NPS Detector Frame Mechanical Design and Constraints

(We are trying to “freeze” the outside dimensions of the NPS detector frame)

Mail to Mike Fowler on April 28:
I tried to look at a table of angle and distances from the "designer's eye". Here are the cases we should check as far as I can judge:

NPS angle	distance to front face of detector
5.5 degrees	6 meters

(it may be 6 degrees suffices, but I wanted to take the worst case)

7.9 degrees	4 meters

(at this distance it would also be good to check 5.5 degrees as this is our nominal "NPS facility design distance, so please see where the interferences are with 5.5 degrees and 4 meters too)

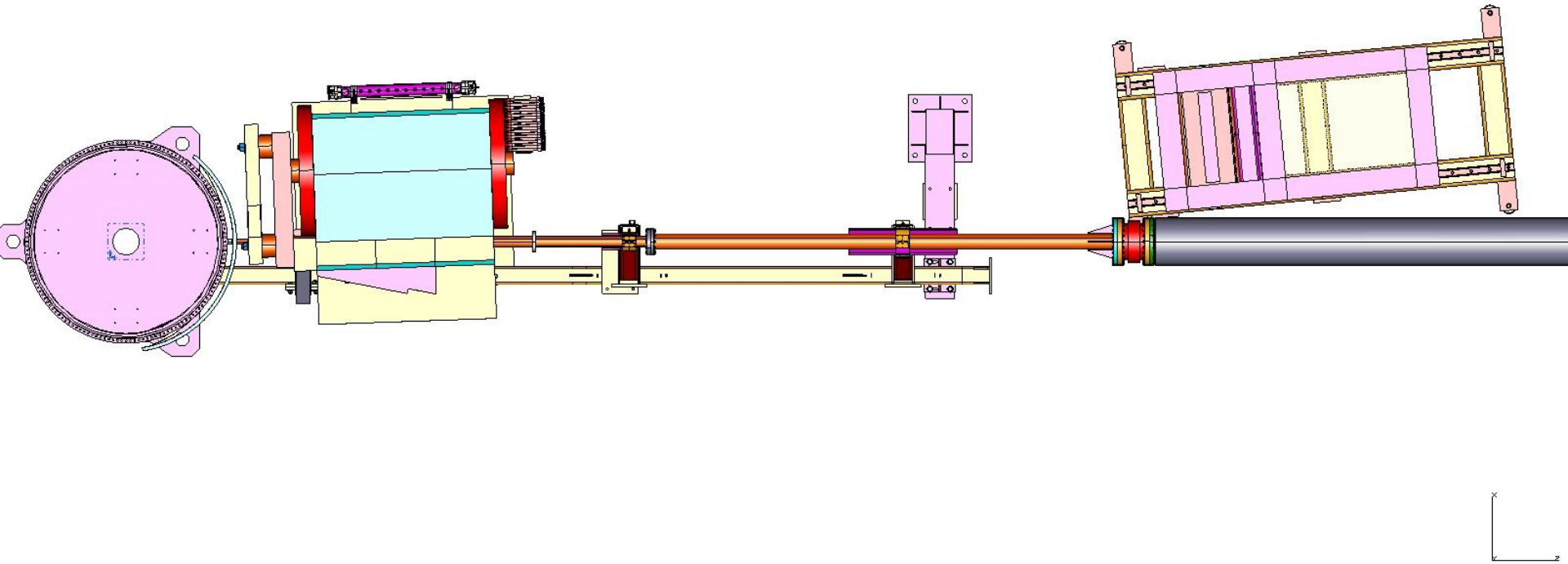
10 degrees	3 meters

Also, the detector can shift from 3 meter distance all the way to 11 meters. When we looked at this before, we considered to perhaps only allow rails from 3 meter to 7 meters, and then move to cover the range 7 meters to 11 meters.

