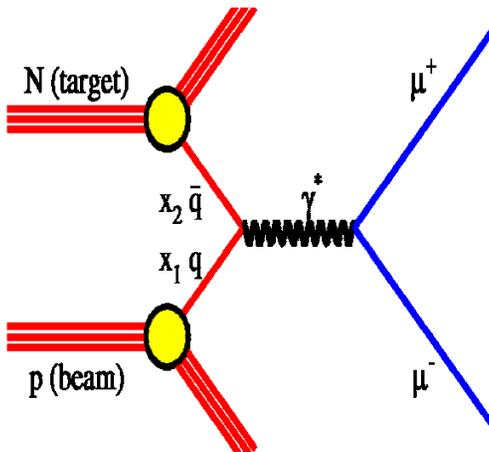
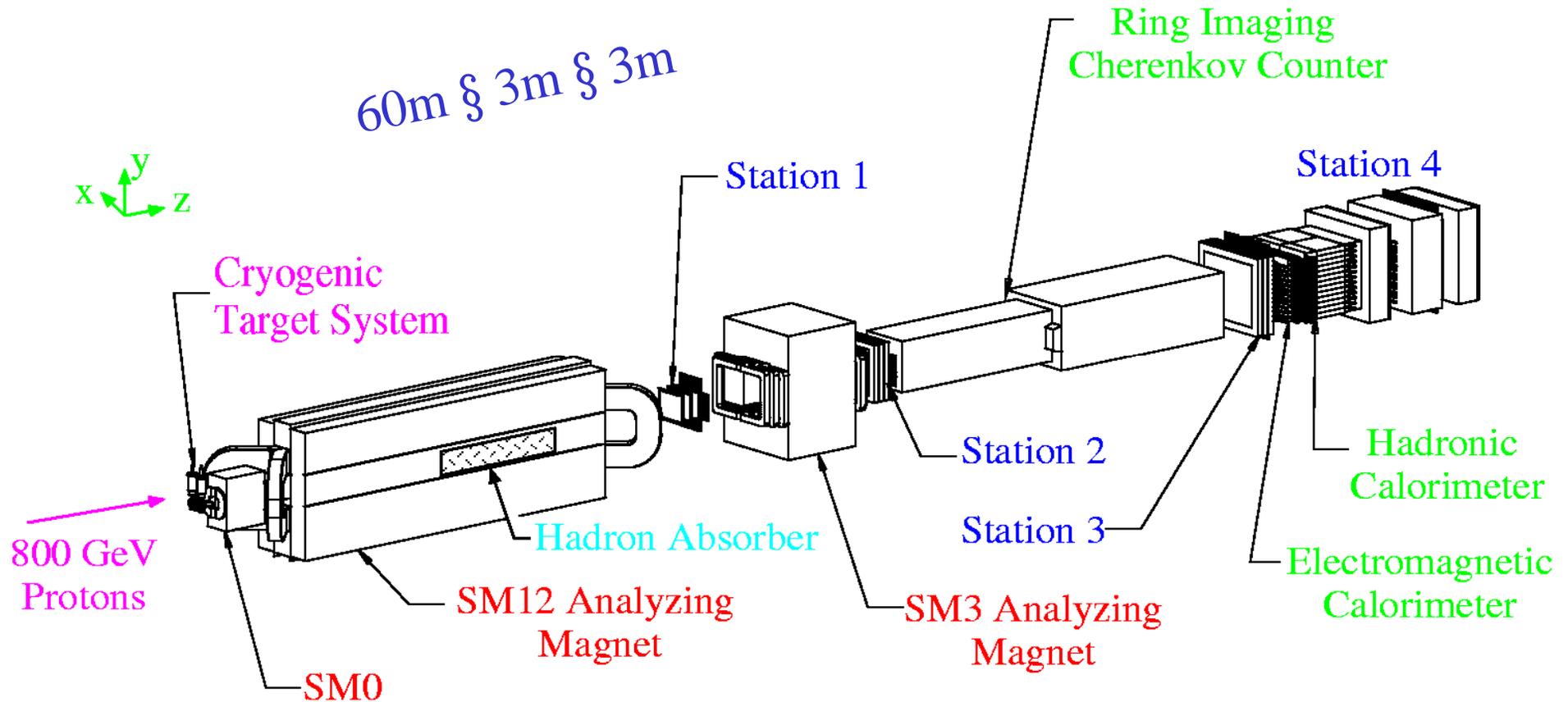


Fermilab E906: Hodoscopes for Stations 3 and 4

Donald Isenhower
Abilene Christian University
Abilene, Texas U.S.A.



