NPS Decabling Procedure

Here we would like to discuss in detail the steps and outline for the disassembly of the NPS detector, in particular, we will cover the "decabling". Our thinking is very much oriented around the layers of the cabling as there are currently in the hall. With this in mind, the outline we propose is:

0. Preparations

1. Removal of the LED ribbon cables.

2. Removal of the water feeds and draining the detector.

3. Removal of the temperature sensor cables.

4. Removal of the LV cables.

5. Removal of the HV cables.

6. Removal of the signal cables from the patch panel to the detector.

We will now go into these layers in more detail. Note: we will refer to these cables in two different types broadly, these are short cables, which means they go from the distribution boards at the top of the SHMS to the NPS detector, and long cables which means they go in one run from the interior of the SHMS all the way to the NPS. Also, we recommend that the detector be pushed back to the 6m pin point to allow for ease of access.

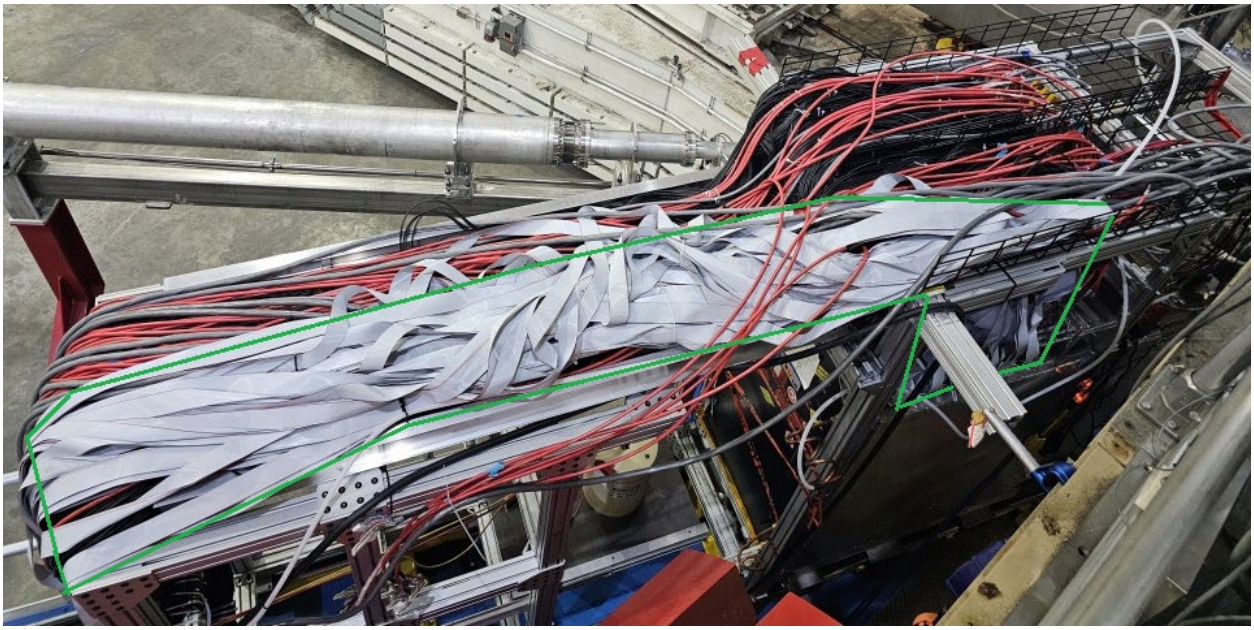
0. Preparations

a. **IMPORTANT!!!** Turn off all the HVs (2 crates for NPS and 1 slot for NDX) and LVs.