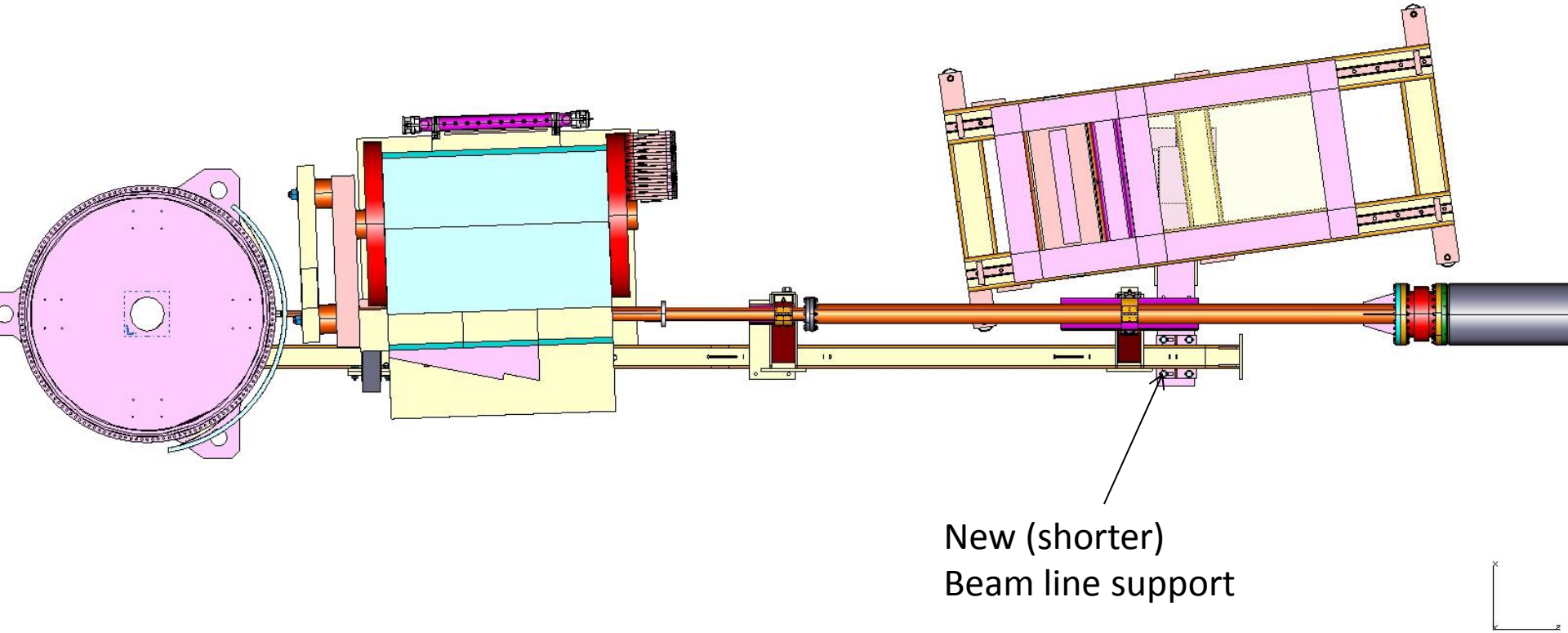
And, when the detector is positioned on the SHMS deck (larger angles, other side of the magnets), the front face of the detector should at least be able to move from 3 meters to 5 meters. The only thing to once more verify here is that it "fits vertically on the deck", and the second-level supports do not block/prevent motion.

Hope this helps, just make a few snapshots for when we meet in 2-3 weeks such that we can look at the various interferences and "freeze" the outside of the detector frame.

