Homework Questions
Review of DUNE-SP High Voltage System
CERN, June 4-5, 2019

1. Given that pDUNE will be warm around Spring 2020, can you consider/make a plan to try monitoring mechanical deformations, and evaluate their impact -if any- on the new mechanical changes that are proposed for DUNE?
2. Have you already evaluated all the tolerances relevant to the installation process?
3. HV feedthrough: the lessons learnt from pDUNE operation have been incorporated in the proposed design for DUNE. This includes the room-T design. How long it will take to move from the conceptual to the final design and what are the tests foreseen before releasing production? Is there a specific document listing all the requirements for this item with all the design changes that have been presented?
4. The engineering safety review of the engineering design document has just taken place, and the Board has provided a number of questions to the team. When the HV Consortium will respond to the engineering safety questions?
5. Can you comment on the QC of the connection between FC and CPA, and explain the consequences of losing that connection versus adding redundancy.
6. Can you explain the plans for qualification/validation of the engineering drawings from now till the FDR? Who is responsible for the final approval? are external experts included in the approval process?
7. FRP design relies mostly on tests and consultation of official guidelines. This calls for a careful analysis of all tests that need to be done for final qualification, agreed proper safety factors, and that all possible scenarios are considered in the calculations. Which mechanism (body) has been put in place to decide on the final qualification values?
8. Could you please show in detail the interface between endwalls and CPA field shaping strips: pDune had a small gap. How this is addressed and controlled?
9. Are the needs for instrumentation for the high voltage system fully defined and agreed with other consortia ? Please discuss them.
10. The HV consortium did not discuss hardware/(software) interlocks. Are these fully defined ? Could you please provide a list of the interlocks on the HV system that are currently in use in ProtoDUNE.
11. When do you expect to be able to present the result of the studies of the discharges in the field cage ? Are these likely to result in any design change ? Which elements of the detector design are going to be affected ?
12. Could you please discuss the redundancy in the electrical connections between the various elements of the HV detector ? Are there any connections where you think that it is necessary to build redundancy in the system ? (particularly worried by the HV bus on the CPA)
13. Can the monitoring capability of ProtoDune be revised, and a plan for pDUNEII be made?
14. Can you show the function (electrical/mechanical/grounding…) and design details of all the important connections between items, on boards, etc..