

Muon Strip-scintillator + WLS + Pixelated Photon Det. Testing

The Big Picture:

Proof of Principles OK

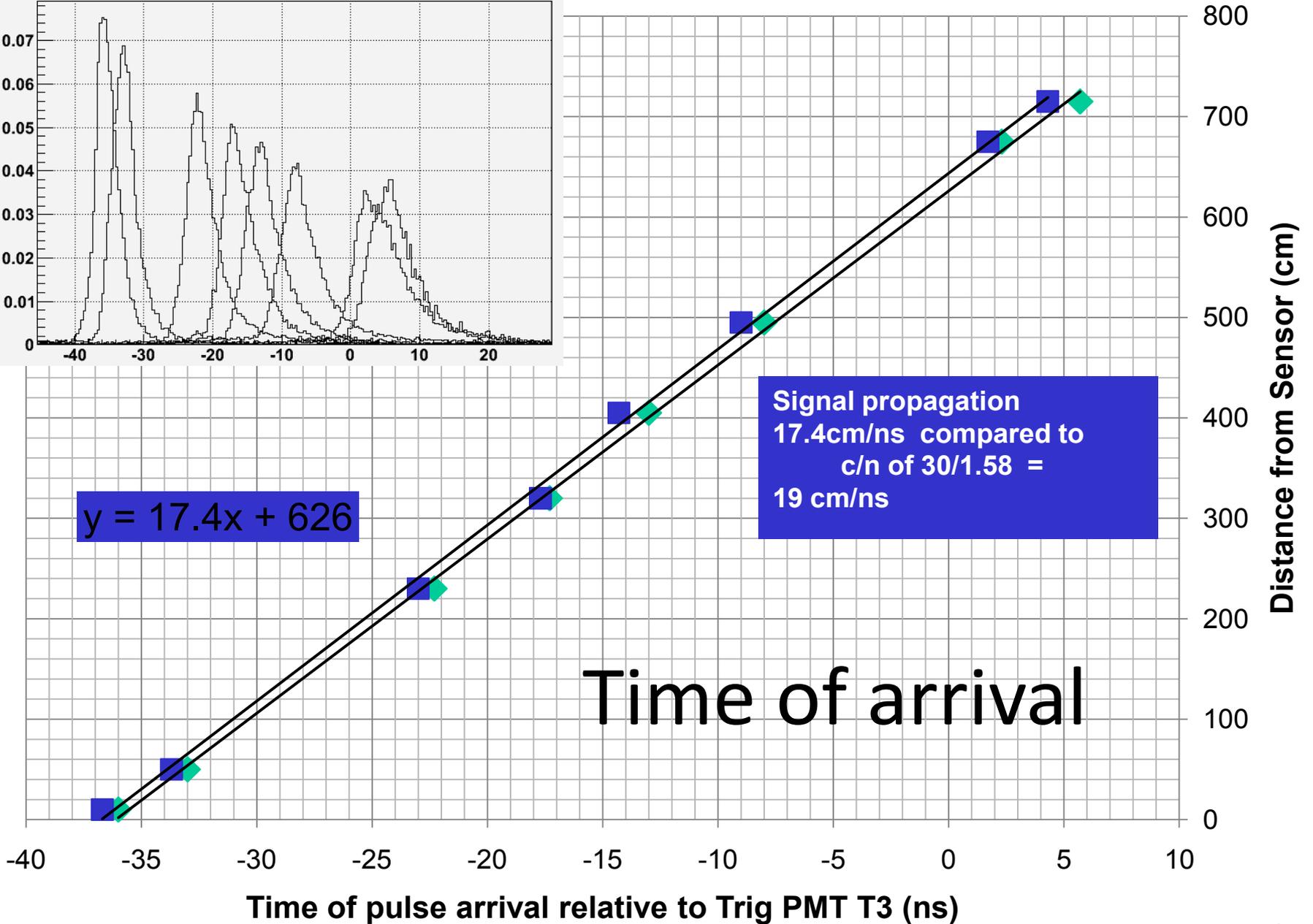
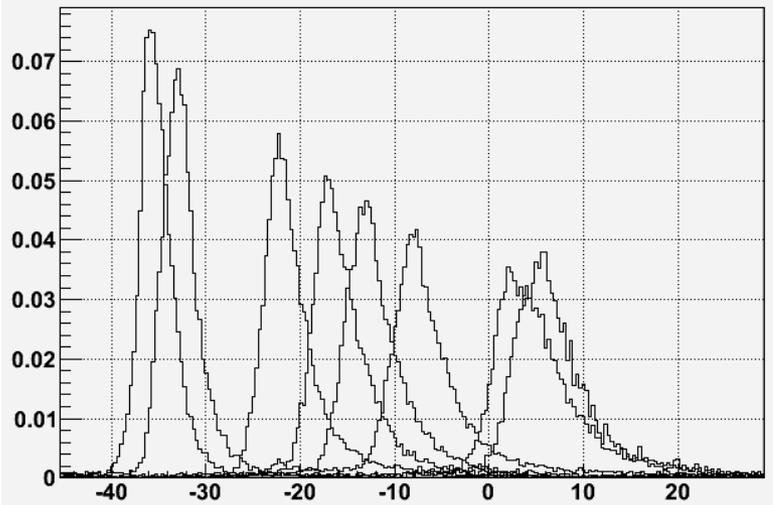
Most Crucially Needed R&D?

