

Monday, February 22, 2021

## Minutes of the DarkSide calibration meeting

19.02.2021

**Participants** Pierre Barrillon, Alessio Caminata, Silvia Caprioli, Marco Carlini, Davide Franco, Fabrice Hubaut, Alexander Kish, Pascal Pralavorio, Peter Skensved, Hanguo Wang, Isabelle Wingerter-Seez.

**Next meeting: In a month time.** Pierre 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. Plan B presentation - Alessandro Caminata

- Concerning the new plan B, first discussions about calibration with Alex have taken place.
- Concerning the VETO, calibration would be easier as there would be no sector; no interference at the bottom between the TPC structure and the pipes.
- The two points that are important: TPC no more sealed; because of the Gd acrylic walls: neutrons from neutrons sources would be stopped; it should be possible to make holes in the 5-10 cm thickness Gd acrylic. First very preliminary results about the wall thickness show that a thickness of 10-15 cm provide a reasonable neutron rejection.
- David Franco: this acrylic wall prevents to use neutrons; so need to draw holes
- Discussion on the neutron gun...outside of the cryostat ?
- Pierre: does the TPC geometry exist ? Alessio C.: yes TPC exists, cryostat exists (7 m height), water tank (14 m height)
- The gamma part should be quite similar as for plan A.
- Davide F.: with the new scenario the calib. pipe should be similar; pipes are the same; the question is the impact of Gd.
- Alessio points to the structure at the top and at the bottom (see drawing in the file attached to the agenda): it may be possible to lay the pipes between the SiPM and the Gd-acrylic (question raised during Davide Franco's presentation - see below).
- Alex can simulate the sources w/o the pipes which are not yet integrated in the simulation

#### 2. Calibration below the TPC - Davide Franco

- See Davide's presentation attached on the agenda.
- Davide presents the status of calibration in DS50; he points out that in DS50 measurement of XY resolution for S2 was obtained from diffused sources, for which the position is a priori unknown.
- Davide concludes that with point like source below the TPC:
  - Good evt/evt selection with xy and drift time
  - Ideal for testing xy resolution as point like sources are well localised in xy
  - Ideal for testing S1 and S2 vs xy
- Pierre explains why we question the need to be able to run the sources at the bottom of the TPC: installing pipes below the TPC may be delicate; should be done if necessary.
- Davide: top could be used instead; difficulty for routing.
- Fabrice Hubaut asks whether the distance btw bottom of the TPC to pipes in plan B: will change; Alessio: yes, will be increased by the ~10 cm of Gd.
- Davide: could the pipe go between the LAr and the Gd ? Yes. Needs to be studied.
- Hanguo Wang expresses that several items can be optimised.

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### 3. Mockup - Pierre Barrillon

- Pierre presents the evolution of the mock-up since last meeting and the plans:
  - LN2 tank is ready
  - Preparing equipment with probes to measure tube position and temperature.
  - First tests week of 01.03.2021 at warm.

### 4. Calibration system fixation strategy - Pierre Barrillon

- Pierre introduced the topic by presenting a few slides which are available on the agenda. The center of the discussion is how to handle the sources and the wire during and outside the operation of the calibration system
- Peter Skensved describes how operations are done at SNO+; a lot of experience and expertise acquired there.
- The question is entered on where to hook the wire while the system is not in operation; during physics data taking.
- To prevent ice formation inside the tube, air will be pumped and therefore the valve below the glove box should be closed and the wire attached below the valve. Visibility from the glove box limited. Need to practice.
- Peter advocates to keep as many options open as possible.
- Marco: can the motor box be evacuated ? Peter: it depends how one makes the box.
- Small weight for the top rope instead of the hook ?
- Add a rim at the bottom of the glove box to avoid small things going down ?
- How do we bring the sources inside ?

### 5. Round table - Pierre Barrillon

- **Motor box components** Peter S.: Workshop back in full swing since this week; very little has happened in the production line since Christmas. No time estimate for the fabrication of the motor box components.
- **Motor purchase:** Anaheim automation 23MD motor with integrated control; Peter is in the process of ordering a motor of this model. He will test it and if satisfactory will buy three or four more and include them in the shipment from Queen's U. to CPPM
- **Orbital welding in LNGS** Marco C. checked that the orbital welding machine is available at LNGS which requires skilful operators as it is a fairly old system. Marco may go underground next week and investigate further.
- **Cryogenic consumption:** nothing from the calibration system
- **Any calibration tests on the test cryostat ?** Marco C. comments that the occupancy on the top of the cryostat has to be understood. If there are four chimneys, it should be possible.