

Considerations for HV and signal  
connector panel at back of NPS

NPS Detector –  
crystal stack,  
30 by 36 matrix

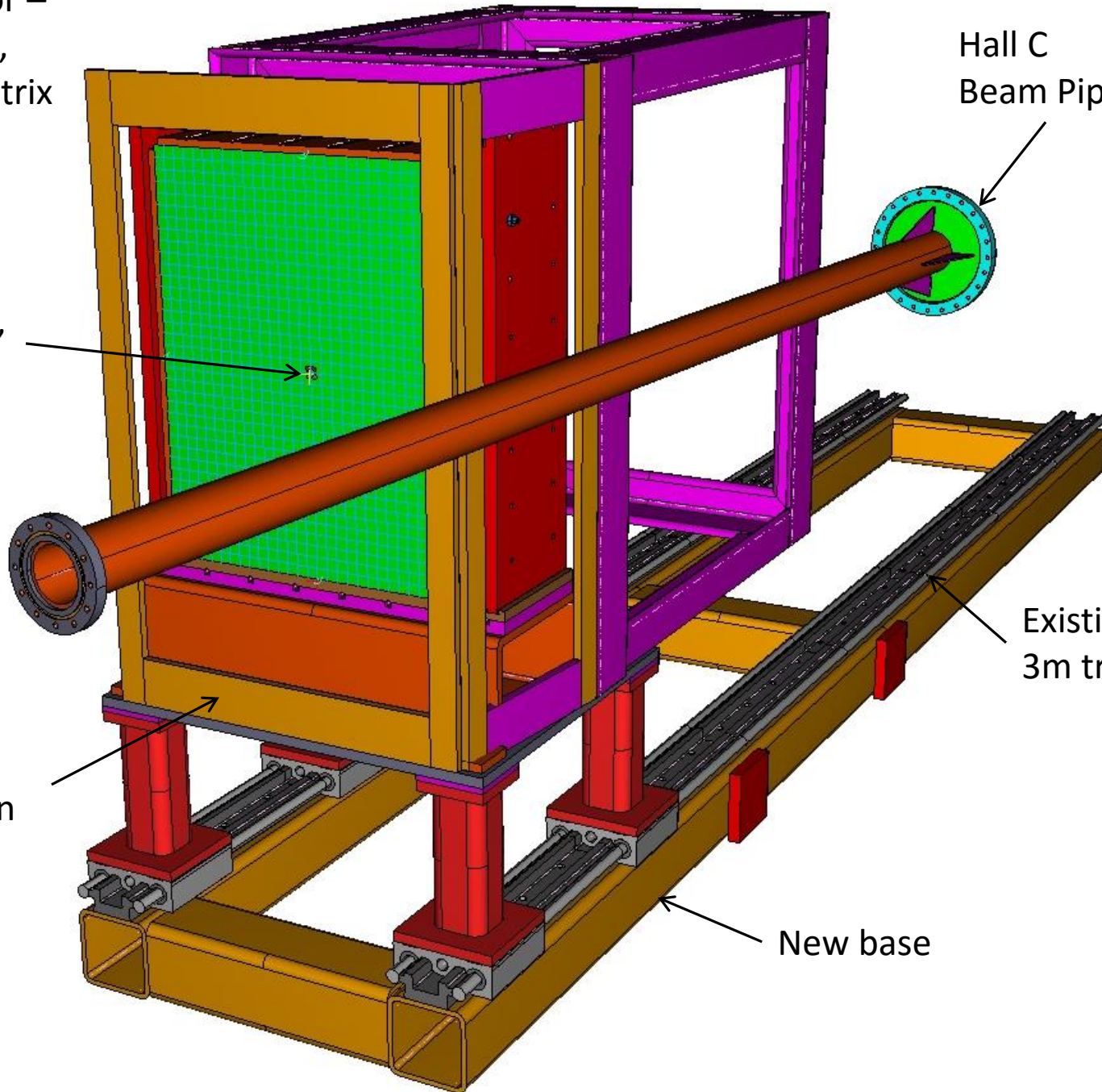
Detector  
center 45.5”  
above deck

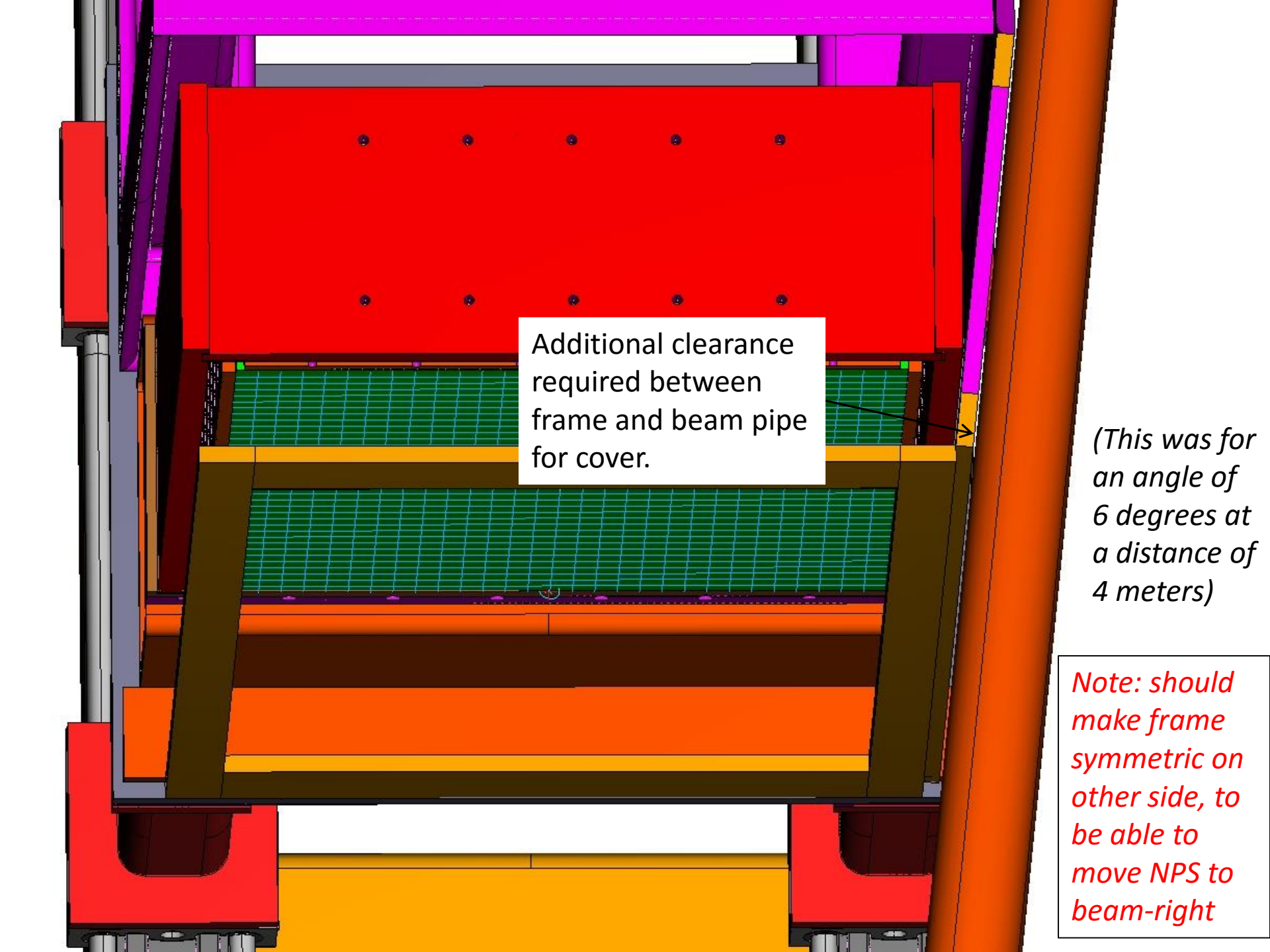
Incomplete  
frame design

Hall C  
Beam Pipe