Long Strips: Built & Tested

Interfaces: WLS fiber/PPD/FE

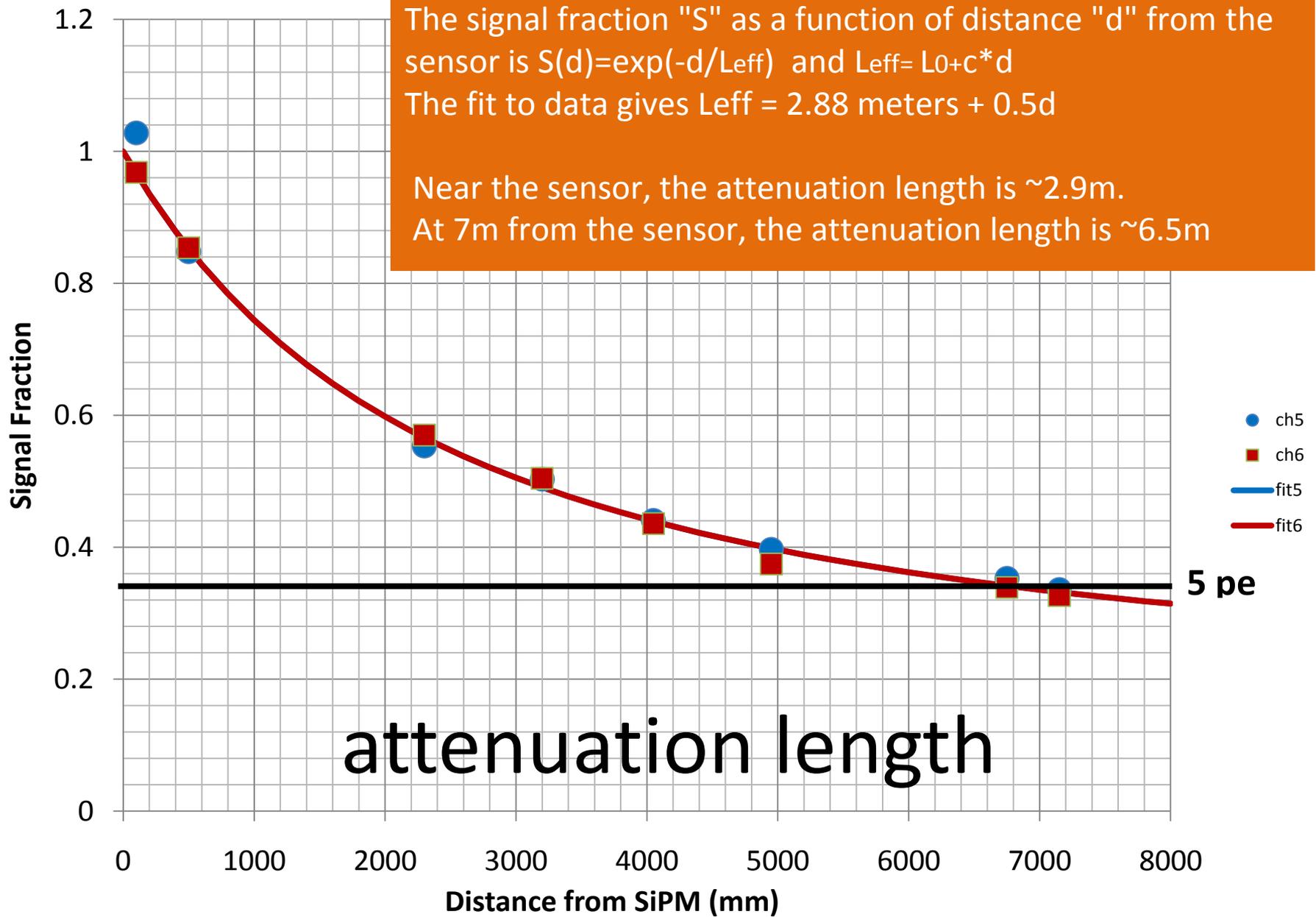
Cable evolution: miniature coax

Analog Signal/Digitization



The signal fraction "S" as a function of distance "d" from the sensor is $S(d)=\exp(-d/L_{\text{eff}})$ and $L_{\text{eff}}= L_0+c*d$
The fit to data gives $L_{\text{eff}} = 2.88 \text{ meters} + 0.5d$

Near the sensor, the attenuation length is $\sim 2.9\text{m}$.
At 7m from the sensor, the attenuation length is $\sim 6.5\text{m}$



Increase number of PPDs with modified designs: 16, 32, 64 strips

Use existing 3.6m long scint. strips.

