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| NSCL Proton Detector |

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| February 15, 2016 |
|  8:30 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: | Size of PCB Board and Field Cage dimensions |  |  |

#### Discussion:

CW pointed out EP’s idea on using the PCB board as the flange of the detector side and the concerns on the engineers on that in terms of mechanical design. CW asked the reason for the use of the PCB as flange EP gave reasons:

1. It makes easier to mount the detector.
2. Easier to handle and test.

EP suggested that adding a metal flange would work as well if needed, but he prefers the PCB as flange.

DPL asked for the thickness of the PDB board. EP answered 7mm thick or more. He suggested to ark the engineers for calculations on the deformation of the PCB board. He will send soon more details on the PCB board (# copper/PCB layers). He also mentioned the possibility of adding a stainless steels frame to the PDB for additional strength in the flange.

EP said that PCB and field cage dimensions should be defined soon in order to arrange travel to CERN. The most important to define is the size of the PCB board and the holes for the flange. We should define the final geometry ASAP to get into CERN’S queue soon. There are other bigger projects which will take longer and will delay our detector

#### Conclusions:

PCB acting as a flange preferred.

Geometry has to be defined ASAP

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| Action items | Person responsible |  |
| * Details on PCB (thickness, # layers and materials)
 | EP |  |
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| Agenda item: | Dates and funds for EP’s visit to NSCL |  |  |

#### Discussion:

Dates:

EP said that he will check his calendar looking for the most appropriate dates for the visit. He said that probably the month of March will be better dates. He said that he needs to meet with W. Mittig for half a day during his stay here.

Funding:

CW said we have money in our account that we can use to cover EP’s travel expenses. EP said he might have money too, but he has to check whether he can use it or not.

#### Conclusions:

EP will get back to us in two days for setting the dates for the visit.

CW and EP will check their respective accounts

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| Action items | Person responsible | Deadline |
| * Check calendar
 | EP |  |
| * Check for funding for EP’s visit in March
 | EP, CW |  |
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| Agenda item:  | Placement of resistors in Field Cage (FC) and FC Details |  |  |

#### Discussion:

EP said that resistors are mounted from the outer side of the FC. FC design will be carried out by EP and engineers at IRFU and CERN. The question that remains open is how to hold the FC in place in the middle of the detector.

Regarding the electrodes spacing, he wants to keep the original spacing (0.5 mm). This is related to space charge effects in the PCB.

EP suggested to wait for their design on the FC for designing the support structure for it. One of the ideas is to use a tube of a rigid material to keep placement and shape of FC. The two materials considered are PEEK and Plexiglas. DPL and EP agreed in search for both materials electrical properties. Simulations on the charge build up in this materials should also be done

EP also mentioned that he will work on the design of the FC and he will provide a Mockup of it in two weeks.

#### Conclusions:

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| Action items | Person responsible |  |
| * Investigate materials electrical properties
 | EP, DPL |  |
| * Mockup of FC
 | EP |  |
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| Agenda item: | Pumping/Filling procedure and Clean room needs |  |  |

#### Discussion:

EP described in detailed the procedure for the preparation of the detector. The idea is to get it ready and functional in the clean room and to seal it before sending it to the experimental area.

The procedure is the following:

1. Vacuum clean (10-5, 10-6) thoroughly in the clean room and bake it, before inserting the detector, because detector cannot handle more than 80° C (176° F). We need a blank and cap for the cleaning procedure.
2. After cleaning, insert the detector and fill the chamber with the active gas and test it with sources and cosmic rays. A system to hold a source has to be designed. EP has some ideas
3. Leave the detector filled with gas and transport it to the Experimental area.
4. Place the detector in the beam line
5. Leave the gas to circulate for ~1 day. Gas handling system needed in the experimental area.

Regarding the clean room needs, we want to be able to assemble de detector in the clean room and test it. When the detector if taken out from the clean room, it has to be fully operational and ready to be used. EP said that the cleanliness is related to the presence of ~4m particles. He said he will investigate the conditions of other rooms he have been working in and he will convert the conditions to the units RZ asked for. He also said that the needs are more demanding than the ones of AT-TPC group. Because our detector is more sensitive.

For storage, an air tight plastic box to keep the detector away from dust should suffice.

#### Conclusions:

“Cleaner” clean room than AT-TPC needs. Probably the portable tent will not be enough for us. He said he will investigate the conditions of other clean rooms. EP will establish a protocol for handling the detector.

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| Action items | Person responsible | Deadline |
| * Investigate cleaning room needs and “convert units”
 | EP |  |
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| Agenda item:  | Detector attachments to the beam line. Vacuum or not? |  |  |

#### Discussion:

We discussed how the detector is attached to beam line, either we connect it through vacuum or if it is isolated and the beam is transported through air to the detector. In principle, given the beam energy, it is not critical to go through air. Provided we account for the energy losses in the window and the air.

## Other Information

Another thing to be discussed is to define a protocol to proceed if the detector has to be removed because of sparking or other issues. EP suggested, that the easiest thing is probably to remove the whole chamber from its support. He also suggested that the detectors tests should be made with a higher voltage (8 kV) than the one required to operate the detector (6 kV) to be sure it will no spark. Of course this will condition the size of the detector and provide further constrains in the distances. EP suggested to keep the cathode part out of the SEGA barrel, so that we can increase the distance between the cathode and the chamber. We also need to ensure that the power supplies are able to provide 8kV for those tests.

As far as the Gating Grid power supply is concerned, the one design by the Spirit group here at NSCL does not work properly with AstroBox due to capacitance problems. Antti Saastamoinen found another power supply which fits our needs. CW should ask him for the reference of that Power supply.

EP also needs the dimensions of the CAD drawing of figure [Image001.png](https://wikihost.nscl.msu.edu/protondetector/lib/exe/fetch.php?media=image001.png). DPL will ask the engineer to provide such dimensions.

Regarding feedthroughs, EP, pointed out that he wants them to be able to operate with Argon at 200 torr, in case we want to go to lower pressures in the chamber.