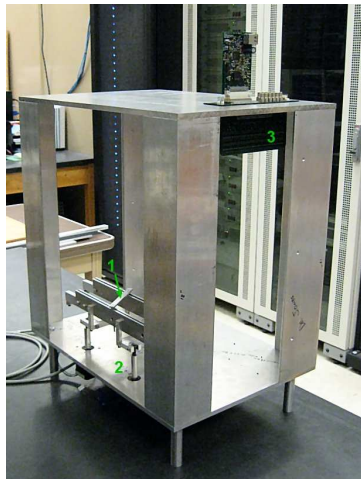
State of Microscope chamber assembly

Mechanical assembly of the prototype is well on track for beam test:

- ▶ most details of alignment and light seal have been checked, the rest in the machine shop queue
- ▶ larger chamber components await welding (job submitted)

Reminder of principle parts:

1. SciFi bundle tray on adjustable rails
2. Actuated fiber array support columns
3. SiPM board with amplifiers



Testing of electronics

Progress in testing the readout/control electronics:

- ▶ Control electronics ✓
- ▶ Basic software for test run ✓
- ▶ Amplifier board
 - ▶ DC levels (quiescent voltages, bias etc.) corrected ✓
 - ▶ Outfitting to protect the SiPM's upon insertion and for alignment of SiPMs to fibers ✓
 - ▶ Testing with SiPMs flashed by a pulser ⌚
 - ▶ Calibration of SiPM bias voltages

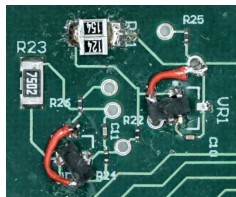
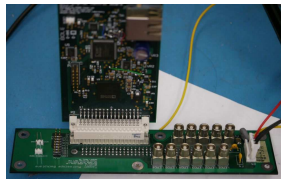


Figure: Tweaking the voltage regulator circuits on the amplifier board

Goals for Beam Test

Issues to look into during beam test

- ▶ first time readout with fADC!
- ▶ pulse photo-statistics: satisfying time resolution requirement?
- ▶ pulse shape:
 - ▶ efficiency lost due to dead time
 - ▶ uncertainty in the integral - effect on time walk when used for leading-edge correction
- ▶ any rate-related issues in SiPMs
(\exists hopes to push the detector to 5 MHz)
- ▶ cross-talk - signal sharing among...
 - ▶ adjacent optical channels.
 - ▶ adjacent amplifiers

(Tolerable? Consistent with the Monte Carlo?) Sources of cross talk can be isolated to some degree by comparing fiber channel pair combinations.

- ▶ practice online scintillator alignment to electron trajectory

Prototype's Placement in Hall B

The electron beam in Hall B is directed downward into a beam dump in the floor. Requesting access to the cage containing hodoscope is *discouraged*.

Little enough material in the way to put microscope beneath.

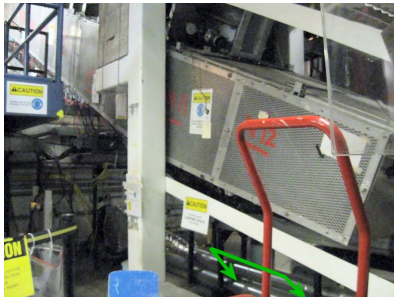


Figure: Left photo shows the cage of the Hall D hodoscope. The approximate position of the microscope prototype is shown in green. The right photo shows the space beneath the cage.

Status of preparations for beam test

Outlook for work in the coming weeks in preparation for the beam test:

- ▶ Beam test proposal: in draft form; completion pending rate calculations and alignment specs — **2 weeks**
- ▶ Mechanical assembly nearly complete: awaiting welding of major parts — **2 weeks**
- ▶ Electronics readout fully tested — **1 month**
- ▶ Installation opportunity: HD-Ice install in Hall B 7/23-9/10