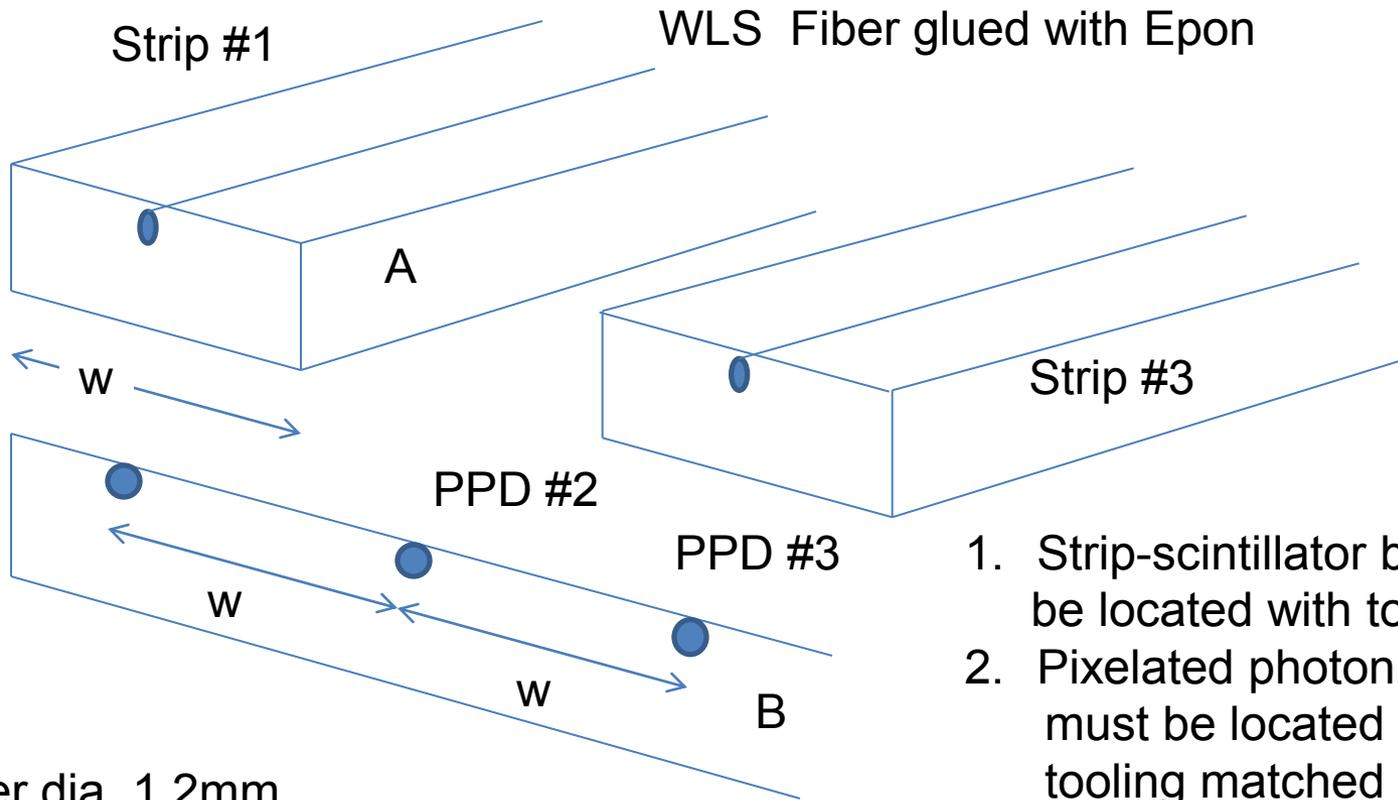
Concentrate on the mechanical strip/ WLS fiber to FE electronics interface.

Maintain analog electrical output via miniature coax or twisted-pair ribbon.

Go to TB4 style electronics w/16 channels/board to handle DAQ.

Test menu: standard measurements plus noise, cross-talk, attenuation....