Existing Rails  
3m travel

New base





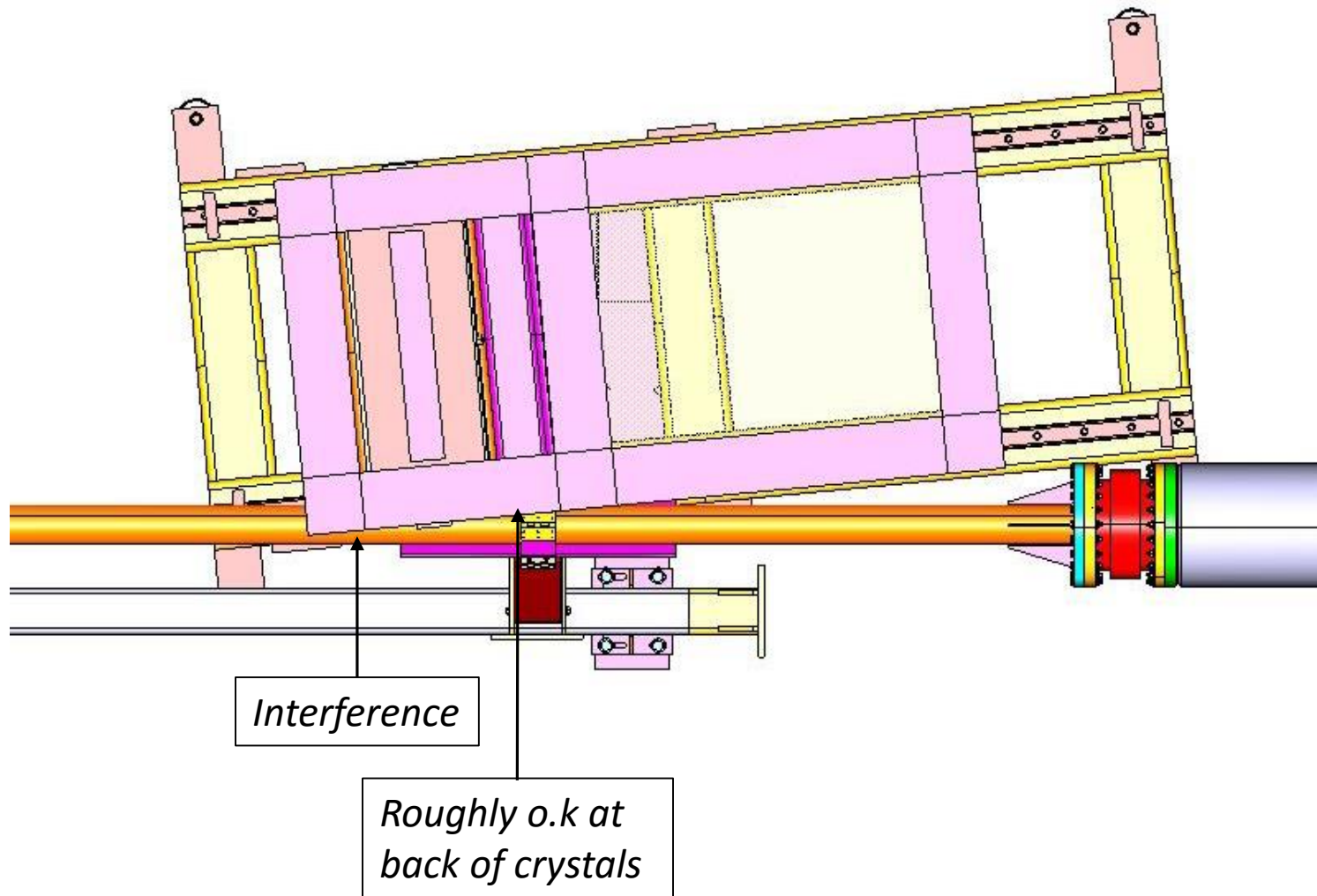
A detailed cross-sectional diagram of a beam pipe assembly. The central component is a green grid-patterned beam pipe. Above it is a red rectangular frame with six circular holes. Below the beam pipe are several layers of orange and yellow components. The entire assembly is supported by a red base. Annotations include a white box with black text pointing to a gap between the frame and the beam pipe, and a red box with black text on the right side. A red note is also present in a white box at the bottom right.

