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| NSCL Proton Detector |

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| February 29, 2016 |
|  9:30 EST |
| Phone Call |

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| Meeting called by: | Chris Wrede | Type of meeting: | Phone Call |
| Attendees: | Chris Wrede (CW) Lolly Pollacco (EP), David Perez-Loureiro (DPL) | Note taker: | DPL |
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## Minutes

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| Agenda item: | PCB connections and feedthroughs |  |  |

#### Discussion: CW asked EP about the connectors on the PCB board. EP met with the engineers at CERN and gave him March 14th as a deadline. We should get back from them by that time. EP pointed out that there will be direct output for the signals without need to meander in the PCB. It will be a 4-layer board with ~25 connectors. Finally we will not use Sub-D25 connectors for the signal but direct connectors for each individual pad. 12 of these connectors are actually provisional and it will be needed to test whether they are really necessary. The considered connectors are the very similar to the [Samtec SMA-MT](https://wwws.samtec.com/technical-specifications/default.aspx?seriesMaster=SMA-MT), which have better EM capabilities than the Sub-D25. Moreover, these connectors make the design cheaper, because they are soldered more easily. In addition, these connectors make the design more versatile, adding the possibility of adding up outputs, for instance. EP said also that we need to have a source to monitor the performance under pressure and temperature variations and that it is not possible to do this with the Sub-D25. LP pointed out that we can use the D25 as well of the anode signals, but it is more expensive and less versatile.

CW indicated that adding more feedthroughs to the flange will increase the chance to have gas leaks. LP said that there is no chance of leaking (each output has an elbow to avoid this). He also mentioned that each connector is tripled, that means, it is connected three times to the surface of the PCB

#### Conclusions:

There will be ~25 SMA-MT connectors on the PCB board side. No SubD-25. The new connectors have better Em capabilities and are more versatile

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| Action items | Person responsible | Deadline |
| * PCB design
 | CERN Engineers | March 14th |
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| Agenda item: | Biasing the Gating Grid (GG) |  |  |

#### Discussion:

EP said that the biasing of the Field Cage (FC )is reassured by the copper strips in the Kapton and the last rings of the FC. Everything is attached to the cathode side, in order to have all the HV feedthroughs on that side. However, they added some extra connectors to the anode PCB in case que need to bias the 200 V from that side due to the HV in the cathode side and the strong electric field therein. Actually, we have to investigate how to pass the cables from the cathode side with the low voltages (~200 V). We need to screen them

DPL asked how many connectors we are going to have the cathode side. EP replied at least 5 or 6. One for the cathode, another one for the Field cage (First ring in the resistive chain), three for the GG and the ground to close the circuit for the FC

#### Conclusions:

6 HV connectors on the Cathode side for all the biasing. 4 extra connectors on the anode side if there are problems the biasing from the cathode side.

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| Agenda item: | Longer active Volume? |  |  |

#### Discussion:

EP is quite reluctant to increase the length of the detector. If we make the detector longer, the voltage of operation will be the 6 kV instead of the ~5.5 kV of the present geometry. He also mentioned that there is a small correlation between the tension in the anode and the drift field. Increasing the length about 30% and keep the same electric field (200 V/cm) will require a very high voltage in the cathode. We have to investigate if the lower field works

#### Conclusions:

We need to investigate the performance of a longer detector in terms of beta background

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| Action items | Person responsible | Deadline |
| * Geant4 Simulations with the longer detector
 | DPL,MH |  |

## Other Information

EP mentioned the need of new electrostatics calculations regarding the embedded strip in the PCB to reduce the charge build-up and capacitance in the inter-strip region. He will send a detailed e-mail with the new calculations needed.

DPL asked for the order of magnitude for the capacitances on the anode. EP said they are quite high (~200 pF for each electrode in the anode). We need to reduce the capacitance, and he is thinking how to do it

EP travel plans: Arrival in March 14th. CW has to set up a meeting with the engineers for that afternoon (~3pm)