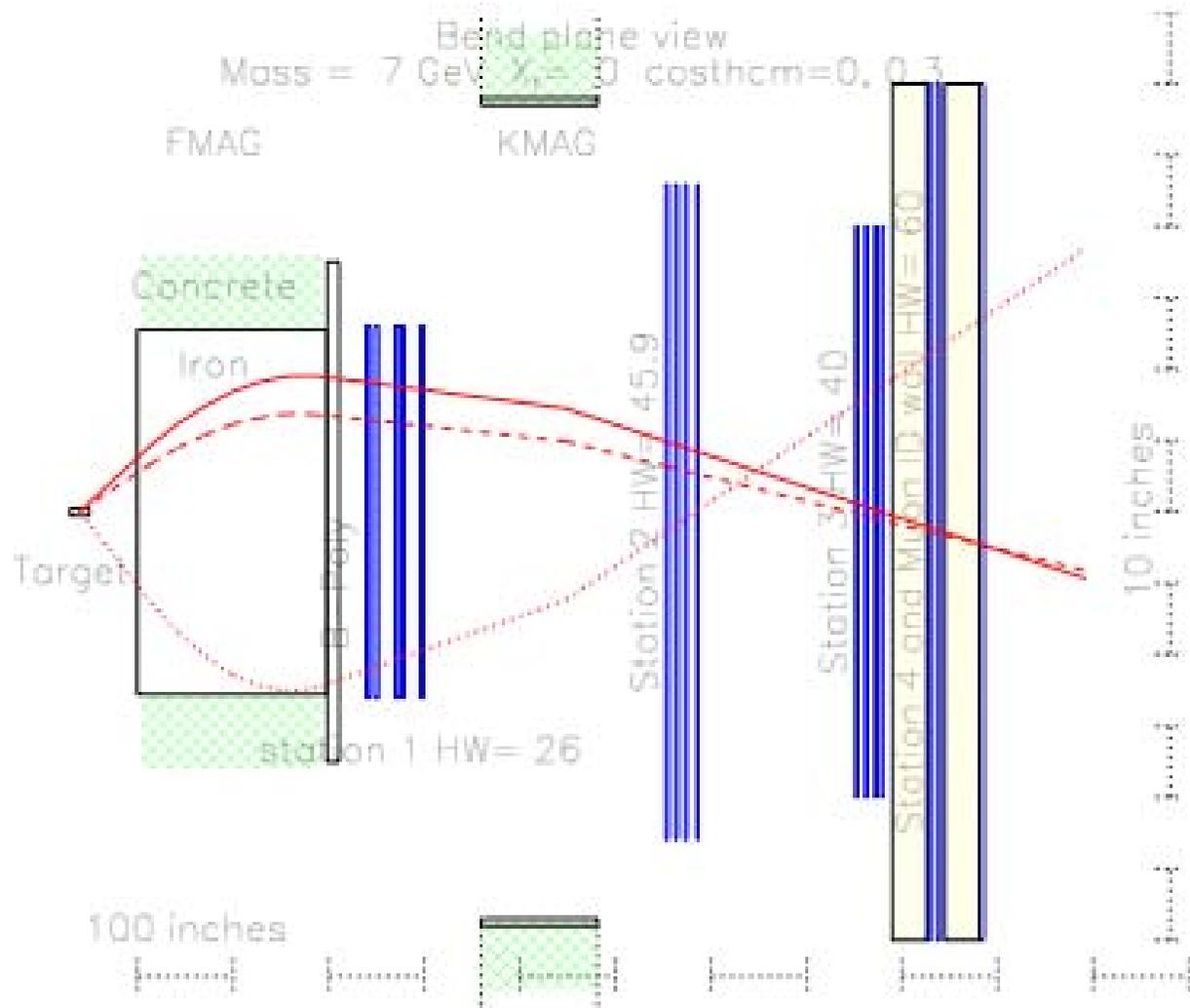
Just for new collaborators: Fermilab E866/NuSea Detector