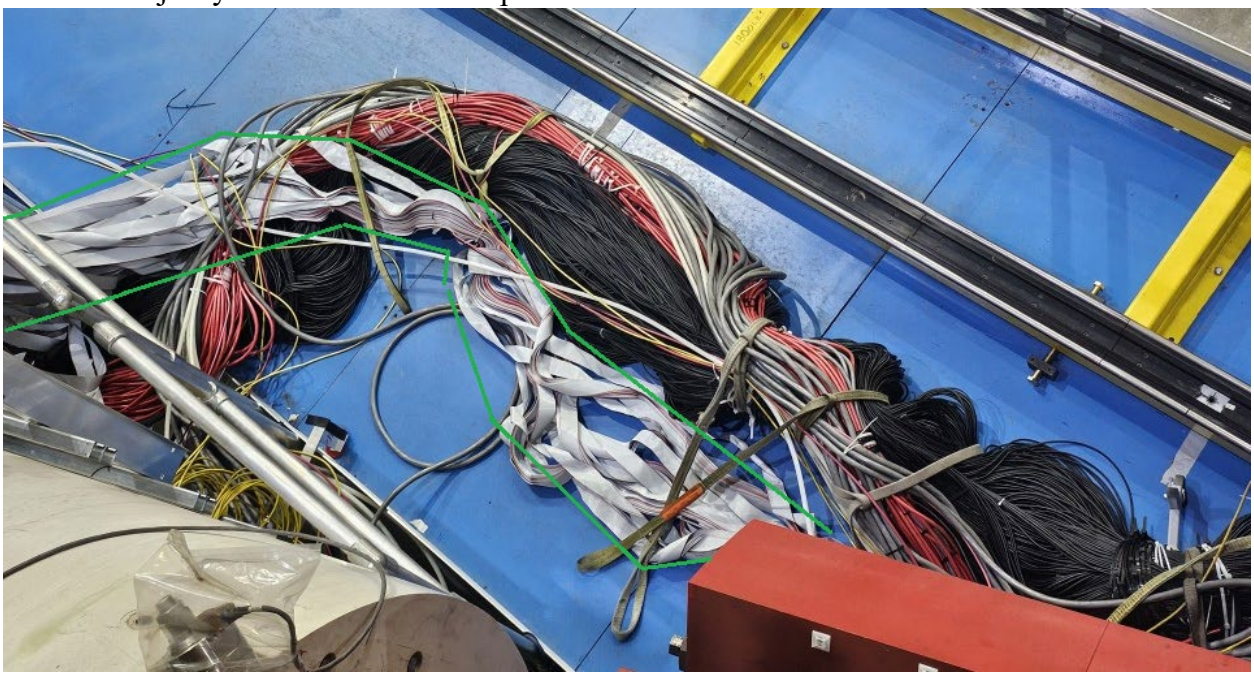
b. Removal of the water feeds and draining the detector. The water pipes that transport the chilled water into the detector will need to be drained as well as the detector, eventually the detector will need to be "winterized".

c. Removal of signal and HV cables of NDXs. These cables are on top of all the other cables and passed under the SHMS magnets. The yellow signal cables are easily broken if bent too much, so one has to be careful when removing them. (Check with Ellen)

1. **Removal of the LED ribbon cables**.



These are the ribbon cables that are responsible for distributing power to the LED system in the NPS, they are full-length cables, starting in the SHMS hut, then routing up through the roof, then down the side of the hut through the bundle, and onto the top of the detector (ref figures). Both ends of the cables are simple ribbon cable RA IDC style with latches; they are fragile and should be disconnected carefully. Beginning at the detector side once the connectors are removed the rest of the ribbon cables can be removed from the bundle easily as they are separate from the majority of the bundle on the platform.