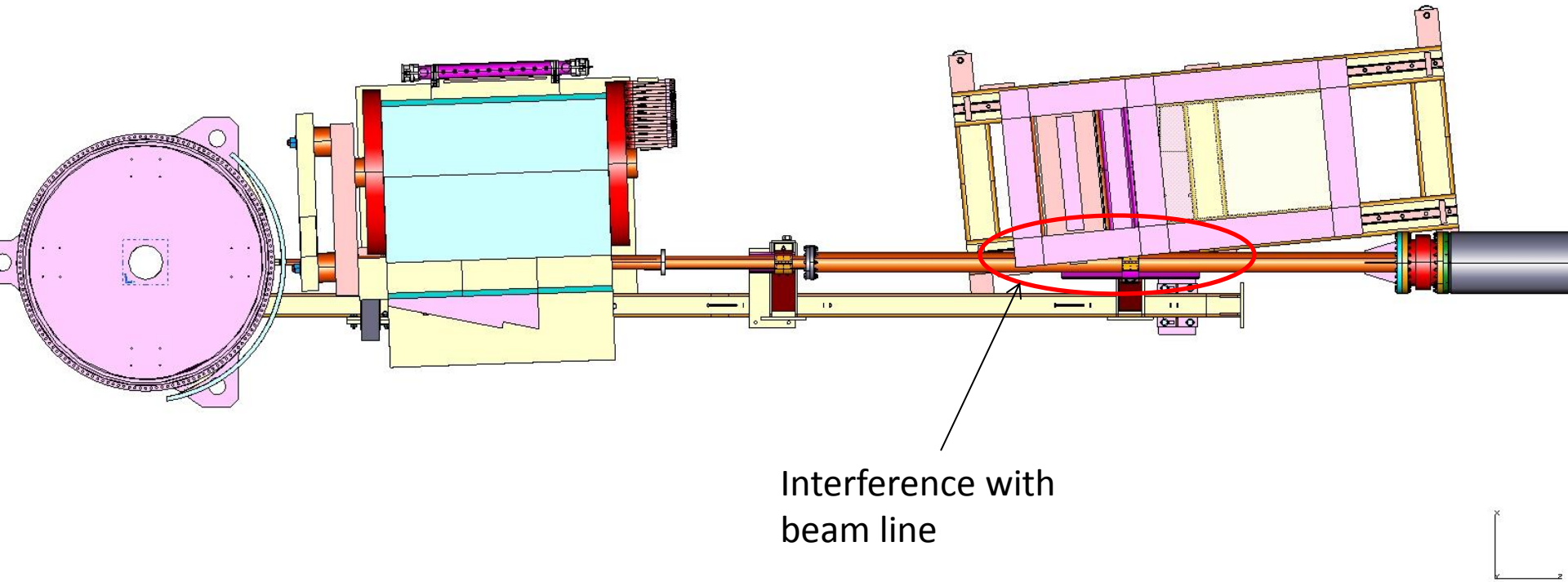
Detector at 6 meters, 5.5 deg



Detector at 4 meters, 7.9 deg.



Detector at 4 meters, 5.5 deg.



At further meeting with Mike Fowler (May 10th) checked that:

At NPS detector of 4 meters can make 6.5 degree fit easily

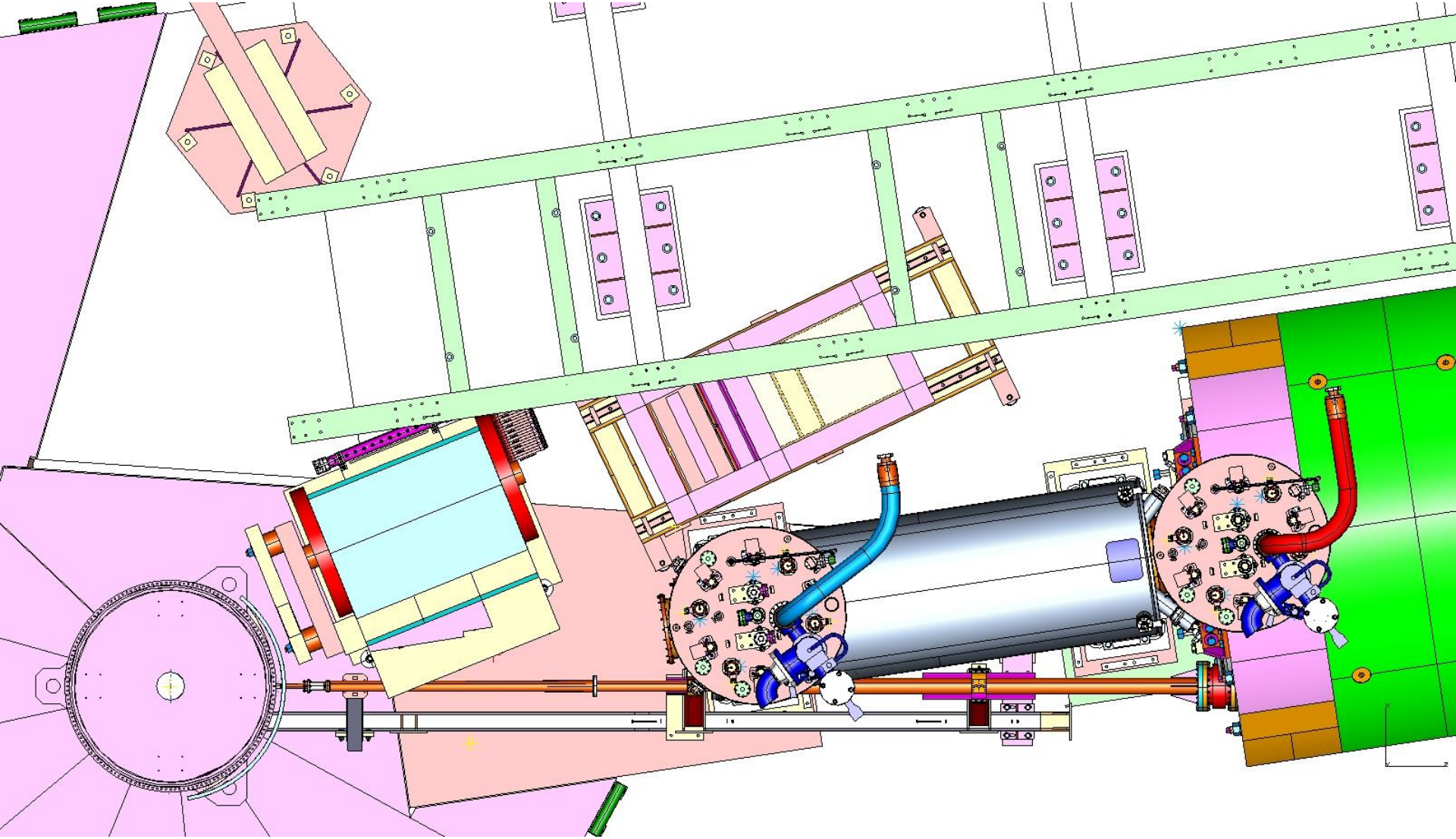
but would be very difficult to reach 6.0 degrees