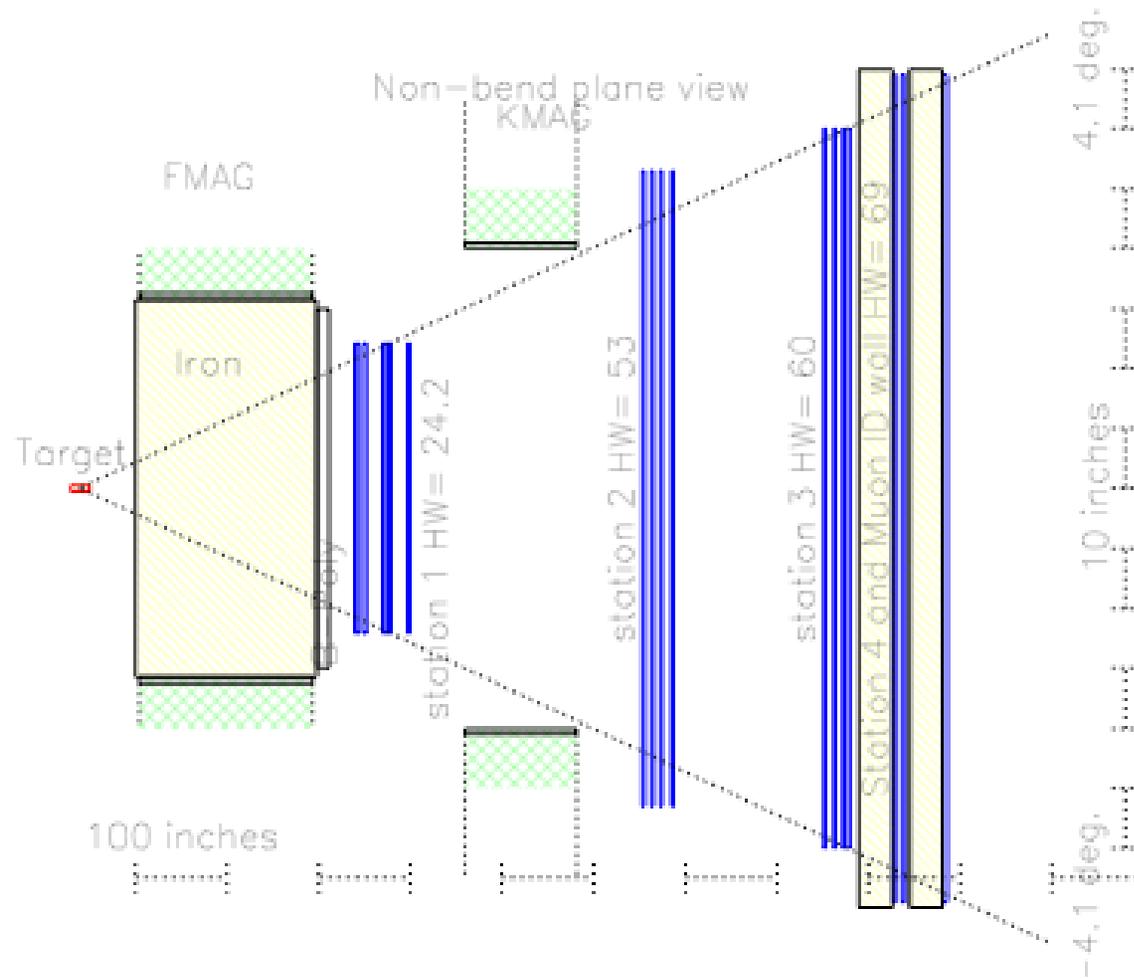
- Forward x_F , high mass μ -pair spectrometer
- Liquid hydrogen and deuterium targets
- Two acceptance defining magnets (SM0, SM12)
- Also used solid W, Be, Fe targets