Additional clearance  
required between  
frame and beam pipe  
for cover.

*(This was for  
an angle of  
6 degrees at  
a distance of  
4 meters)*

*Note: should  
make frame  
symmetric on  
other side, to  
be able to  
move NPS to  
beam-right*

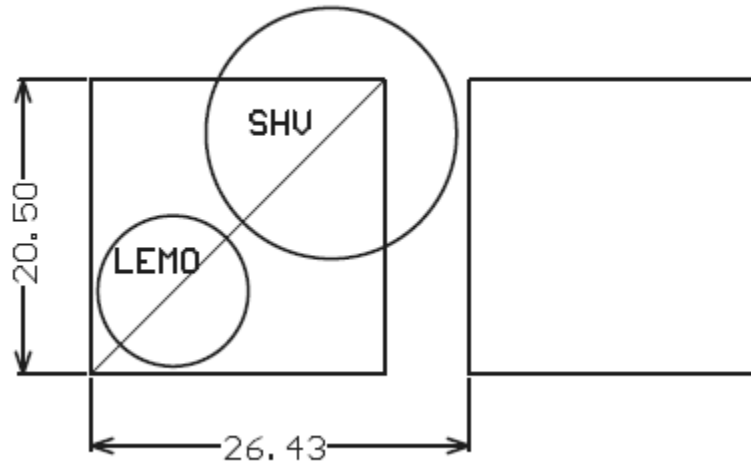
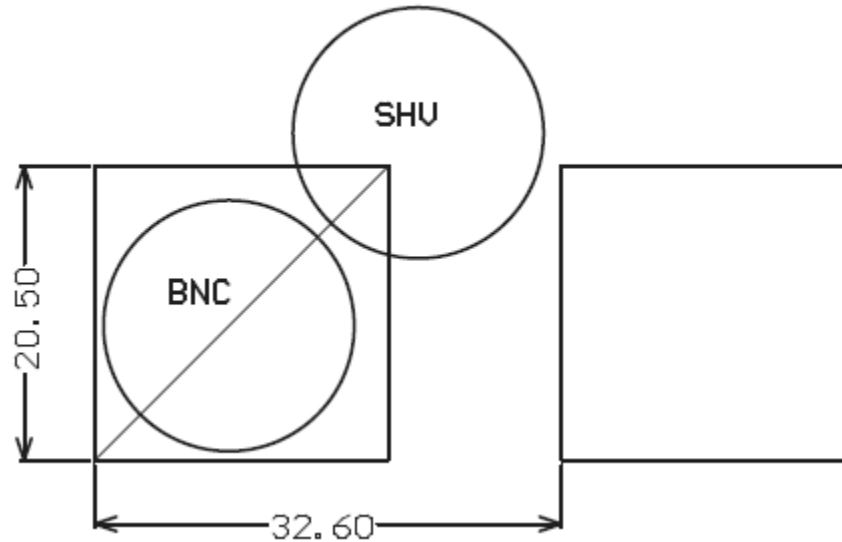
Position 6 degrees, 4 meter distance from pivot to front crystals



Minimum connector space requirement:

(SHV + BNC) = 3.26 by 3.26 cm<sup>2</sup>, or 1285 by 1285 mil

(SHV + LEMO) = 2.64 by 2.64 cm<sup>2</sup>, or 1040 by 1040 mil

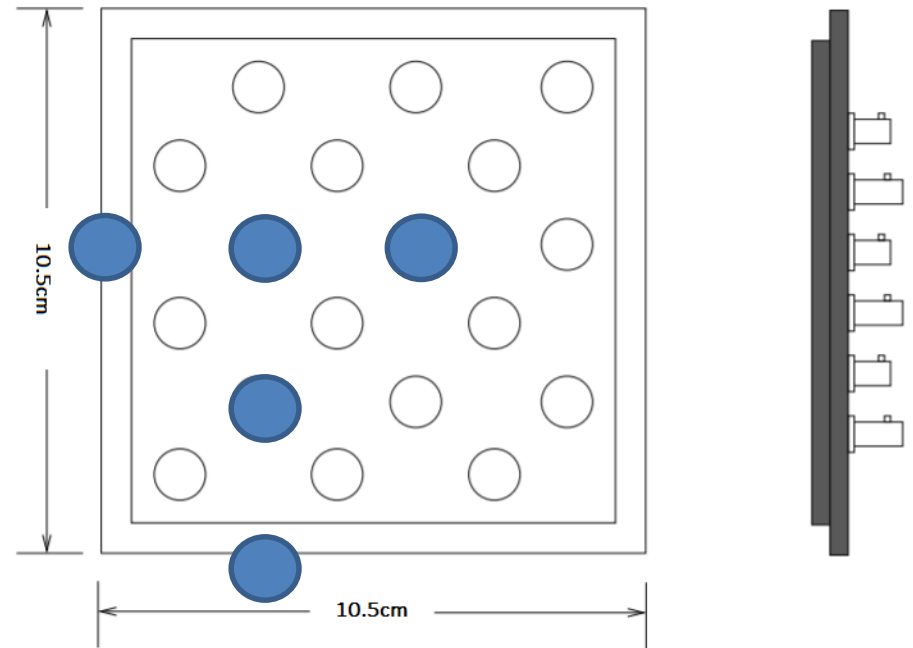


Can squeeze a bit more, following the prototype

Prototype: 3 by 3 channels, 6.15 by 6.15 cm<sup>2</sup>

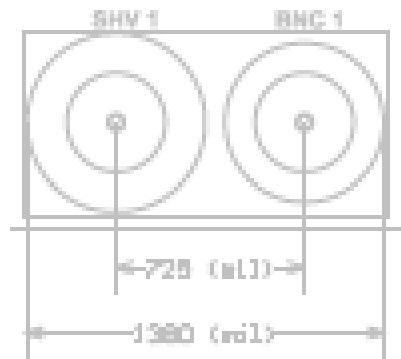
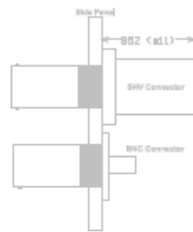