Af uld be pull
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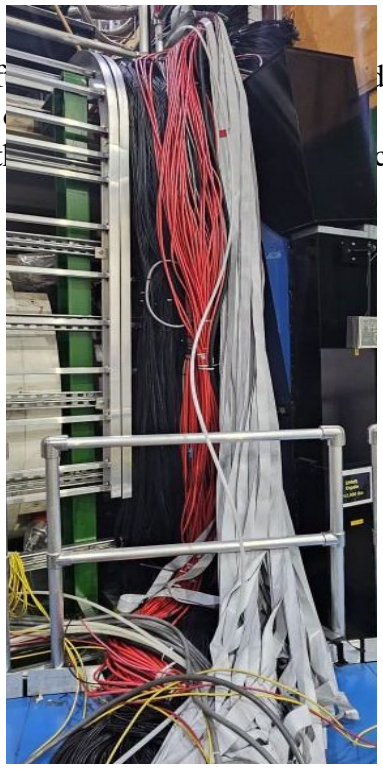
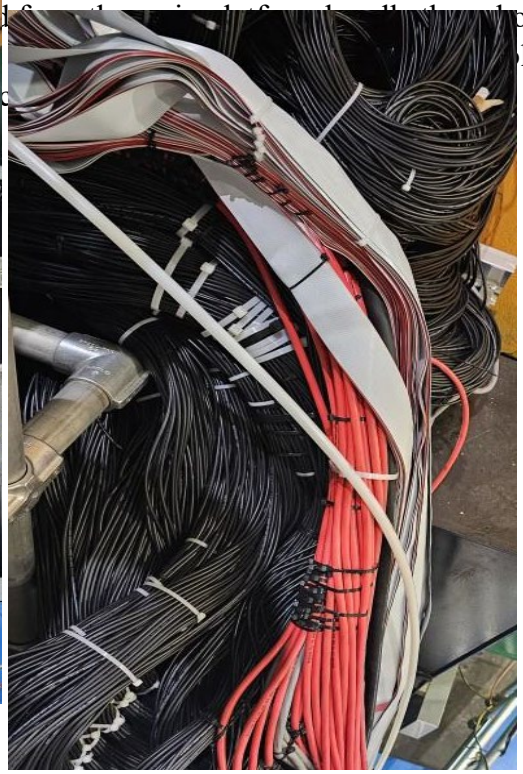
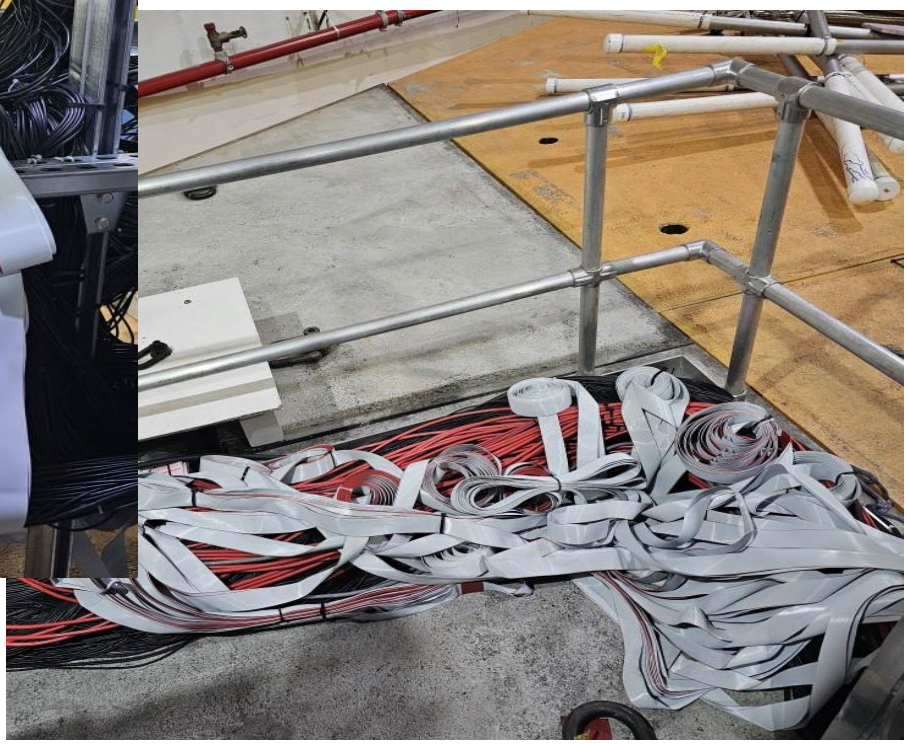




As the majority of it is on the roof it is the logical place to stage them for removal, this can be done by means of a small cargo net or other craneable container. The remainder from the interior of the hut ca of the SHMS, this will require at least two people on ladders in th eed from the cable trays running overhead. After these are bro d and spooled.