"Design Idea" for Coupling WLS to PPD



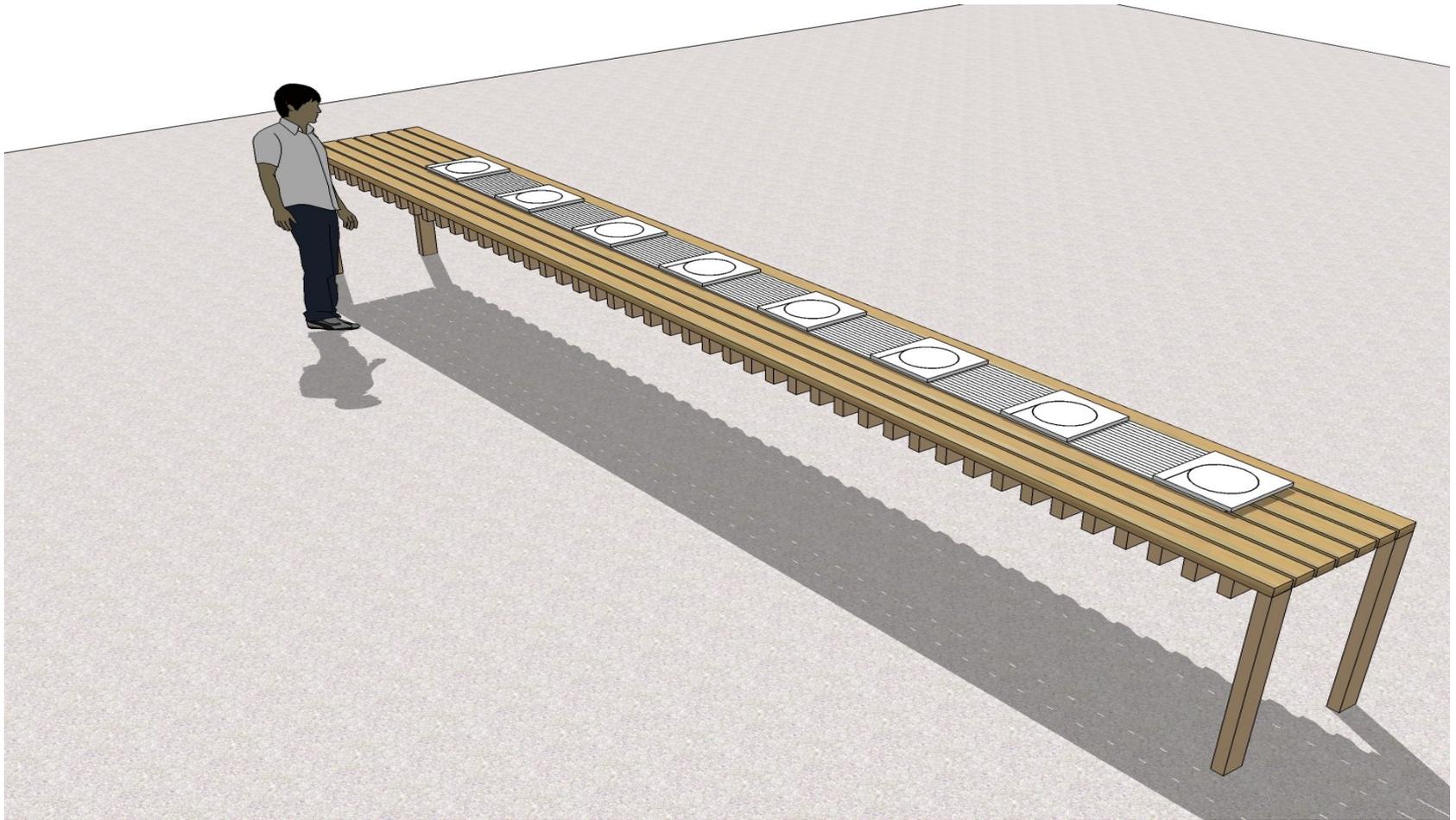
1. Strip-scintillator bars must be located with tooling.
2. Pixelated photon detectors must be located with tooling matched to 1.
3. WLS polished end located with tooling matched to B.

Fiber dia. 1.2mm.

PPD pixels inscribed in 1.2mm dia circle.

Bar B has to be used to locate PPDs about ~1mil from polished end of WLS fiber.

Test Bench for Cosmic Testing



Tasks and Schedule

Long Strips

1. Need to make measurements of existing strip scintillator dimensions.
2. New strips with glued WLS will require an understanding of tooling before we glue fibers into strips. Drawings are necessary. Maybe Notre Dame can do some of the drawings?
3. Need to consult good designer. Carl Lindenmeyer? Giovanni P.?

Cosmic Ray Test Stand

1. Need to find about 10 trigger counters that are 7" X 15".
2. Need to construct Paul's Stand to hold 16 long strips plus trigger counters: Top trigger counters, then four rows of four strips, bottom trigger counters. Fe for selecting stiffer CRs?

TB16 Boards.

Thursday morning meetings?

Need updated SiD Muon cost estimate. Any volunteers?