- Beam dump (4.3m Cu)
- Hadronic absorber (13.4 I_0 -Cu, C, CH₂)
- Momentum analyzing magnet (SM3)
- Three tracking stations
- Muon identifier wall & 4th tracking

Solid Fe Magnet Detetor (not to scale)



Solid Fe Magnet Detetor (not to scale)



Some details on Stations 3 and 4

- Each plane will have 2x16 scintillators (split up/down or left/right).
- Every station 4 paddle will be double ended (this is dictated by the trigger).
- See proposal for details on how these were planned for the trigger.
- Will be made from Eljen scintillator, each piece will be diamond milled (Eljen Corp. is about 60 km from Abilene, so they will be convenient for us).

Details on EJ-200 Scintillator

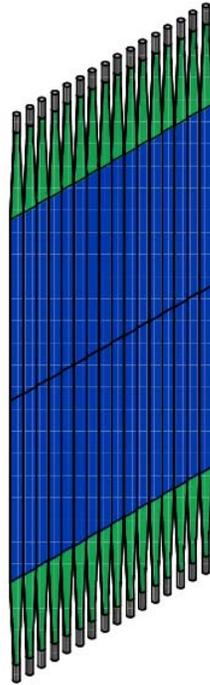
(note: Charles Hurlbut at Eljen is the one who founded Bicron's plastic scintillator division and developed many of their scintillator materials)



QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

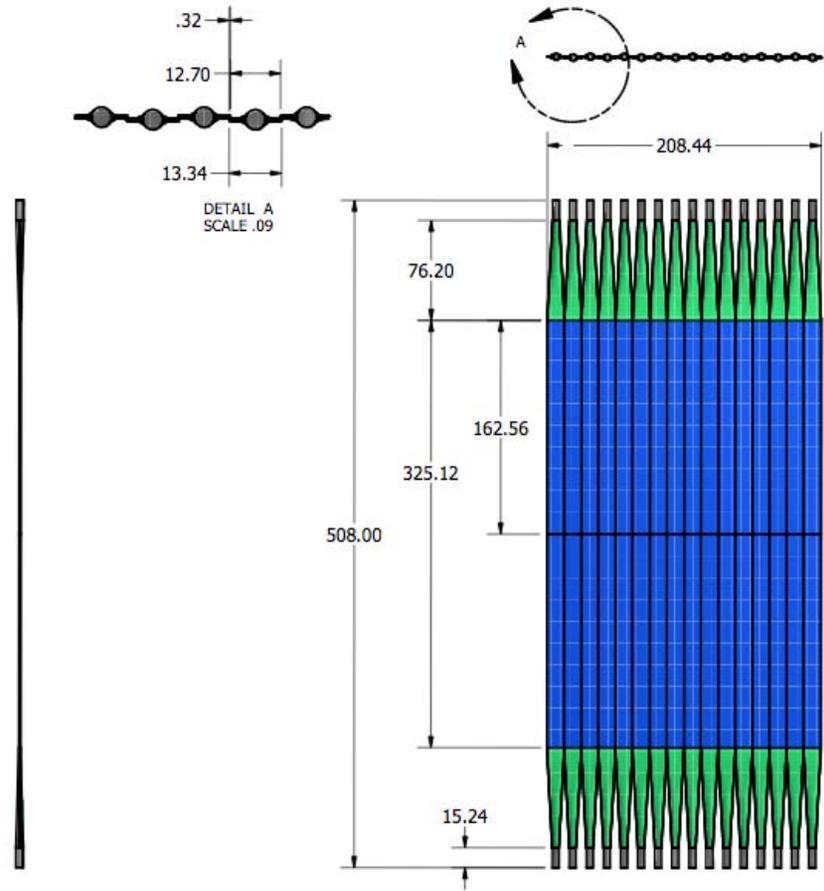
Station 3: X and Y planes, both split in middle