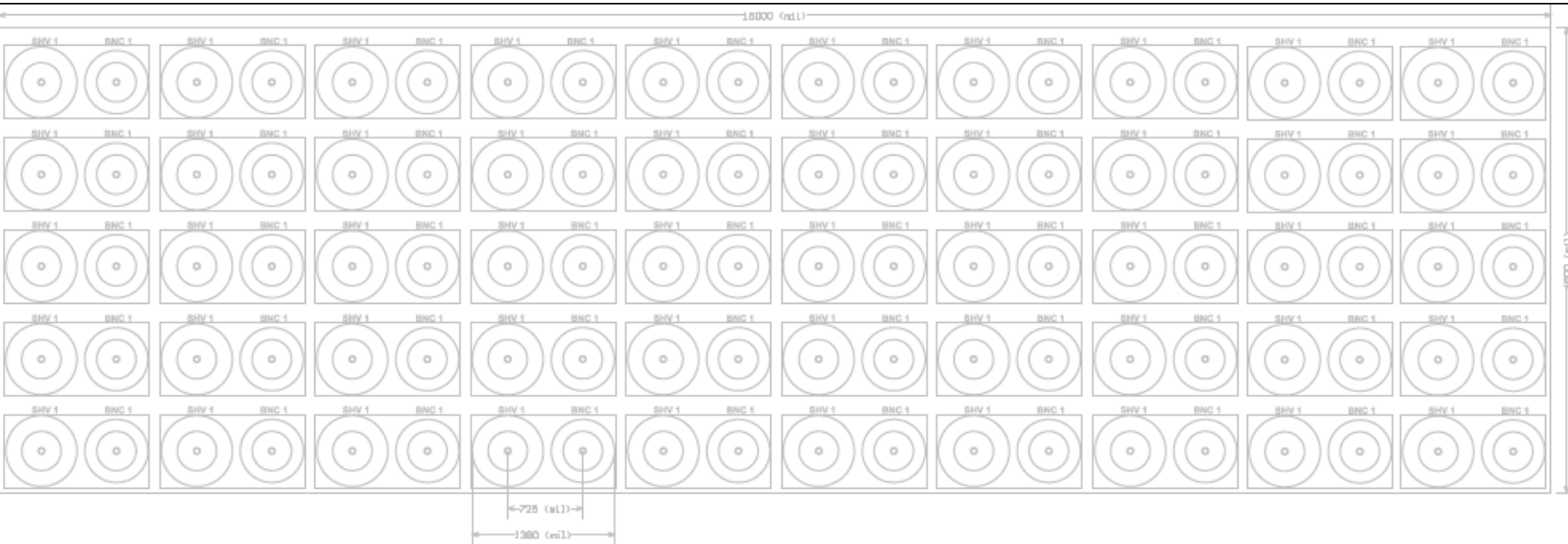
connector space 9.0 by 9.0 cm<sup>2</sup>, or 3540 mil by 3540 mil

(3.5 by 3.5 would have nearly fit in 10.5 cm space of backplane)



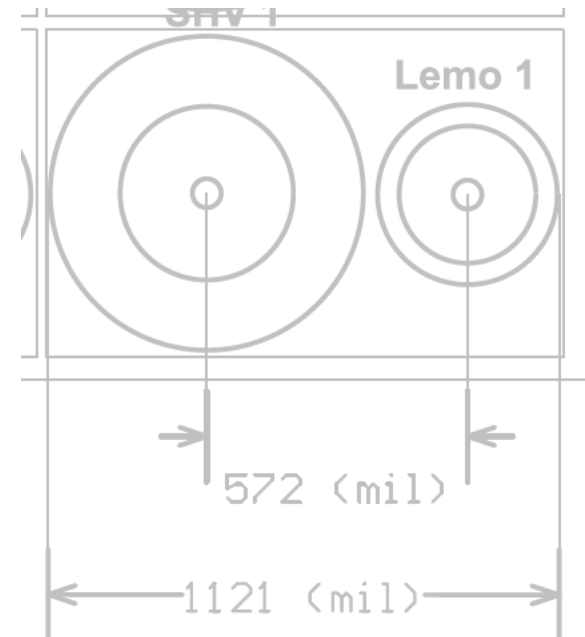
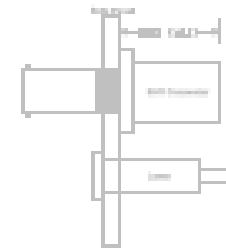
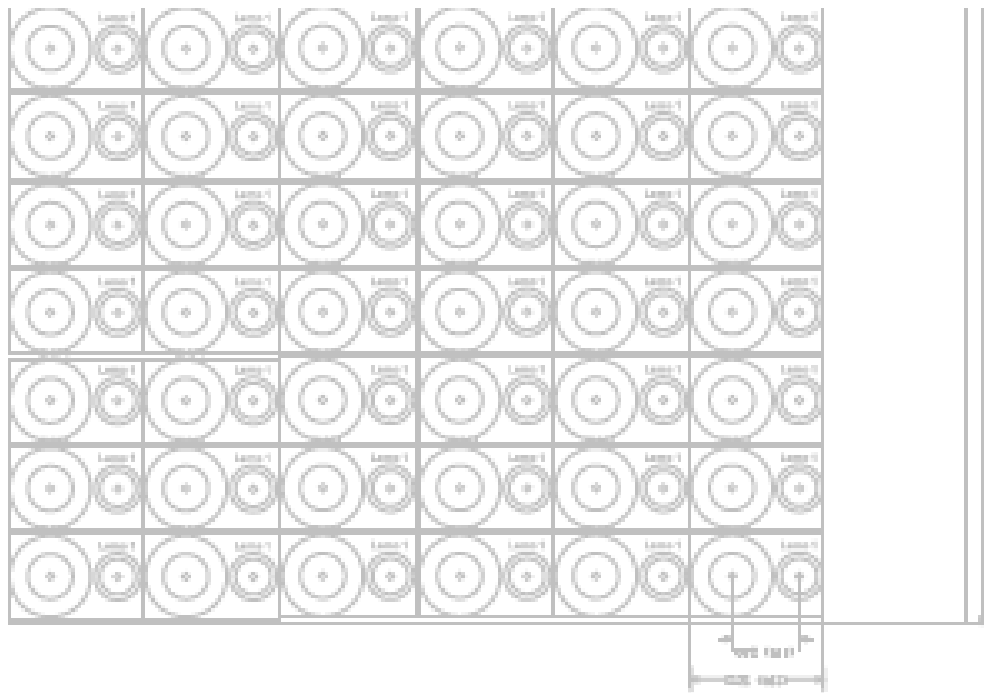
From Fernando, for the Hall D COMCAL – 100 channels split over two connector panels

