

Monday, June 7, 21

Minutes of the DarkSide calibration meeting

03.06.2021

Participants Pierre Barrillon, Marco Carlini, Fabrice Hubaut, Alexander Kish, Pascal Pralavorio, Peter Skensved, Marie van Uffelen, Bruce Vogelaar, Hanguo Wang, Isabelle Wingerter-Seez.

Next meeting: In a month time. Pierre Barrillon will circulate a doodle poll in a couple of weeks to fix the date.

The INDICO agenda of the meeting is available at this [link](#). The files of the presentations are attached to the agenda.

Points to remember

1. **Layout of the calibration pipes: could one pipe run straight from the top to the middle/bottom of the TPC with a 10 degrees angle ?**
2. **No dead end tube ?**
3. **One single vertical pipe for the DD-gun ?**
4. **Pierre B. to send the encoders to Peter S.**
5. **Dry air and N2 gas ?**

1. Calibration system preliminary CAD integration in option C - Marco Carlini - Slides

- Marco Carlini presented the *current* state of the CAD integration for the DS20k detector, in the context of the option C design. So far, the only fixed position assignments are the four corners of the top cover, occupied by the Detector Support System (DSS) penetrations, because of mechanical constraints. The calibration pipes penetrations are, for the time being, located beyond the DSS's, outside the cover. (page 3)
 - page 4: The distance between the pipe axis and the TPC external wall has been maintained to 30 mm as much as possible. A portion of the pipe leading from the cryostat top towards the TPC has a 10 degrees slope
 - page 5 looking from the bottom
 - page 6 here CF35 flanges ; could be orbital welding
 - page 7 distance btw the pipe and the bottom of the TPC could be reduced by a couple of cm.
 - page 8 alternative ideas can be developed; they appear to be difficult as illustrated by the green circle showing the optimal positions of calibration exit through the
 - page 9 another alternative shift the plans; still interference wit
- *Peter Skensved* asks whether it could be feasible to have one tube running with a 10 degree angle straight to the bottom; will be discussed.
- *Pierre Barrillon* recalled the idea to have the DD gun at a fix location; may be do not need the DD gun to move around the TPC. The question of dead end pipe was brought up.
- *Peter S.* proposes to have one vertical pipe, a bit further away from the Ti vessel.
- Alex reminds that the DD-gun is more affected by the thickness of Gd than by the distance to the TPC surface.

2. Calibration pipes with Borexino - Bruce Vogelaar - Slides

Bruce Vogelaar gave a description of the way calibration sources were guided in the Borexino experiment.

- Bruce V. is concerned/worried by the idea of guiding sources in curve pipes; it appears to him challenging
- Page 2 Bruce shows that one could slide a tube inside a larger straight tube, with the source attached.
- Page 3 proposal for DS20k - Re-intrant penetration sealed pipes
- Make the cryo. more complicated.

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- Hanguo Wang: concerns about tube ending in the TPC and the possibility that parts get detached and cannot be extracted; therefore U-shape pipes are favoured.

3. Motor box components status - Peter Skensved - Slides

- Peter S. presented the status of the production of the motor box components. The first unit (out of four) is currently being assembled on the back plane.
- *Bruce V.* expressed concern about friction between the rope and the pipe; Peter S. responded that there is no friction (experienced in SNO+) with the identified rope (vec.....) and stainless steel.
- Pierre will send the encoders bought in winter 2020 at CPPM to Peter S.

4. Mock-up status - Pierre Barrillon - Slides

- Pierre B. presented the goal of the mock up test and the status report.
- A first attempt to filling the tank with LN2 is scheduled for the 07.07.2021.
- The U-pipe will be equipped with strain gages, temperature probes and one humidity sensor.
- *Bruce V.* questions the purpose of using dry air and a humidity sensor; why not use N2 gas ? Pierre B. replies that dry air is easier to access at CPPM.
- *Hanguo W.* follows Bruce in saying "you cannot use dry air; you are going to create an oxygen bomb". Only Oxygen will stay in the tube; would use N2.... **This question will be discussed for sure.**
- Alex points out that the humidity sensor should be at the inlet.

5. Calibration session next week (collaboration week) - Isabelle Wingerter-Seez

- Jelena Maricic has organised the calibration session of the collaboration week (cf INDICO agenda [link](#))
- We briefly discussed the organisation of the presentations:
 - Mock-up status - Pierre Barrillon
 - Simulation + Plan C layout Viktor
 - DD-gun