In reality, at all these configurations the “2 degree scattering point” (this is the minimum angle accessible within the sweeper magnet gap when that magnet is positioned at a 5.5 degree central angle) is already well within the matrix of crystals, so it really does not help to push to smaller angles than 6.5 degrees for a detector distance of 4 m.

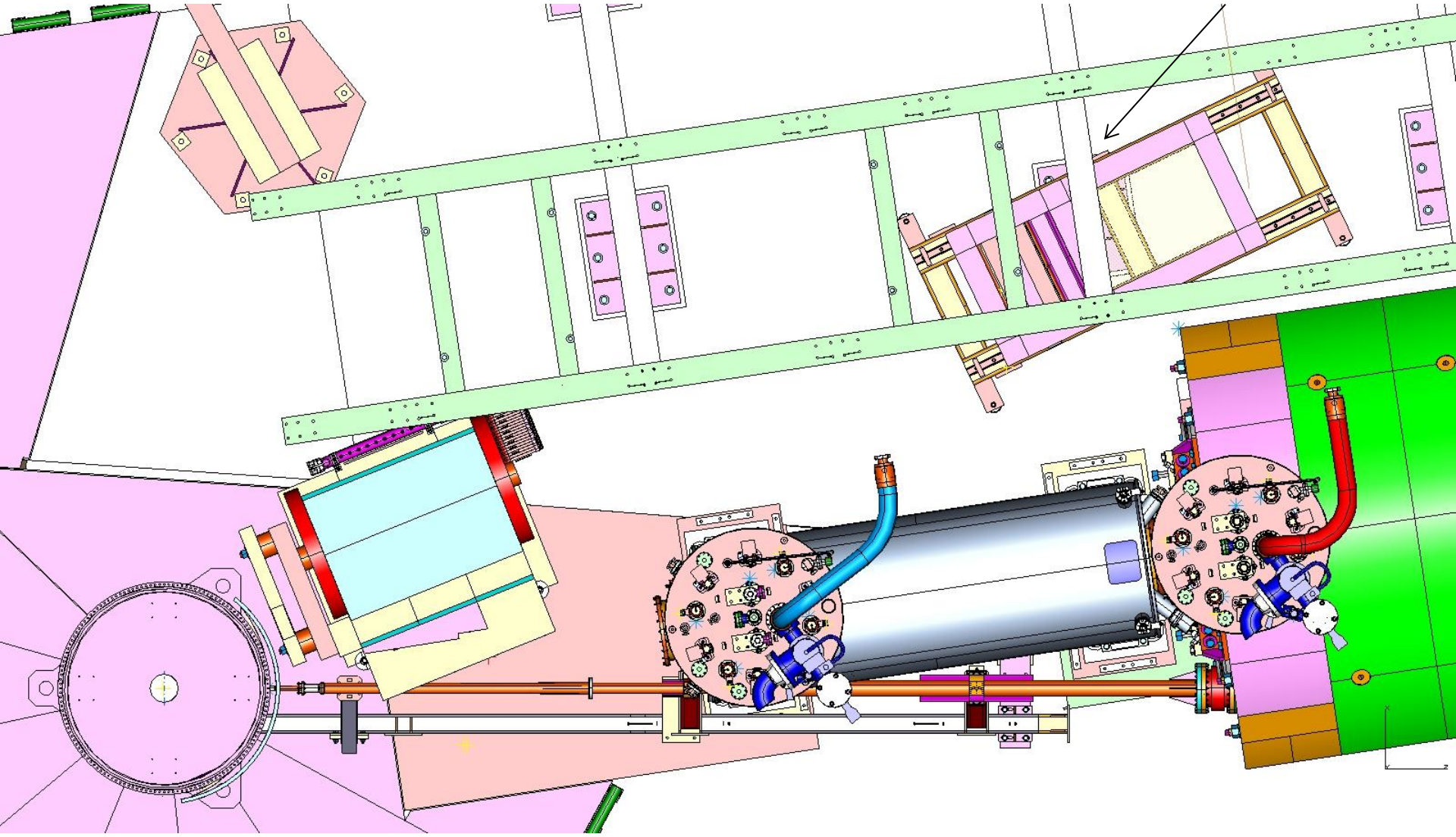
Question: Can we settle on 6.5 degree minimum angle for a detector distance of 4 meter?