Hodoscope 3x



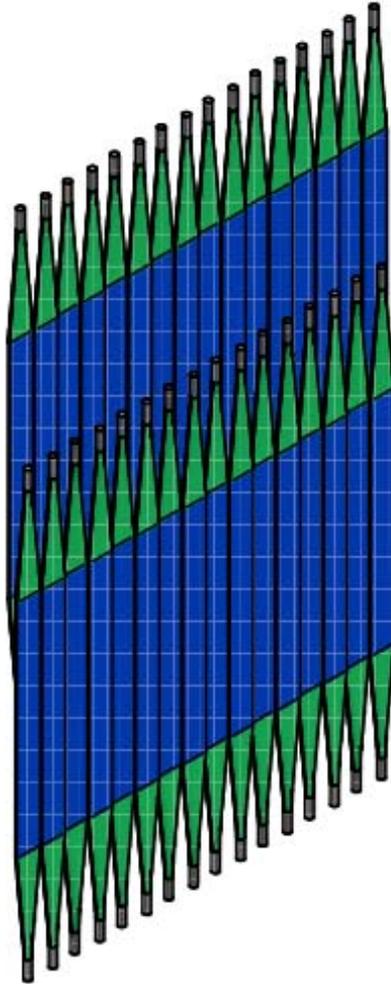
16 x 2 counters for each plane

Hodoscope 3x

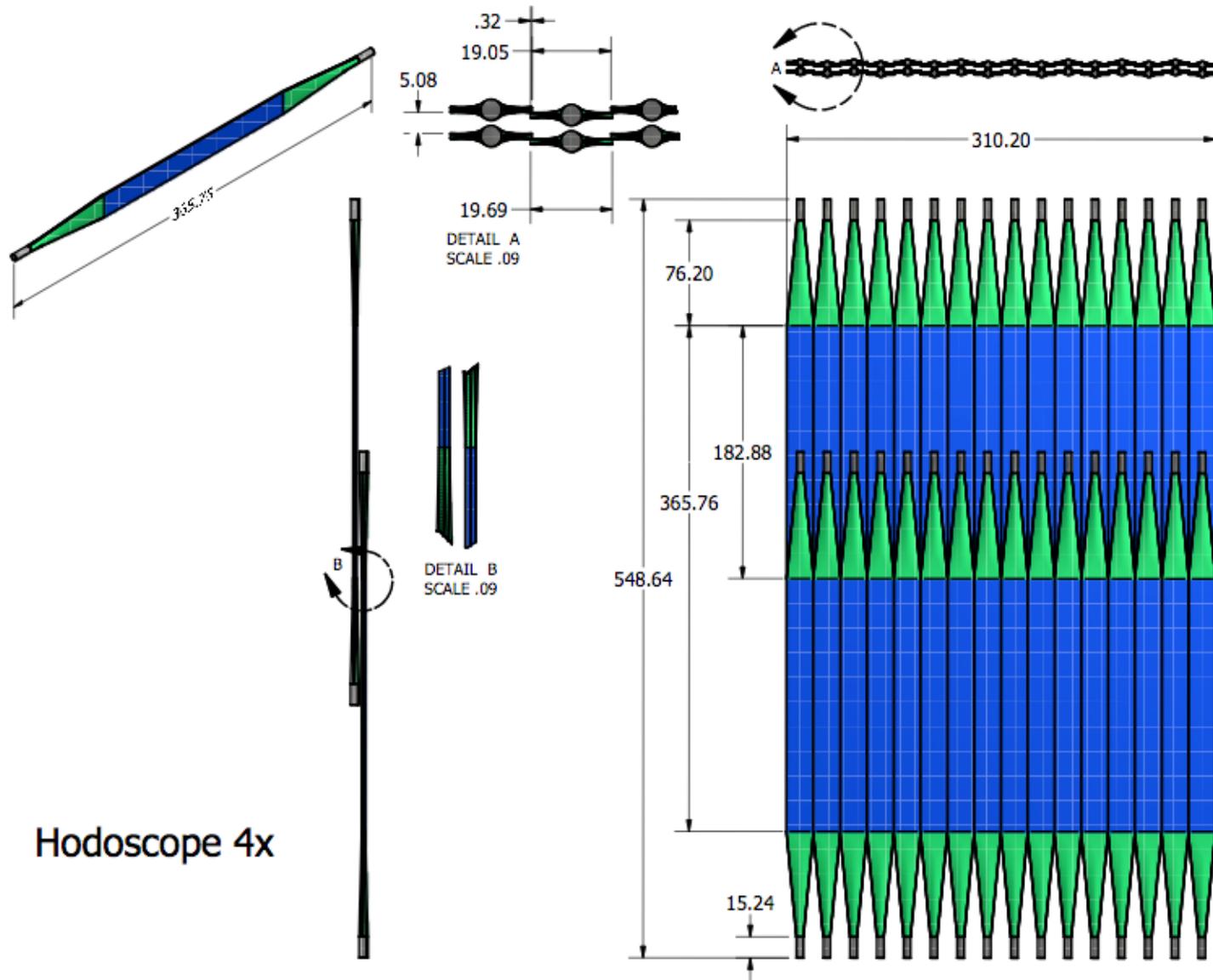


Thank to Paul Reimer for plots

Hodoscope 4x

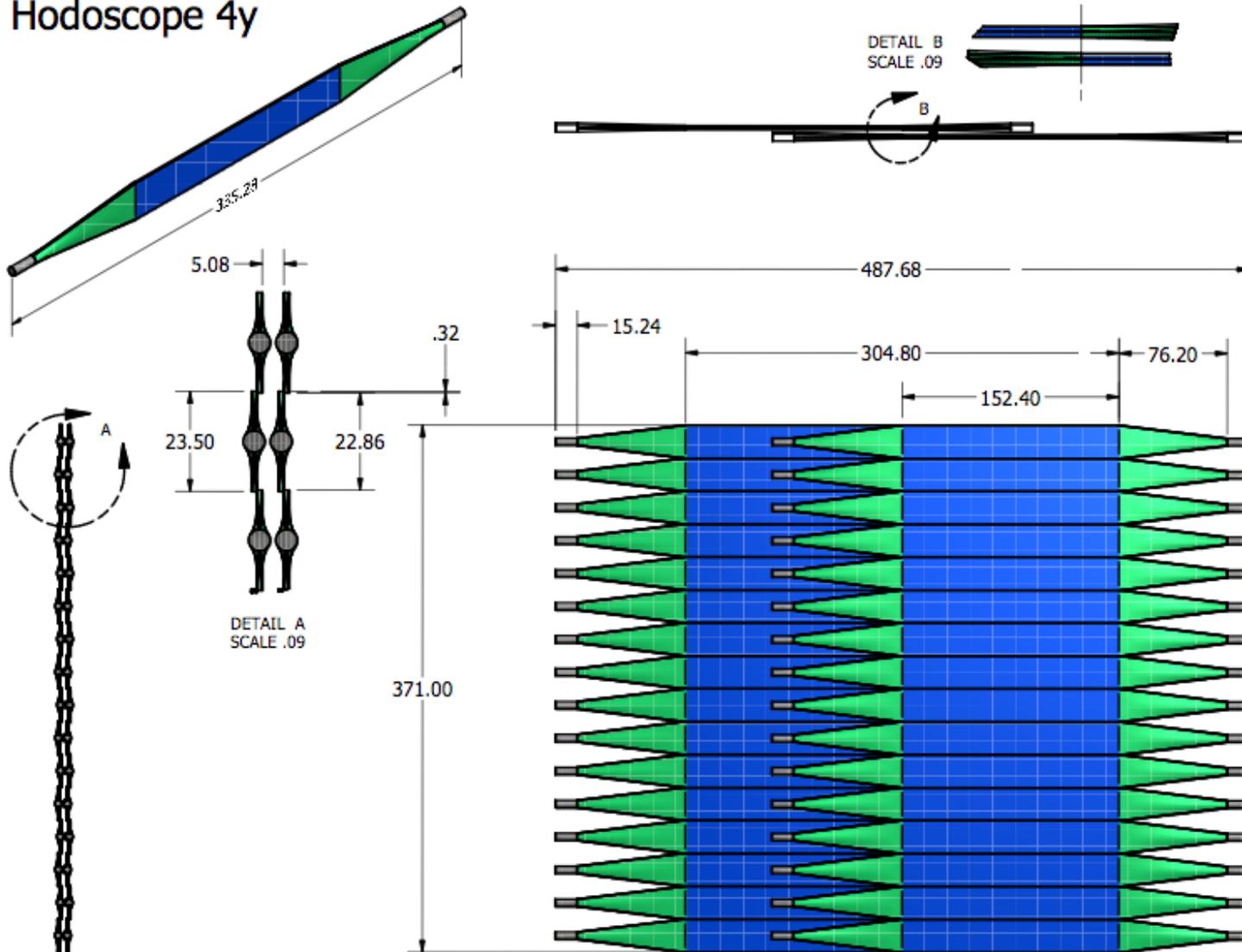


Station 4, 16x2 counters, double-ended readout



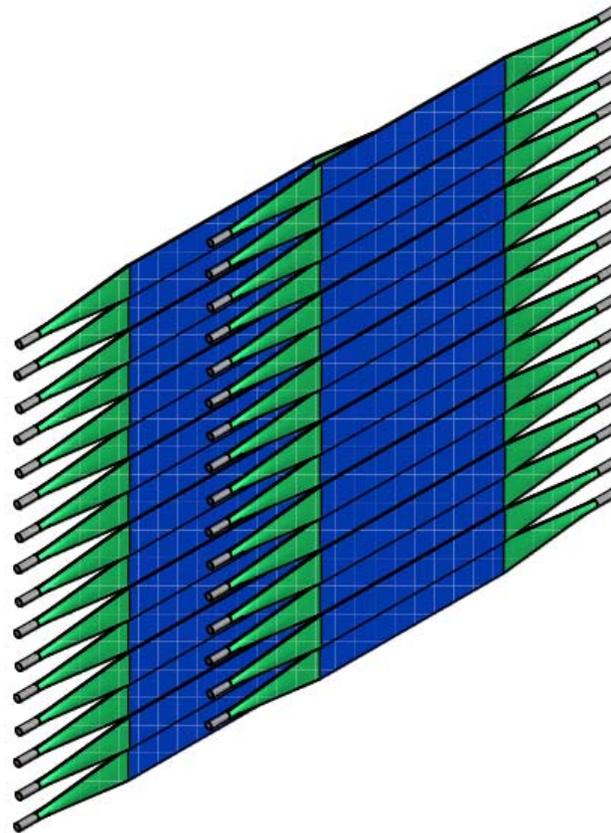
Hodoscope 4x

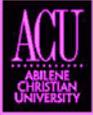
Hodoscope 4y



Note: due to double ended readout the left/right (up/down) planes will not be at the same z-position. Rough estimate of separation is 10-15 cm, so it should be of no consequence for trigger.

Hodoscope 4y





ACU Manpower and Schedule 2009

- Spring 2009:
 - Scintillator will need to be ordered in time to be available by early May.