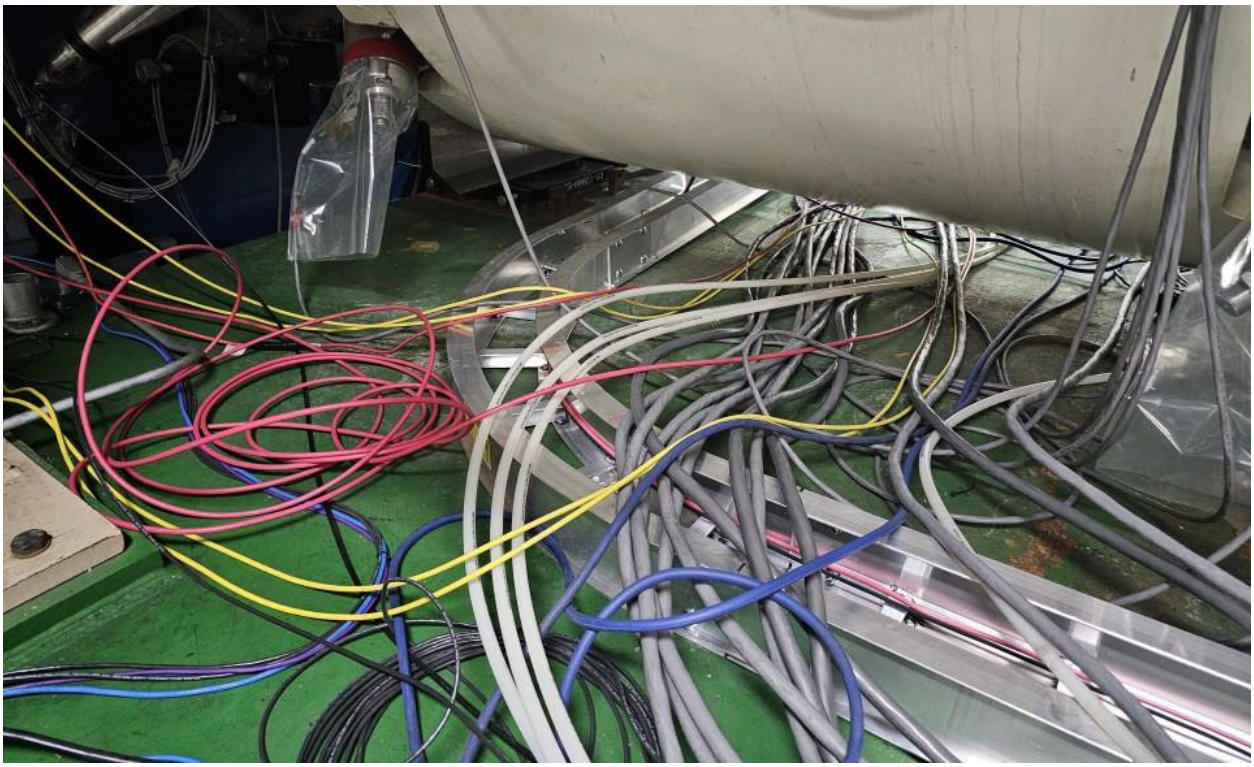


The one complication in this is that all of the ribbon cables are routed through a choke point at the base of the cable tray (see figs below). This can be
foot of the tray that goes to the ground, this piece of the cable tr
joining plate. The last segment of the cable tray isn't currently
is being supported by a unistrut frame. Once this piece is remov
more easily.

2. Removal of the water pipes and temperature sensor cables.

The next layer of connecting cables in the bundle are the cables that are routed to the NPS chiller, also included in this group are the water pipes that transport the chilled water into the detector. Once these water pipes are drained and disconnected they can be brought back under the SHMS magnets over to the side where the chiller is located (see fig below)

Similarly to the water feeds the temperature sensor cables are routed from the top of the detector and are then passed under the SHMS magnets to the Keysight mainframe. These cables are sitting on top of the next layer of cables on top of the NPS and are semi-separate in the main bundle so removing them is expedient and will make the next steps less complicated.



3. Removal of the LV cables.

These are another set of full-length cables that run all the way from the hut to the NPS. They sit on top of and beside the HV cables. They follow the same runs as the HV cables as well and have some slack coiled up in the cable bin on the second floor overlooking the drop-down (see Figs below). These should be treated in a similar fashion to the LED ribbon cables and the slack should be pulled up onto the top of the hut where they can be collected and then moved down wholesale.

4. Removal of the HV cables.

The next layer of cabling is the HV, these are another set of full-length cables that run all the way from the hut to the detector. Special care is needed with these cables as both of their ends are susceptible to damage, with the crate side connectors having multi-pin connectors and the detector side having Molex-style connectors. Once a cable has been disconnected from the detector or the crate side it would be safest to wrap the end securely prior to moving it further. Similar to the LV cables they also have a large amount of slack coiled up still on the cable basket, with this in mind, due to the simplicity of the runs on top of the hut and their weight it may be simpler to take them off individually so as to reduce the chance of damaging the cable ends. This can be done by separating one from the main bundle on the platform after it has been

disconnected from the top of the detector and then pulling it up to the secon
Once there the corresponding cable from inside the hut can be pulled up and
the second-floor platform and then can be removed.

5. Removal of the signal cables from the patch panel to the detector.

At this point the only remaining cables are the signal cables, fortunately, we only need to remove the segments that run from the detector to the patch panel on the top of the SHMS hut; still, this will be the most complicated item on the list. Beginning with the disconnection from the NPS detector itself, we will require the scissors lift to access the beam side of the detector to safely disconnect the left half of the Lemo's from their bulkhead connectors. The right half can be removed from the platform side by using a ladder. It is important to note that the disconnection of the Lemo cables via the scissors lift can take place earlier than this in the overall process and the cables can be left in place till the appropriate time; however, it may be best to work in tandem on both sides of the detector simultaneously so doing it at this point may be preferable. The connectors on the opposite end of the cables are at the patch panel located on

the top of the hut overlooking the cable bin on the second level. There is a railing in place so disconnecting them can be done safely, and can be done in parallel with the uncabling of the detector side as well.

With the detector side disconnected, we can then begin separating the individual bundles of the signal cables from the main bundle. There are approximately 90 bundles of 12 cables each plus spares, we estimate that each one of these bundles weighs ~40lbs and as such moving them will take significant effort. With both ends disconnected it would be easiest to begin unstacking the mass of cables (see fig below) on the second-floor platform in layers, top-down, freeing bundles as we go. They can then be passed down to the NPS platform where they can then be brought down, spooled up, and then placed into whatever long-term storage solution w on. During this process, it would also be wise to put the protective caps on the ends of and to bag the ends as well. It should also be noted here that we will be lending 200 o cables to another group for another experiment so we will only need to store the remai the s such.