10 by 5 channels, 15000 mil by 4500 mil



From Fernando, for the Hall C NPS – ~1200 channels split over two connector panels

25 by 25 channels, 29019 mil by 18686 mil



*But, would be very advantageous if we could have only one connector panel in the back (or perhaps a few connectors on the top)*

→ *Never connectors (or cables) on beam-side*

→ *Could move detector beam right and beam left*



Minimum connector space requirement:

(SHV + BNC) = 3.26 by 3.26 cm<sup>2</sup>, or 1285 by 1285 mil

(SHV + BNC) as per prototype = 3.0 by 3.0 cm<sup>2</sup>, or 1185 by 1185 mil

(SHV + LEMO) = 2.64 by 2.64 cm<sup>2</sup>, or 1040 by 1040 mil

30 by 36 crystal stack = 61.5 by 73.8 cm<sup>2</sup>

Minimum connector space (SHV + BNC) = 90.0 by 108 cm<sup>2</sup>

Interference at 6 degrees at a 4 m distance:  $400 \text{ cm} \times \sin(6^\circ) = 41.8 \text{ cm}$

Detector frame space ~ 84 cm wide when flared out to back of crystals.

Perhaps a bit larger and 90 cm would work, even if tight for connectors.

E.g., at 500 cm space =  $(41.8 + 10.4 - 5.1)$  (assuming <4" beam pipe) = 47.1 cm)

Even if such a connector plane could be such area, how do we flare out from the smaller crystals to the larger space need for connectors (SHV and BNC?)

- 1) Can we fit a 90 by 108 cm<sup>2</sup> connector panel at the back of the crystals while not hitting the beam pipe for the configuration at 6 degrees and 4 meters?  
Vertical likely works, horizontal not clear/maybe.
- 2) Can we make a sketch how the cables would flare out from the divider to such a back connector plane?

- 1) Can we fit a 90 by 108 cm<sup>2</sup> connector panel at the back of the crystals while not hitting the beam pipe for the configuration at 6 degrees and 4 meters? Vertical likely works, horizontal not clear.
- 2) Can we make a sketch how the cables would flare out from the divider to such a back connector plane? **Likely yes, divider ends in cables anyways.**