Mike will get me slides to illustrate all of this more, but I did not receive them yet. If we agree on the question, it should take limited time to “freeze” the outside dimensions of the detector frame and pass them on to Carlos.

Detector at 3 meters, 14.5 deg



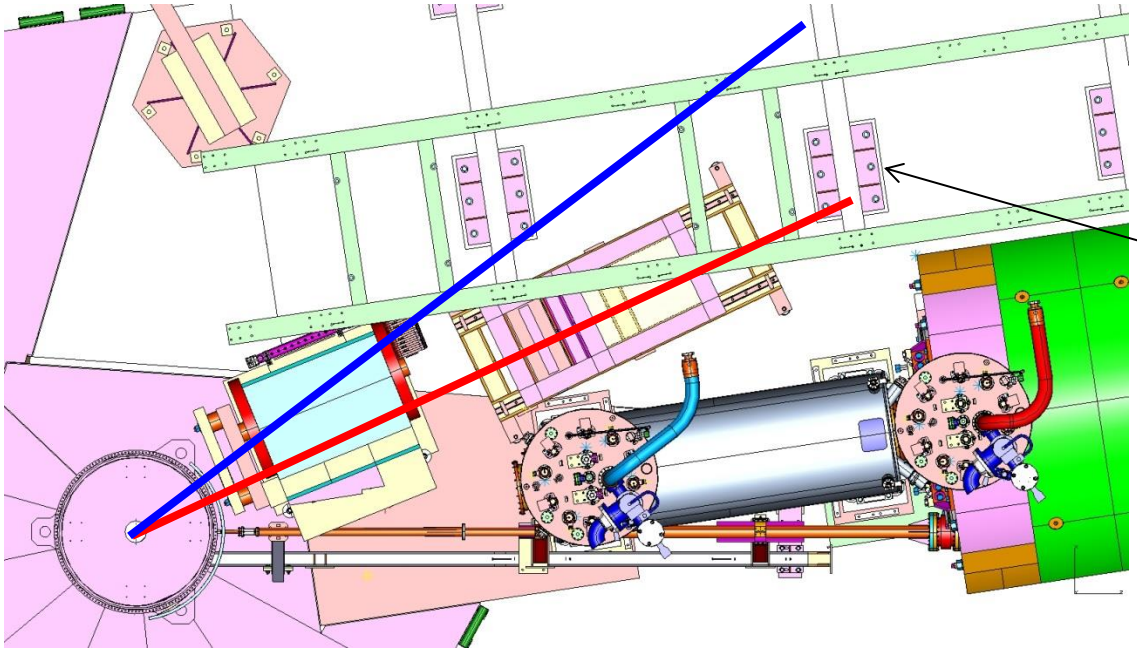
Detector at 5 meters, 14.5 deg



Originally thought this was all fine and asked Mike on the meeting of May 10th to only “tilt” the detector a bit more such that it would be able to slide through the first post and not hit the third one and we could potentially have a range of 3 meter to 6 meters…

But: at walkthrough of Hall C found that the post that now would need to be removed to slide the detector from 3 meter to 5 meters has the run safe box and other electrical connections on it, and directly behind it the water (LCW) lines.

So, we should simply settle for less overlap with the small-angle configuration (i.e. ~20 degrees or more only) and go "outside" that post.



Reuse of existing Thomson slides for detector motion:

Dear Mike,

I asked Walter and he remembered where he had put the old SOS detector slides.
I looked today and found all 12 of them in the Physics Storage area. Even if pieces are 24” segments, they are really each 2.43 meter long unless one cuts the bars.
I also found the old HES and HKS rails. Those are more sturdy and wanted to mention it to you if you need those for the PbWO4 weight. Look to me about 5 meter long each.

So, can you perhaps on your slides also add one or two with indications of these slides, and then we can see which ones work best for the NPS. The HKS/HES ones may also help for the magnet as some people want to move those.

I asked Walter to for now mark all slides as being needed for NPS, and then when you tell me what works best we can pick and relocate the ones we need.

Best regards, Rolf