 - Old stations 3 and 4 hodoscopes need to be obtained from LBL as soon as possible so that they can be disassembled.
 - Old 2” PMTs will be tested and matched for performance.

- Summer 2009 (primarily construction at FNAL):
 - Isenhower 75% time at FNAL
 - Towell 25% time at FNAL
 - Expect 4 students for summer at FNAL. Joseph Kish graduates in May, but has agreed to help oversee construction.

- Some work can be done at ACU in the academic year. Possible to spend two or weeks or so at FNAL during Christmas break for finishing up. Assumption is that FNAL will take care of moving hodoscopes into place after magnets and such are put in place.



Conclusions on timeline of construction

- ACU will need to order scintillator and light guides where we have them by May.
- Old E866 station 3 and 4 hodoscope planes need to be shipped to either ACU or Fermilab. If the old scintillator/PMT pieces were shipped to Abilene ASAP, the PMTs could be removed, cleaned, and tested before summer.
- Summer months will be used to disassemble old hodoscopes, test old PMTs, and construct new hodoscope planes.
- Do we overlap hodoscope paddles? If so, by how much. Tradeoff is between rate limits and trigger capabilities.
- If we begin run in June, 2010, almost all station 3 and 4 hodoscope construction must be finished by mid-August, 2009.
- Still need to finalize how all hodoscopes will be read out and verify other details such as HV, cables and such.